



## CHEMISTRY

### JEE (MAIN AND ADVANCED) CHEMISTRY

#### STOICHIOMETRY

##### ILLUSTRATIVE EXAMPLES

1. Potassium permanganate oxidises oxalic acid in sulphuric acid medium to give potassium sulphate, manganous sulphate, carbondioxide and water.

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2. Sulphuric acid oxidises hydroiodic acid to iodine and forms hydrogen sulphide and water.



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3. Manganese dioxide oxidises hydrochloric acid to chlorine and gives manganous chloride and water.



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4. Chlorine reacts with cold dilute caustic soda to give sodium chloride, sodium hypochlorite and water.



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5. Permanganate oxidises sulphite to sulphate in acidic solutions.



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6. Iodate oxidises chromic hydroxide and gives iodide and chromate in basic medium.



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7. Chromium metal in basic medium is oxidised in air to give chromic tetrahydroxide anion.



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8. Write phosphorous reacts with aqueous caustic soda to give hypophosphite and phosphine.



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9. Acetylene is oxidised by permanganate in acidic solutions to liberate carbondioxide.



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10. Calculate the weight of calcium carbonate required to produce carbon dioxide that is sufficient for conversion of one decimole sodium carbonate to sodium bicarbonate.



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11. What weight of magnesia is obtained by complete combustion of two grams of metal?



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12. When 50 grams of sulphur was burnt in air, 4 % of the impure residue is left over. Calculate the volume of air required at STP containing 21 % of oxygen by volume.



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**13.** What is the weight of calcium carbonate required for the production of 1 L of carbon dioxide at  $27^{\circ}\text{C}$  and 750 mm, by the action of dilute hydrochloric acid?



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**14.** Calculate the volume of  $\text{O}_2$  at STP required to burn completely 70 ml of acetylene.



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**15.** 2 L of hydrogen and 2.5 L of chlorine are allowed react in diffused light. Write the volume composition of the component gases after reaction.



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16. 100 mL of phosphorus pentachloride is totally decomposed to its trichloride at 1 atm and 546 °C. How many molecules of chlorine are formed?



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17. Methane undergoes slow atmospheric oxidation and produces carbonmonoxide. If  $2 \times 10^{22}$  oxygen molecules are used in such oxidation, what weight of methane is consumed?



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18. In a gas phase reaction, 50 kg of nitrogen and 10 g of hydrogen are mixed to produce ammonia. Identify the limiting reagent. Calculate the maximum amount of ammonia produced.



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19. 100 mL of each acetylene and oxygen are mixed. The mixture is strongly heated to complete the reaction and colled back to room temperature. What is the maximum volume of carbondioxide obtained. Why?



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20. A jug contains 2L of milk. Calculate the volume of the milk in  $m^3$ .



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21. How many seconds are there in 2 days ?



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SUBJECTIVE EXERCISE - 1 (Long answer questions)

1. State the law of definite proportions. Suggest one problem to understand the law, by working out that problem.



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### SUBJECTIVE EXERCISE - 1 (Short answer questions)

1. Define and explain molar mass.



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2. State and explain the law of conservation of mass.



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3. State the law of definite proportions. Suggest one problem to understand the law by working out that problem.



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4. State and explain the law of multiple proportions.



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5. State and explain Gay-Lussac's law of combining volumes.



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6. Explain the mole concept.



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7. There is no need that a given species must always possess equivalent weight always constant? Is it true? Explain.



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8. The equivalent weight of sulphuric acid is given as 98. How far it is true when sulphuric acid is a dibasic acid?



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9. Calculate the molecular weight of aluminum sulphate  $Al_2(SO_4)_3$



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10. Calculate the molar masses of  $C_{12}H_{22}O_{11}$  and  $CaCO_3$ .



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11. Find out the number of moles of sodium bicarbonate present in 5.08 gm of sodium bicarbonate ( $NaHCO_3$ ).



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12. Calculate the number of moles of helium in 6.46 gm of helium (at wt. of helium =4)



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13. Calculate the number of moles of zinc in 23.3 gm of zinc.



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### SUBJECTIVE EXERCISE - 1 (Very short answer questions)

1. What is the weight of 0.0590 mole of aspirin ( $C_9H_8O_4$ )



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2. Find the ratio of volumes of  $H_2$  and  $O_2$  reactions and also to the water vapour formed under similar condition when 1000 ml of  $H_2$  reacts with 500 ml  $O_2$  to form 1000 ml of water vapour.



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3. How many moles of glucose are there in

a) 540 gm glucose b) 900 gm glucose



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4. How many glucose molecules are present in 5.23 gm of glucose



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5. Calculate the volume occupied by 2 moles of  $NO_2$  at STP.



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6. Calculate the number of molecules present in  $1.12 \times 10^{-7}$  c.c. of a gas at STP.



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7. Calculate the real mass of one carbon atom



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## SUBJECTIVE EXERCISE - 2 (Short answer questions)

1. Distinguish between empirical and molecular formula



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2. How is empirical formula of a compound determined ?



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3. Give methods for estimating percentage of element.



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### SUBJECTIVE EXERCISE - 3 (Long answer questions)

1. Explain the different types of redox reactions.



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2. Explain the different types of redox reactions.



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### SUBJECTIVE EXERCISE - 3 (Short answer questions)

1. Calculate the oxidation number of hydrogen in different states making use of the following formulae.  $H$ ,  $HCl$ ,  $H_2O$ ,  $NaH$



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2. Calculate the oxidation number of oxygen in the following:  $O_2$ ,  $KO_2$ ,  $H_2O_2$ ,  $MgO$ ,  $Cl_2O$ ,  $OF_2$



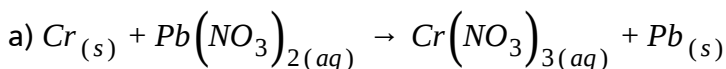
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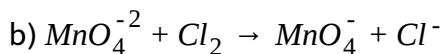
3. What is general oxidation number of oxygen in its compounds? Mention two exceptions, giving one example each, where oxygen shows other than general oxidation state.



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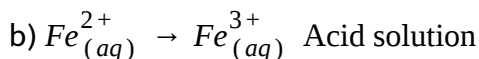
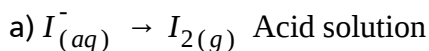
4. Balance the following equations by the oxidation number method.





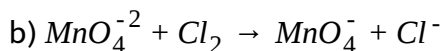
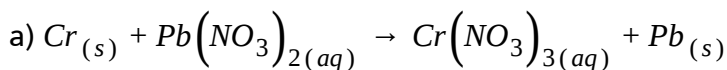
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5. Balance the following equations by the oxidation number method.



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6. Balance the following equations by the oxidation number method.



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7. Explain any two types of redox reactions with examples.



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8. Write the electrode reactions in a Daniel cell.



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9. Arrange the  $MnO_4^-$ ,  $Cr_2O_7^{2-}$  and  $V^{3+}$  in the increasing order of their oxidising power.



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10. Chemical analysis of a carbon compound gave the following percentage composition by weight of the elements present, carbon = 10.06 %, hydrogen = 0.84 %, chlorine = 89.10 %. Calculate the empirical formula of the compound.



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11. A carbon compound on analysis gave the following percentage composition, carbon 14.5%, hydrogen 1.8%, chlorine 64.46%, oxygen 19.24%. Calculate the empirical formula of the compound.



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12. 0.2g of an organic compound on analysis give 0.147g of carbondioxide, 0.12 g of water and 74.6 c.c of nitrogen at S.T.P. Calculate the weight percentages of constituents.



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13. The empirical formula of a compound is  $CH_2O$ . Its molecular weight is 90. Calculate the molecular formula of the compound.



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14. A compound contains 4.07 % hydrogen, 21.27 % carbon and 71.65 % chlorine. Its molar mass is 98.96g. What are its empirical and molecular formulas ?



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15. Combustion of 0.6gm of an organic compound gave 1.17gm of carbondioxide. 0.84 gm of water. Vapour density of the compound is equal to 22.4. The compound contains carbon, hydrogen and nitrogen. Calculate the molecular formula.



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16. For two redox couple  $A^{2+}/A$  and  $B^2/B$  the reduction potential values are -1.28V and +0.34V. Which is a strong reduction agent? Can both of them displace  $H_2$  from dilute hydro chloric acid? Why?



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17. How are the end points of titrations detected in the following reactions.

i)  $MnO_4^-$  oxidises  $Fe^{2+}$

ii)  $Cr_2O_7^{2-}$  oxidises  $Fe^{2+}$

iii)  $Cu^{2+}$  oxidises  $I^-$



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### SUBJECTIVE EXERCISE - 3 (Very short answer questions)

1. What is a combination reaction of redox reactions? Give example.



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2. Chemical decomposition need not involve redox process-Answer it with one example.



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3. Aluminothermit process is an example for which type of redox change?

Which substance is the reducing agent here?



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4. What are comproportionation reactions? Give example.



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5. What are comproportionation reactions? Give example.

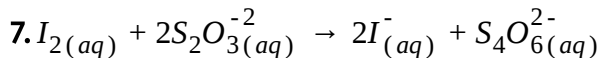


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6. The function of a salt bridge is



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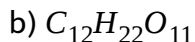
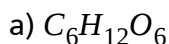


For the above titrimetric reaction how is the end point determined?



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8. Calculate the oxidation number of carbon in the following:



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9. What is the oxidation number of manganese in  $KMnO_4$ ?



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10. Calculate the oxidation number of sulphur in  $SO_4^{2-}$ ?



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11. What is the oxidation number of manganese in  $MnSO_4$ ?



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12. Calculate the oxidation number of iron in  $Fe_3O_4$ ?



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13. Calculate the oxidation number of sulphur in  $H_2S_2O_8$ ? (Hint: Two of the oxygens form peroxide bond)



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14. What is the common oxidation number of halogens, when they are in combined state with metals?



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**15.** Write the formulae for the following compounds.

a) Mercury (II) chloride

b) Nickel (II) sulphate

c) Tin (IV) oxide

d) Thallium (I) sulphate

e) Iron (III) sulphate

f) Chromium (III) oxide.



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**16.** Consider the elements Cs, Ne, I and F.

a) Identify the element that exhibits only negative oxidation state.

b) Identify the element that exhibits only positive oxidation state.

c) Identify the element that exhibit both positive and negative oxidation states

d) Identify the element which neither exhibit the negative nor does the positive oxidation state.



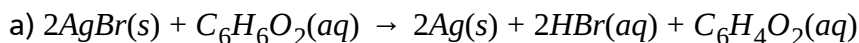
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17. Which of the following act both as oxidising as well as reducing agents?

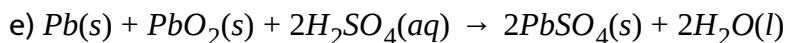
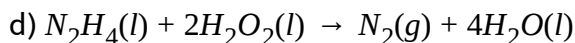
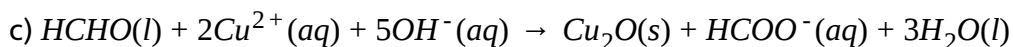
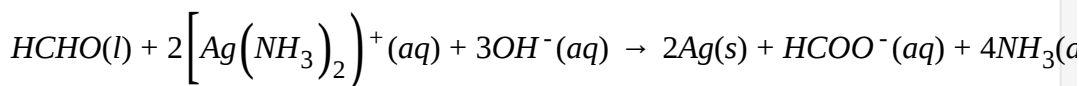


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18. Identify the substance oxidised, reduced, oxidising agent and reducing agent for each of the following reactions :

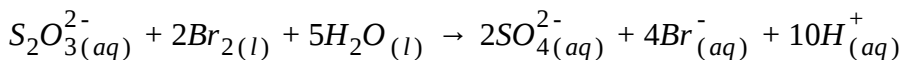
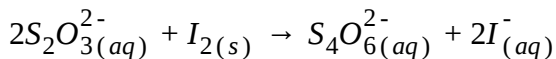


b)



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19. Consider the reactions :



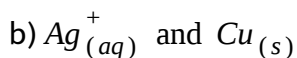
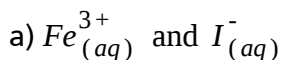
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20. Why does the same reductant, thiosulphate react differently with iodine and bromine ?



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21. Using the standard electrode potentials predict if the reaction between the following is feasible.



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22. Predict the products of electrolysis in each of the following

i) An aqueous solution of  $\text{CuSO}_4$  with Copper electrodes

ii) An aqueous solution  $\text{CuSO}_4$  with platinum electrodes



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23. Given the standard electrode potentials

$$K^+ / K = -2.93V, Ag^+ / Ag = 0.80V.$$

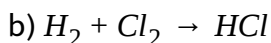
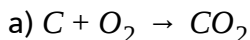
Which among them has greater reducing power ?

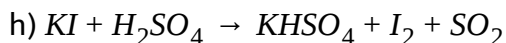
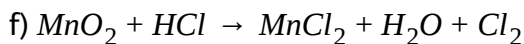
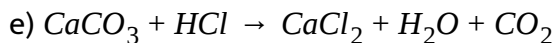
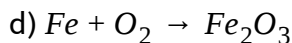
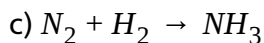


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#### SUBJECTIVE EXERCISE - 4 (Short answer questions)

1. Balance the following equations and write down the stoichiometric proportions.





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2. The volume of  $CO_2$  formed when 1 litre of  $O_2$  reacted with 2 lit of CO under the same condition is



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3. The approximate production of  $Na_2CO_3$  per month is  $4.24 \times 10^8 gm$ , while that of methyl alcohol is  $3.2 \times 10^8 gm$ . Which is produced more in terms of moles?



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4. What amount of  $\text{CaO}$  is produced by 1 gm of calcium with oxygen.

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5. What weight of  $\text{O}_2$  is obtained when 0.245gm of  $\text{KClO}_3$  decomposes completely to  $\text{KCl}$  and  $\text{O}_2$ :

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6. How much of lime,  $\text{CaO}$  can be obtained by the calcination of 400 gm of lime stone?

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7. What volume of  $\text{CO}_2$  is obtained at STP by heating 4 g of  $\text{CaCO}_3$  ?

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8. Calculate the volume of  $CO_2$  obtained at STP when 2.12 g of  $Na_2CO_3$  reacts with excess of dil  $HCl$ .



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9. What is the weight of  $NaHCO_3$  required to give 0.56 lit of  $CO_2$  at STP on heating ?



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10. What volume of  $NH_3$  is formed when 2.24lit of  $N_2$  combine with 4.48 litres of  $H_2$  at STP.



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11. An astronaut receives the energy required in his body by the combustion of 34gm of sucrose per hour. How much oxygen he has to

carry along with him for his energy requirement in a day?



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**12.** Calculate the volume of oxygen gas required at STP conditions for the complete combustion of 10cc of methane gas at  $20^{\circ}\text{C}$  and 770 mm pressure.



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**13.** What is the weight of calcium carbonate required for the production of 1 L of carbon dioxide at  $27^{\circ}\text{C}$  and 750 mm, by the action of dilute hydrochloric acid?

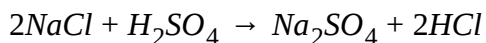


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**14.** Calculate the volume of  $\text{H}_2$  liberated at  $27^{\circ}\text{C}$  and 760 mm of Hg pressure by action by 0.6 g magnesium with excess of dil HCl.

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15. Calculate the amount of 90%  $H_2SO_4$  required for the preparation of 420 kg HCl.

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16. Calculate the weight of lime ( $CaO$ ) that can be prepared by heating 200 kg of lime stone ( $CaCO_3$ ) which is 90 % pure.

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17. Calculate the amount of water (g) produced by the combustion of 16 g of methane.

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18. How many moles of methane are required to produce 22g  $\text{CO}_2$  after combustion?



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19. Which is cheaper for generating hydrogen gas by action of excess acid on

a) Zn metal

b) Mg assuming the price of Zn is Rs 10/-per Kg and Mg as Rs 25/- per Kg.



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### SUBJECTIVE EXERCISE - 5 (Short answer questions)

1. Write on scientific notation.



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2. What is meant by significant figures? How are these counted?



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### SUBJECTIVE EXERCISE - 5 (Very short answer questions)

1. What is factor label method ?



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2. What is unit factor.



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3. Is zero a significant figure ?



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4. Add 12, 11, 18 and 1.012 and report in significant figures.



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## OBJECTIVE EXERCISE - 1

1. Chemical equation is balanced according to the law of

- A. Multiple proportions
- B. Reciprocal proportions
- C. Conservation of mass
- D. Definite proportions

**Answer: C**



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2. (A): In Haber's process,  $N_2$  and  $H_2$  combine in 1 : 3 volume ratio

(R): Gases combine in simple volume ratio

- A. Both A and R are true and R is the
- B. Both A and R are true but R is not the correct explanation of A
- C. A is true but R is false
- D. A is false but R is true

**Answer: A**



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3. Percentage of copper and oxygen in samples of  $CuO$  obtained by different methods were found to be the same. This proves the law of

- A. Multiple proportions
- B. Reciprocal proportions
- C. Conservation of mass



D. Constant proportions

**Answer: A**



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4. The law of conservation of mass holds good for all of the following except

A. All chemical reactions

B. Nuclear reactions

C. Endothermic reactions

D. Exothermic reactions

**Answer: B**



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5. "The total mass of reactants is always equal to the total mass of products in a chemical reaction." This statement is known as

- A. Law of conservation of mass
- B. Law of definite proportions
- C. Law of equivalent weights
- D. Law of combining masses

**Answer: A**



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6. In the reaction between hydrogen and oxygen gives water vapour, the ratio of volumes is 2 : 1 : 2. This illustrates the law of

- A. conservation of mass
- B. combining weights
- C. combining volumes

D. all the above

**Answer: C**



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7. Law of combining volumes was proposed by

A. Lavoisier

B. Gay Lussac

C. Avogadro

D. Dalton

**Answer: B**



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8. Two samples of lead oxide were separately reduced to metallic lead by heating in a current of hydrogen. The weight of lead from one oxide was half the weight of lead obtained from the other oxide. The data illustrates.

- A. Law of reciprocal proportions
- B. Law of constant proportions
- C. Law of multiple proportions
- D. Law of equivalent proportions

**Answer: C**



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9.

LIST - 1

A) Law of conservation of Mass

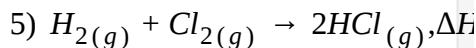
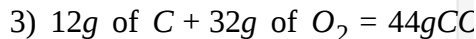
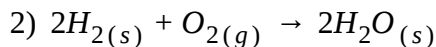
B) Avogadro's Law

C) Gay-Lussac's Law of combining volumes

D) Law of conservation of energy

LIST - 2

1)  $V_1/V_2 = n_1/n_2$



A.  $\frac{A}{3} \frac{B}{1} \frac{C}{4} \frac{D}{5}$

B.  $\frac{A}{3} \frac{B}{1m} \frac{C}{5} \frac{D}{4}$

C.  $\frac{A}{3} \frac{B}{1} \frac{C}{2} \frac{D}{5}$

D.  $\frac{A}{1} \frac{B}{2} \frac{C}{4} \frac{D}{5}$

Answer: A



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10. Carbon and oxygen combine to form two oxides, carbon monoxide and carbond dioxide in which the ratioi of the weights of carbon and oxygen is respectively 12:16 and 12:32. these figures illustrate the

- A. Law of multiple proportions
- B. Law of reciprocal proportions
- C. Law of conservation of mass
- D. Law of constant proportions

**Answer: A**



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**11.** Two gaseous samples were analysed. One contained 1.2 g of carbon and 3.2 g of oxygen. The other contained 27.3% carbon and 72.7% oxygen. The experimental data is in accordance with

- A. Law of conservation of mass
- B. Law of definite proportions
- C. Law of reciprocal proportions
- D. Law of multiple proportions

**Answer: B**



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**12.** The molar volume of any gas at STP is

A. 1 litre

B. 22.414 lit

C.  $6.02 \times 10^2$  lit

D. 22.414 ml

**Answer: B**



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**13.** One gram - atom of oxygen is

A. 1 g of oxygen

B. 16 g of oxygen

C. 22.4 g of oxygen

D. 8 g of oxygen

**Answer: B**



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**14.** One gram molecule of oxygen is

A. 16 gms of oxygen

B. 32 gms of oxygen

C. 8gms of oxygen

D. 1gm of oxygen

**Answer: B**



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15. Avogadro number is

- A. The number of atoms in one gram-atomic-weight
- B. The number of molecules in one gram molecular-weight
- C. The number of atoms in 0.012 kg of  $C - 12$
- D. all of these

Answer: D



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16. A mole is define so

- A) the amount of substance containing the same number of chemical units as the number of atoms in exactly 12g of  $C^{12}$
- B) the amount of substance containing Avogadro number of chemical units
- C) the unit for expressing amount of a substance

A. A only

B. B only

C. C only

D. all

**Answer: D**



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**17.** The mass of a mole of hydrogen atoms is

A.  $1.008g$

B.  $2.016g$

C.  $6.02 \times 10^{23}g$

D.  $1.008a\mu$

**Answer: A**



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18. The molar mass of hydrogen is

A.  $1.008g$

B.  $2.016g$

C.  $6.02 \times 10^{23}g$

D.  $2.016a\mu$

**Answer: B**



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19. One mole of atoms of oxygen represents

A.  $6.02 \times 10^{23}$  atoms of oxygen

B. 32 g of oxygen

C. 22.4 L of  $O_2$  at STP

D. 8g of oxygen

**Answer: A**



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**20.** One mole of molecules of dioxygen represents

A.  $6.02 \times 10^{23}$  molecules of oxygen

B. 8 gms of oxygen

C. 16 g of  $O_2$

D. 11.2 L of  $O_2$  at STP

**Answer: A**



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**21.** One mole of sodium represents

A.  $6.02 \times 10^{23}$  atoms of sodium

B. 46 gms of sodium

C. 11 g of sodium

D. 34.5gt of sodium

**Answer: A**



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**22.** The charge present on 1 mole electronsis

A. 96500 Coulombs

B. Coulomb

C.  $1.60 \times 10^{-19}C$

D. 0.1 Faraday

**Answer: A**



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23. The weight of 0.1 mole of  $\text{Na}_2\text{CO}_3$  is

A. 106 g

B. 10.6 g

C. 5.3 g

D.  $6.02 \times 10^{22} \text{g}$

**Answer: B**



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24. The molar mass of a substance is 20g. The molecular mass of the substance is

A. 20 g

B. 20 a.m.u

C. 10 g

D. 10 a.m.u

**Answer: B**



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**25.** Avogadro number of helium atoms have a mass of

A. 2g

B. 4g

C. 8gms of oxygen

D.  $4 \times 6.02 \times 10^{23}g$

**Answer: B**



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**26.** The volume of two moles of oxygen at STP

A. 22.4 L

B. 11.2 L

C. 40 L

D. 44.8 L

**Answer: D**



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27. The following property of a gas does not vary with pressure and temperature.

A. density

B. volume of a mole

C. volume

D. vapour density.

**Answer: D**



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28. The ratio between the number of molecules in equal masses of nitrogen and oxygen is

A. 7:8

B. 1:9

C. 9:1

D. 8:7

**Answer: D**

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29. The gas which is twice as dense as oxygen under the same conditions is

A. Ozone

B. Sulphur trioxide

C. Sulphur dioxide

D. Carbon dioxide

**Answer: C**



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**30.** 1 mole of water vapour is condensed to liquid at  $25^{\circ}\text{C}$ . Now this water contains

i) 3 moles of atoms

ii) 1 mole of hydrogen molecules

iii) 10 moles of electrons

iv) 16 g of oxygen The correct combination is

A. (i) & (ii) are correct

B. (i) & (iii) are correct

C. (i) & (iv) are correct

D. All are correct

**Answer: D**



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**31.** A chemical equation is always balanced with respect which one of the following

(i) Number of atoms (ii) Number of molecules

(iii) Number of moles (iv) Mass

A. Only i is correct

B. Only iii correct

C. Only iv Correct

D. Both i & iv correct

**Answer: D**



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32. Which of the following has highest mass?

A. One gram atom of Iron

B. 5 moles of  $N_2$

C.  $10^{24}$  carbon atoms

D. 44.8 lit of He at STP

**Answer: B**



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33. 1 gram of hydrogen contains  $6 \times 10^{23}$  atoms. Then 4 grams of He contains

A.  $6 \times 10^{23}$  atoms

B.  $12 \times 10^{23}$  atoms

C.  $24 \times 10^{23}$  atoms

D.  $1.5 \times 10^{23}$  atoms

**Answer: A**



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**34.** Elements 'A' and 'B' combine in the ratio of their

- A. Atomic weights
- B. Molecular weights
- C. Equivalent weights
- D. Mass numbers

**Answer: C**



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**35.** Molecular weight of orthophosphoric acid is  $M$ . Its equivalent weight is

A.  $3M$

B.  $M$

C.  $\frac{M}{2}$

D.  $\frac{M}{3}$

**Answer: D**



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**36.** Which of the following acid has the same molecular weight and equivalent weight ?

A.  $H_3PO_2$

B.  $H_3PO_2$

C.  $H_3PO_4$

D.  $H_2SO_4$

**Answer: A**

 [Watch Video Solution](#)

37. The equivalent mass of  $\text{CaCO}_3$

- A. 100
- B. 50
- C. 33.3
- D. 25

**Answer: B**

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38. The following is not a fixed quantity

- A. atomic weight of an element
- B. equivalent weight of an element (or) compound
- C. molecular weight of a compound

D. formula weight of a substance

**Answer: B**



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**39.** Equivalent weight of  $K_2Cr_2O_7$  as oxidant in acidic medium is

A. 24.5

B. 49

C. 147

D. 296

**Answer: B**



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**40.** The equivalent weight of Bayer's reagent is



A. 31.6

B. 52.6

C. 79

D. 158

**Answer: B**



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**41.** Molecular weight of  $KMnO_4$  is "M". In a reaction  $KMnO_4$  is reduced to  $KMnO_2$ . The equivalent weight of  $KMnO_4$ , is

A. M

B.  $\frac{M}{2}$

C.  $\frac{M}{3}$

D.  $\frac{M}{5}$

**Answer: A**

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42. When Ferrous sulphate acts as reductant, its equivalent weight is

- A. twice that of its molecular weight
- B. equal to its molecular weight
- C. one-half of its molecular weight
- D. one-third of its molecular weight

**Answer: B**

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43.  $2H_2O \rightarrow 4e^- + O_2 + 4H^+$ . The equivalent weight of oxygen is

- A. 32
- B. 16
- C. 8

D. 4

**Answer: C**



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**44.** In acidic medium dichromate ion oxidises ferrous ion to ferric ion. If the grammolecular weight of potassium dichromate is 294 gm, its equivalent weight is

A. 294

B. 147

C. 49

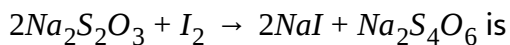
D. 24.5

**Answer: C**



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45. The equivalent weight of hypo in the reaction [M is molecular weight]



A. M

B.  $\frac{M}{2}$

C.  $\frac{M}{3}$

D.  $\frac{M}{4}$

**Answer: A**



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46. (A) : Equivalent weight of Cu in CuO is 63.6 and in  $\text{Cu}_2\text{O}$  is 31.8.

(R) : Equivalent weight of an element =  $\frac{\text{Atomic weight of an element}}{\text{Valency of the element}}$

A. Both A and R are true and R is the correct explanation

B. Both A and R are true but R is not the correct explanation of A

C. A is true but R is false

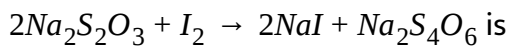
D. A is false but R is true

**Answer: D**



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**47.** The equivalent of iodine in the reaction



[M is molecular weight]

A. M

B.  $\frac{M}{2}$

C.  $\frac{M}{3}$

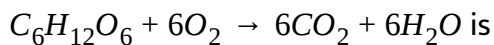
D. 2M

**Answer: B**



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48. The equivalent weight of glucose in the reaction



[M is molecular weight]

A.  $\frac{M}{4}$

B.  $\frac{M}{12}$

C.  $\frac{M}{24}$

D.  $\frac{M}{48}$

Answer: C



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- |     | Medium of reaction | Equivalent weight of $KMnO_4$ |
|-----|--------------------|-------------------------------|
| 49. | A) Acidic          | a) 158                        |
|     | B) Neutral         | b) 79                         |
|     | C) Strongly basic  | c) 52.6                       |
|     | D) Weakly basic    | d) 31.6                       |

The correct match is

A.  $A - d, B - c, C - a, D - c$

B.  $A - d, B - c, D - a, D - b$

C.  $A - d, B - b, C - a, D - c$

D.  $A - d, B - c, C - a, D - a$

**Answer: A**



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**50.** The number of millimoles of  $H_2SO_4$  present in 5 litres of  $0.2NH_2SO_4$  solution is

A. 500

B. 1000

C. 250

D.  $0.5 \times 10^{-3}$

**Answer: A**

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51. The number of Glucose molecules present in 10 ml of decimolar solution is

A.  $6.0 \times 10^{20}$

B.  $6.0 \times 10^{19}$

C.  $6.0 \times 10^{21}$

D.  $6.0 \times 10^{21}$

**Answer: A**

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52. 0.1 gram mole of urea is dissolved in 100g. of water. The molality of the solution is

A. 1 m



B. 0.01 M

C. 0.01 M

D. 1.0 M

**Answer: A**



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**53.** Aqueous NaOH solution is labelled as 10 % by weight mole fraction of the solute in it is

A. 0.05

B. 0.0476

C. 0.052

D. 0.52

**Answer: B**



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54. 6 g. of Urea is dissolved in 90 g. of water. The mole fraction of solute is

A.  $1/5$

B.  $1/50$

C.  $1/51$

D.  $1/501$

Answer: C



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LIST - 1

(Molecules)

A) Glucose

B) Oxalic acid

55. C) Inorganic Benzene

C) Inorganic Benzene

D) Oxygenated water

LIST - 2

(Empirical formula)

1)  $BNH_2$

2)  $CH_2O$

3)  $CH$

4)  $CHO_2$

4)  $CHO_2$

5)  $HO$

The correct match is

A.  $\frac{A}{3} \quad \frac{B}{5} \quad \frac{C}{2} \quad \frac{D}{4}$

B.  $\frac{A}{2} \quad \frac{B}{4} \quad \frac{C}{1} \quad \frac{D}{5}$

C.  $\frac{A}{1} \quad \frac{B}{3} \quad \frac{C}{2} \quad \frac{D}{4}$

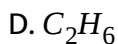
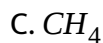
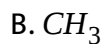
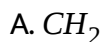
D.  $\frac{A}{4} \quad \frac{B}{2} \quad \frac{C}{1} \quad \frac{D}{3}$

**Answer: B**



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**56.** A compound contains carbon and hydrogen in the mass ratio 3 : 1. The formula of the compound is



**Answer: C**



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57. Assertion A: Empirical formula of glucose or that of acetic acid is  $CH_2O$ .

Reason(R): If percentage composition of elements is same, then empirical formula is same.

The correct answer is

- A. Both A and R are true and R is the correct explanation
- B. Both A and R are true but R is not the correct explanation of A
- C. A is true but R is false
- D. A is false but R is true

**Answer: A**



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58. The percentage of oxygen in  $NaOH$  is

A. 40

B. 6

C. 8

D. 20

**Answer: B**



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**59.** The empirical formula of acetic acid is the same as that of

A. Sucrose

B. Glucose

C. Oxalic acid

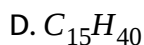
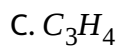
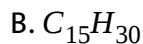
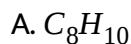
D. Formic acid

**Answer: B**



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60. A compound contains 90 %  $C$  and 10 %  $H$ . The empirical formula of the compound is



**Answer: C**



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61. 0.14 g of an element on combustion gives 0.28 g of its oxide. What is that element ?

A. Nitrogen

B. Carbon

C. Fluorine

D. Sulphur

**Answer: C**



**Watch Video Solution**

**62.** (A): Oxidation state of carbon in  $C_6H_{12}O_6$  is zero.

(R) : Oxidation state of carbon in all organic compounds is zero.

A. Both A and R are true and R is the correct explanation

B. Both A and R are true but R is not the correct explanation of A

C. A is true but R is false

D. A is false but R is true

**Answer: C**



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63. Oxidation state of N in  $N_3H$  is

A.  $+1/3$

B.  $+3$

C.  $-1/3$

D.  $-1$

Answer: C



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64. Oxidation number of C in  $CH_2O$  is

A.  $-2$

B.  $+2$

C.  $0$

D.  $4$



**Answer: C**



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**65.** Oxidation state of Ni in  $Ni(CO)_4$  is

A. 0

B. 4

C. 8

D. 2

**Answer: A**



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**66.** Oxidation state of Fe in  $K_4[Fe(CN)_6]$

A. +6

B. +4

C. +2

D. +5

**Answer: C**



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**67.** Oxidation number and valency of oxygen in  $OF_2$  are

A. +1, 2

B. +2, 2

C. +1, 1

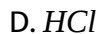
D. +2, 1

**Answer: B**



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68. In which of the following the oxidation state of chlorine is +5 ?



**Answer: B**



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69. All elements commonly exhibit an oxidation state of

A. +1

B. -1

C. zero

D. +1

**Answer: C**



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**70.** The maximum oxidation state that fluorine exhibits is

A. -1

B. zero

C. +1

D. +2

**Answer: B**



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**71.** The element that always exhibits a negative oxidation state in its compounds is

A. Nitrogen

B. Oxygen

C. Fluorine EQU

D. Chlorine

**Answer: C**



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**72.** The minimum oxidation state that nitrogen exhibits is

A. -2

B. -3

C. -4

D. -5

**Answer: B**



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73. In the conversion of  $K_2Cr_2O_7$  to  $K_2CrO_4$  the oxidation number of the following changes

- A. K
- B. Cr
- C. Oxygen
- D. None

**Answer: D**



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74. The oxidation number of 'Mn' in potassium permanganate is

- A. +6
- B. +7
- C. +5

D. +8

**Answer: B**



**Watch Video Solution**

**75.** The oxidation number of 'N' in  $NH_3$  is

A. +1/3

B. 0

C. -3

D. 1

**Answer: C**



**Watch Video Solution**

**76.** What is the oxidation state of carbon in carbondioxide?

A. +2

B. +4

C. +6

D. +1

**Answer: B**



**Watch Video Solution**

**77.** In which of the following compounds oxygen exhibits an oxidation state of +2?

A.  $H_2O$

B.  $H_2O_2$

C.  $OF_2$

D.  $H_2SO_4$

**Answer: C**



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78. The oxidation number of sulphur in  $S_8$ ,  $S_2F_2$  and  $H_2S$  are

- A. 0, + 1 and - 2
- B. +2, + 1 and - 2
- C. 0, + 1 and + 2
- D. -2, + 1 and - 2

Answer: A

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79. In the conversion of  $CrO_4^{-2} \rightarrow Cr_2O_7^{-2}$ , the oxidation number of oxygen

- A. increases
- B. decreases

C. becomes zero

D. remains unchanged

**Answer: D**



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**80.** Oxidation number of carbon is zero in the compound

A. methyl chloride

B. chloroform

C. glucose

D. carbon tetrachloride

**Answer: C**



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LIST - 1

(Oxidation state)

A) + 3

81. B) + 1

C) 0

D) + 5

LIST - 2

(Substance)

1) Nitrogen

2) Nitrous oxide

3) Nitrate ion

4) Hydroxylamine

5) Nitrite ion

The correct match is

A. 

<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
1	4	3	2

B. 

<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
5	2	4	3

C. 

<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
4	5	3	1

D. 

<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
5	2	1	3

**Answer: D**



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82. If three electrons are lost by  $Mn^{3+}$ , its final oxidation state would be

A. 0

B. +6

C. +2

D. +4

**Answer: B**



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**83.** Oxidation number and Covalency of sulphur in  $S_8$  molecule are respectively

A. 6 and 8

B. 0 and 8

C. 0 and 2

D. 6 and 2

**Answer: C**



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84. The oxidation state of Barium in  $Ba(H_2PO_2)_2$  is

A. +3

B. +2

C. +1

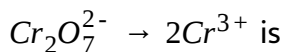
D. -1

**Answer: B**



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85. The number of electrons involved in the half reaction



A. 3

B. 6

C. 5

D. 0

**Answer: B**



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**86.** Sum of the oxidation numbers of carbon in acetaldehyde is

A. -2

B. +2

C. -4

D. -1

**Answer: A**



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**87.** In bleaching powder oxidation states of *Cl* are

A. -1, + 2

B. -2, + 1

C. -1, + 1

D. -2, + 1

**Answer: C**



**Watch Video Solution**

**88.** Oxidation number of sulphur in oleum ( $H_2S_2O_7$ ) is

A. +4

B. +2

C. -2

D. +6

**Answer: D**



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89. The compound formed in the brown ring test has the formula

$\left[Fe(H_2O)_5NO\right]SO_4$ . The oxidation state of iron in it is

A. +1

B. +2

C. +3

D. zero

**Answer: A**



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90. In the reaction of chlorine with dry slaked lime, the oxidation number of chlorine changes

i) from -1 to +1

ii) from +1 to -1

iii) from zero to -1



iv) from zero to +1

The correct combination is

A. Only ii & iii are correct

B. iii & iv are correct

C. i & ii are correct

D. All are correct

**Answer: B**



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**91.** When copper is added to a solution of silver nitrate, silver is precipitated. This is due to

i) oxidation of silver

ii) oxidation of copper

iii) oxidation of silver

iv) reduction of silver ion

The correct combination is

- A. Only iii and iv are correct
- B. Only i and ii are correct
- C. Only ii and iv are correct
- D. All are correct

**Answer: C**



**Watch Video Solution**

**92.** Oxidation numbers of sodium, mercury in sodium amalgam are

- A. zero, zero
- B. +1, - 1
- C. -2, + 2
- D. 0, + 1

**Answer: A**



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93. Chlorine is passed into dilute, cold  $KOH$  solution. What are the oxidation numbers of chlorine in the products formed?

A. -1, + 5

B. -1, + 3

C. +1, + 7

D. +1, - 1

**Answer: D**



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94. The oxidation state of sulphur in  $Na_2S_4O$  is

A.  $3/2$

B.  $2/3$

C.  $5/2$

D. 2/5

**Answer: C**



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**95.** The oxidation number of sulphur in  $S_2O_8^{2-}$

A. +7

B. +6

C. +4

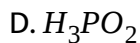
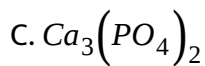
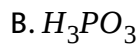
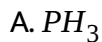
D. +5

**Answer: B**



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**96.** Phosphorous exhibits highest oxidation state in

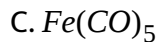
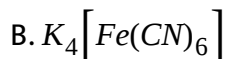


**Answer: C**



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**97. Iron has the lowest oxidation state in**



**Answer: C**



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98. The oxidation number of  $Cr$  in  $CrO_5$  is

A. +10

B. +6

C. +4

D. +5

Answer: B



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LIST - 1      LIST - 2

A)  $NH_3$       1) Oxidant

B)  $KMnO_4$       2) Both oxidant and reductant

C)  $SO_2$       3) Neither oxidant nor reductant

D)  $He$       4) Reductant

5) Dehydrating agent

99.

The correct match is

A.  $\begin{array}{cccc} \underline{A} & \underline{B} & \underline{C} & \underline{D} \\ 4 & 3 & 1 & 3 \end{array}$

B.  $\begin{array}{cccc} \underline{A} & \underline{B} & \underline{C} & \underline{D} \\ 2 & 4 & 1 & 3 \end{array}$

C.  $\begin{array}{cccc} \underline{A} & \underline{B} & \underline{C} & \underline{D} \\ 4 & 1 & 2 & 3 \end{array}$

D.  $\begin{array}{cccc} \underline{A} & \underline{B} & \underline{C} & \underline{D} \\ 3 & 2 & 1 & 4 \end{array}$

**Answer: C**



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**100.** In the reaction,  $I_2 + 2KClO_3 \rightarrow 2KIO_3 + Cl_2$

- i) Iodine is oxidised
- ii) Chlorine is reduced
- iii) Iodine displaces chlorine
- iv)  $KClO_3$  is decomposed

The correct combination is

A. Only i & iv are correct

B. Only iii & iv are correct

C. i, ii, iii are correct

D. All are correct

**Answer: C**



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**101.** Oxidation number of iron in  $Na_2[Fe(CN)_5NO]$

A. +2

B. +3

C. +1

D. 0

**Answer: A**



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102. The oxidation number of phosphorus in sodium hypophosphite is

A. +3

B. +2

C. +1

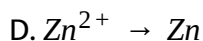
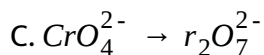
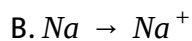
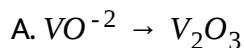
D. -1

Answer: C



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103. Which of the following reactions does not involve the change in oxidation state of metal?



**Answer: C**



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**104.** Oxidation state of oxygen in potassium superoxide is

A.  $-1/2$

B.  $-1$

C.  $-2$

D.  $0$

**Answer: A**



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**105.** Average oxidation number of iodine in  $KI_3$

A.  $+1/3$

B.  $-1/3$

C.  $+3$

D.  $-1$

**Answer: B**



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**106.** The oxidation number of nitrogen in  $\text{NCl}_3$  is

A.  $+3$

B.  $-3$

C. zero

D.  $-1/3$

**Answer: B**



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107. What are the oxidation numbers of 'N' in  $NH_4NO_3$ ?

A. +3, - 5

B. -3, + 5

C. +3, + 6

D. -2, + 2

**Answer: B**



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108. The oxidation state of phosphorus in  $Ba(H_2PO_2)_2$  is

A. +3

B. +2

C. +1

D. -1

**Answer: C**



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**109.** In which one of the following compounds the oxidation number of iodine is fractional?



**Answer: D**



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**110.** What is the change in the oxidation state of  $Mn$ , in the reaction of  $MnO_4^-$  with  $H_2O_2$  in acidic medium?

A.  $7 \rightarrow 4$

B.  $6 \rightarrow 4$

C.  $7 \rightarrow 2$

D.  $6 \rightarrow 2$

**Answer: C**



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**111.**  $K + Cl \rightarrow KCl$ . This is an example of

A. oxidation

B. reduction

C. a redox reaction

D. none of these

**Answer: C**



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112. The conversion  $KMnO_4 \rightarrow K_2MnO_4$  is an example of

- A. oxidation half reaction
- B. reduction half reaction
- C. oxidation and reduction
- D. nither oxidation nor reduction

**Answer: B**



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113.  $MnO_2 + 4HCl \rightarrow MnCl_2 + Cl_2 + 2H_2O$ , In the reaction  $MnO_2$  acts as

- A. oxidation
- B. reduction
- C. both

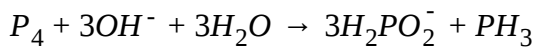
D. None

**Answer: A**



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**114.** In the reaction



phosphorus is undergoing

A. oxidation

B. reduction

C. disproportionation

D. hydrolysis

**Answer: C**



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115. Decomposition of  $H_2O_2$  is an example of

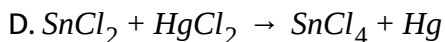
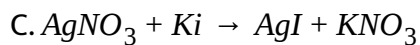
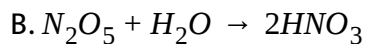
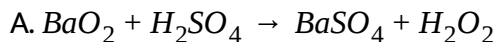
- A. neutralisation
- B. precipitation
- C. disproportionation
- D. hydrolysis

**Answer: C**



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116. Which of the following is an oxidation and reduction reaction?

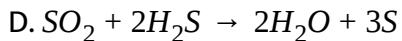
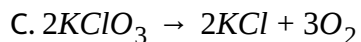
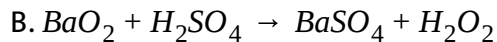
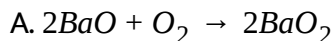


**Answer: D**



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**117.** Which of the following is not a redox reaction?



**Answer: B**



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**118.**  $2\text{CuI} \rightarrow \text{Cu} + \text{CuI}_2$ , the reaction is

A. Disproportionation

B. Neutralisation

C. Oxidation

D. Reduction

**Answer: A**



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**119.** In a reaction between zinc and iodine, in which zinc iodide is formed, what is being oxidised

A. Zinc ions

B. Iodide ions

C. Zinc atom

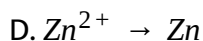
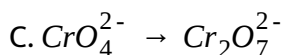
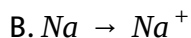
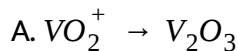
D. Iodine

**Answer: C**



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120. Which one of the following reactions does not involve either oxidation or reduction

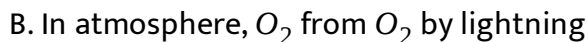
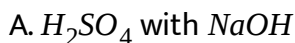


**Answer: C**



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121. Which of the following is redox reaction



D. Nitrogen oxide form nitrogen and oxygen by lightning

**Answer: D**



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**122.**  $C + O_2 \rightarrow CO_2$  the reaction is

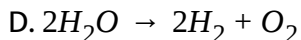
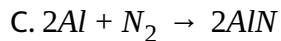
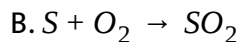
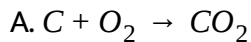
- A. Chemical combination
- B. Decomposition reactions
- C. Displacement reactions
- D. Disproportionation reactions

**Answer: A**



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**123.** Which of the following is not chemical combinations

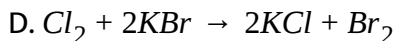
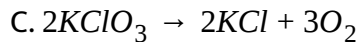
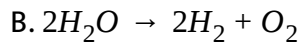
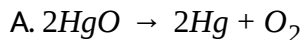


**Answer: D**



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**124.** Which of the following is decomposition reaction

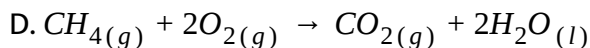
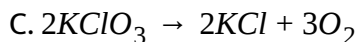
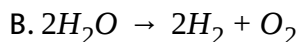
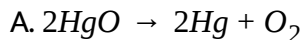


**Answer: A**



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125. Which of the following is not Decomposition reactions

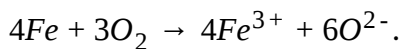


Answer: D



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126. Following reaction describes the rusting of iron



Which one of the following statement is incorrect

A. This is an example of a redox reaction

B. Metallic iron is reduced to  $\text{Fe}^{3+}$

C.  $Fe^{3+}$  is an oxidising agent

D. Metallic iron is a reducing agent

**Answer: B**



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**127.** Which one of the following is not prepared from halide by chemical oxidation process

A.  $F_2$

B.  $Cl_2$

C.  $Br_2$

D.  $I_2$

**Answer: A**



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**128.** The reaction  $Br_2, Cl_2, I_2, P_4$  with NaOH involves

- A. Decomposition
- B. Displacement
- C. Combination
- D. Disproportionation

**Answer: D**



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**129.** Which of the following is metal displacement reaction

- A.  $Zn + CuSO_4 \rightarrow ZnSO_4 + Cu$
- B.  $2Na + 2H_2O \rightarrow 2NaOH + H_2$
- C.  $Ca + 2H_2O \rightarrow Ca(OH)_2 + H_2$
- D.  $2HgO \rightarrow 2Hg + O_2$

**Answer: A**



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**130.**  $Zn + CuSO_4 \rightarrow ZnSO_4 + Cu$ ,  $Zn$  can act as

A. Oxidising agent

B. Reducing agent

C. Reduced

D. Oxidant

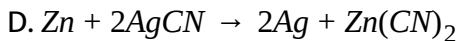
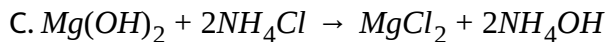
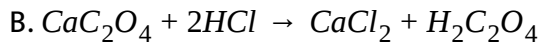
**Answer: B**



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**131.** Which of the following is a redox reaction?

A.  $NaCl + KNO_3 \rightarrow NaNO_3 + KCl$

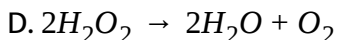
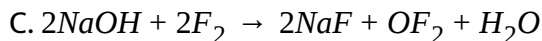
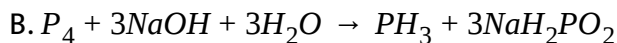
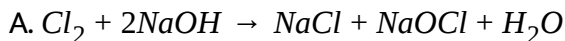


**Answer: D**



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**132.** Which of the following is not an example of disproportionation reaction?



**Answer: C**



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133. In the reaction  $3Mg + N_2 \rightarrow Mg_3N_2$

- A. Magnesium is reduced
- B. Magnesium is oxidized
- C. Nitrogen is oxidized
- D. none of these

**Answer: B**



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134. Which one of the halogen is prepared by only electrolysis method

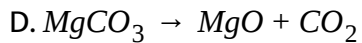
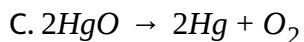
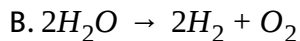
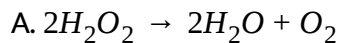
- A.  $Cl_2$
- B.  $Br_2$
- C.  $F_2$
- D.  $I_2$

**Answer: C**



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**135.** Which of the following disproportionation reaction



**Answer: A**



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**136.** Layer test is used for determination of

A. Chalogens

B. Pnictogens

C. Halogens

D. Noble gases

**Answer: C**



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**137.**  $Br_2$  or  $I_2$  dissolve in

A.  $C_6H_6$

B.  $CO_2$

C.  $CCl_4$

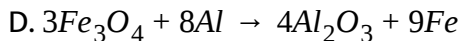
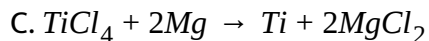
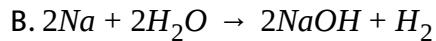
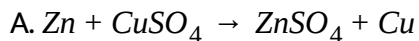
D.  $NH_3$

**Answer: C**



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**138.** Which of the following is not metal displacement



**Answer: B**



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**139.** In the reaction  $2Al + N_2 \rightarrow 2AlN$ , Al is

A. Reduced

B. Oxidised

C. Oxidising agent

D. None of the above

**Answer: B**



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**140.** When P reacts with caustic soda. The products are  $PH_3$  and  $NaH_2PO_2$ . This reaction is an example of

- A. Oxidation
- B. Reduction
- C. Oxidation and reduction(Redox)
- D. Neutralization

**Answer: C**



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**141.** Among the following ion the one that cannot undergo disproportionation



A.  $\text{ClO}^-$

B.  $\text{ClO}_2^-$

C.  $\text{ClO}_3^-$

D.  $\text{ClO}_4^-$

**Answer: D**



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**142.**  $3\text{Cl}_2 + 6\text{NaOH} \rightarrow 5\text{NaCl} + \text{NaClO}_3 + 3\text{H}_2\text{O}$ , chlorine gets

A. Oxidised

B. Reduced

C. Both 1 & 2

D. None of the above

**Answer: C**



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**143.** Which reactions are useful to prepare Hydrogen in the laboratory

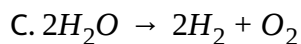
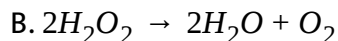
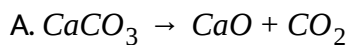
- A. Decomposition
- B. Displacement
- C. Combination
- D. Disproportionation

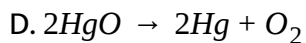
**Answer: B**



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**144.** In which of the following reaction there is no change in oxidation state





**Answer: B**



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**145.** The Lanthanide contraction relates to (AFMC)

A. Oxidising agent

B. Reducing agent

C. (1) and (2) both

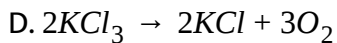
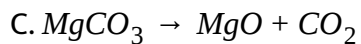
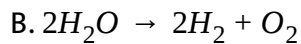
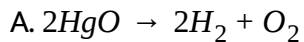
D. None of these

**Answer: A**



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**146.** The reaction is Decomposition but it's not redox reaction



**Answer: C**



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**147.** Which one of the following generally gets displaced by more electro positive metals in nonmetal displacement reactions.



**Answer: A**



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**148.** Fluorine does not undergo disproportiona tion because

- A. Fluorine is always exhibit -1 oxidation state
- B. Fluorine exhibit only two oxidaion numbers
- C. Fluorine exhibit three oxidation numbers
- D. None of the above

**Answer: B**



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**149.** In the reaction,  $2HgO \rightarrow 2Hg + O_2$ ,  $Hg^{2+}$  act as

- A. Oxidising agent
- B. Reducing agent
- C. Oxidised

D. none of the above

**Answer: A**



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**150. (A) :** White P reacts with caustic soda, the products are  $PH_3$  and  $NaH_2PO_2$ . This reaction is an example of disproportionation reaction.

**(R) :** In disproportionation reaction one and the same substance may act simultaneously as an oxidising agent and as a reduced agent.

A. Both A and R are true and R is the correct explanation

B. Both A and R are true but R is not the correct explanation of A

C. A is true but R is false

D. A is false but R is true

**Answer: A**



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151.  $PbS + 4H_2O_2 \rightarrow PbSO_4 + 4H_2O$ . In this reaction  $PbS$  undergoes

- A. oxidation
- B. reduction
- C. both
- D. None

Answer: A



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152. The mass of  $CO_2$  obtained when 2g of pure limestone is calcined is

- A. 44g
- B. 0.22g
- C. 0.88g
- D. 8.8g

**Answer: C**



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**153.** The number of moles of  $CO_2$  produced when 3 moles of  $HCl$  react with excess of  $CaCO_3$  is

A. 1

B. 1.5

C. 2

D. 2.5

**Answer: B**



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**154.** The weight of a pure sample of  $KClO_3$  to be decomposed in order to get 0.96g of  $O_2$  is



- A. 2.45 G
- B. 1.225 G
- C. 9.90EG
- D. None

**Answer: A**



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**155.** 6g of Mg reacts with excess of an acid. The amount of hydrogen produced would be

- A. 0.5 g
- B. 1 g
- C. 2 g
- D. 4g

**Answer: A**

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**156.** The number of moles of  $Fe_2O_3$  formed when 5.6 lit of  $O_2$  reacts with 5.6g of Fe?

A. 0.125

B. 0.01

C. 0.05

D. 0.10

**Answer: C**

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**157.** What volume of  $H_2$  at NTP is required to convert 2.8g of  $N_2$  in to  $NH_3$  ?

A. 2240 ml

B. 22400 ml

C. 6.72 lit

D. 224 lit

**Answer: C**



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**158.** The number of grams of NaOH that completely neutralises 9.8g of phosphoric acid is

A. 120

B. 24

C. 36

D. 12

**Answer: D**



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**159.** The volume of  $CO_2$  obtained by the complete decomposition of one mole of  $NaHCO_3$  at STP is

- A. 22.4 L
- B. 112.2 L
- C. 44.8 L
- D. 4.48 L

**Answer: B**



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**160.** A peroxidase enzyme contains 2 % selenium (Se=80). The minimum molecular weight of the enzyme is

- A. 1000
- B. 2000

C. 4000

D. 800

**Answer: C**



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**161.** The amount of Mg in gms. to be dissolved in dilute  $H_2SO_4$  to liberate  $H_2$  which is just sufficient to reduce 160g of ferric oxide is

A. 24

B. 48

C. 72

D. 96

**Answer: C**



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**162.** The mass of 80 % pure  $H_2SO_4$  required to completely neutralise 60g of  $NaOH$  is

- A. 92 g
- B. 58.8 g
- C. 73.5 g
- D. 98 g

**Answer: C**



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**163.** Haemoglobin contains 0.33 % iron ( $Fe=56$ ). The molecular weight of haemoglobin is 68000. The number of iron atoms in one molecule of haemoglobin is .

- A. 2
- B. 3

C. 4

D. 5

**Answer: C**



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**164.** The volume of  $\text{CO}_2$  formed when 1 litre of  $\text{O}_2$  reacted with 2 lit of CO under the same condition is

A. 1L

B. 2L

C. 3L

D. 1.5L

**Answer: B**



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**165.** The number of molecules of  $\text{CO}_2$  liberated by complete combustion of 0.1 g of graphite in air is

A.  $3.01 \times 10^{22}$

B.  $6.02 \times 10^{23}$

C.  $6.02 \times 10^{22}$

D.  $3.01 \times 10^{23}$

**Answer: C**



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**166.** The weight of oxygen required to completely react with 27g of Al is

A. 8g

B. 16g

C. 32g

D. 24g



**Answer: D**



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**167.** The vapour pressures of pure benzene and toluene are 160 and 60 mm Hg respectively. The mole fraction of benzene in vapour phase in contact with equimolar solution of benzene and toluene is

A. 0.073

B. 0.027

C. 0.27

D. 0.73

**Answer: D**



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**168.** The number of significant figures in 0.0045 are

- A. Two
- B. Three
- C. Four
- D. Five

**Answer: C**



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**169.** The correctly reported answer of the addition of 4.523, 2.3 and 6.24 will have significant figures

- A. Two
- B. Three
- C. Four
- D. Five

**Answer: A**



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**170.** Which of the following units represents the largest amount of energy?

A. Calorie

B. erg

C. Joule

D. Electron - volt

**Answer: D**



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**171.** The actual product of 4.327 and 2.8 is 12.1156. The correctly reported answer will be

A. 12

B. 12.1

C. 12.12

D. 12.116

**Answer: A**



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**172.** Which of the following is incorrect about SI units ?

A. Density in  $\text{kgm}^{-3}$

B. Force in Newtons

C. Pressure in Pascals

D. Amount of the substance in  $\text{mol L}^{-1}$

**Answer: A**



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**173.** Plank's constant has the dimensions of

- A. Force
- B. Work
- C. Angular momentum
- D. Torque

**Answer: B**



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**174.** After rounding 1.235 and 1.225 to three significant figures, we will have their answers respectively as

- A. 1.23, 1.22
- B. 1.23, 1.123
- C. 1.23, 1.23
- D. 1.24, 1.22

**Answer: C**



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**175.**  $NKg^{-1}$  is the unit of

A. Momentum

B. Velocity

C. Pressure

D. Acceleration

**Answer: D**



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**176.** The nuclear cross section is measured in barn'. It is equal to

A.  $10^{-20}m^2$

B.  $10^{-30}m^2$

C.  $10^{-28}m^2$

D.  $10^{-14}m^2$

**Answer: C**



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**177.** 0.00025 has how many significant figures?

A. 5

B. 3

C. -4

D. 2

**Answer: A**



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**178.** The number of significant figures in electronic charge  $1.602 \times 10^{-19} \text{ C}$

A. 1

B. 2

C. 3

D. 4

**Answer: D**



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**179.** An iron ball has a mass of 35gms and a speed of 50m/s. If the speed can be measured with an accuracy of 2 % then the uncertainty in the position

A.  $1.507 \times 10^{-23} \text{ m}$

B.  $1.507 \times 10^{-31} \text{ m}$

C.  $1.507 \times 10^{-33} \text{ m}$



D.  $4.507 \times 10^{-32}m$

**Answer: C**



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**180.** According to significant figure convention, the result obtained by adding 12.11, 18.0 and 1.012 is

A. 31.12

B. 31.1

C. 31

D. 31.122

**Answer: B**



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1. An unbalanced chemical equation is against the law of

- A. The law of gaseous volumes
- B. The law of constant proportions
- C. The law of mass action
- D. The law of conservation of mass

**Answer: D**



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2. In compound A, 1.00 g nitrogen unites with 0.57 g oxygen. In compound B, 2.00g nitrogen combines with 2.28 g oxygen. In compound C, 3.00 g nitrogen combines with 5.13 g oxygen. These results obey the following law.

- A. Law of constant proportion
- B. Law of multiple proportion

C. Law of reciprocal proportion

D. Dalton's law of partial pressure

**Answer: B**



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3. Which of the following pairs can be cited as an example to illustrate the law of multiple proportion?

A.  $Na_2O$ ,  $K_2O$

B.  $CaO$ ,  $MgO$

C.  $Al_2O_3$ ,  $Cr_2O_3$

D.  $CO$ ,  $CO_2$

**Answer: D**



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4. The law of multiple proportions is illustrated by the two compounds

- A. Sodium chloride and sodium bromide
- B. Ordinary water and heavy water
- C. Caustic soda and caustic potash
- D. Sulphur dioxide and sulphur trioxide.

**Answer: D**



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5. A sample of pure carbon dioxide, irrespective of its source contains 27.27 % carbon and 72.73% oxygen. The data support

- A. Law of constant composition
- B. Law of conservtion of mass
- C. Law of reciprocal proportions
- D. Law of multiple proportions

**Answer: A**



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**6.** One mole of  $CH_4$  contains

A.  $6.02 \times 10^{23}$  atoms of hydrogen

B. 4gm atoms of hydrogen

C. 3g of carbon

D.  $1.81 \times 10^{23}$  molecules of  $CH_4$

**Answer: B**



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**7.** The mass of oxygen required to prepare 2 moles of water is

A. 16 g

B. 32 g

C. 8 g

D. 64 g

**Answer: B**



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8. The ratio between the number of molecules in equal masses of  $CH_4$  and  $SO_2$  is

A. 1 : 1

B. 4 : 1

C. 1 : 4

D. 2 : 1

**Answer: B**



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9. The number of sulphur atoms present in 0.2 mole of sodium thiosulphate is

(N=Avogadro number)

A. 4N

B. 0.2 N

C. 0.4 N

D. 0.1 N

**Answer: C**



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10. The number of nitrogen molecules present in l.c.c of gas at NTP is

A.  $2.67 \times 10^{22}$

B.  $2.67 \times 10^{21}$

C.  $2.67 \times 10^{20}$

D.  $2.67 \times 10^{19}$

**Answer: D**



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11. The density of water is 1g/mL. Assuming that there are no intermolecular spaces between water molecules in liquid water, the volume of a water molecule is

A.  $1.5 \times 10^{-23}$  ml

B.  $6 \times 10^{-23}$  ml

C.  $3 \times 10^{-23}$  ml

D.  $3 \times 10^{-22}$  ml

**Answer: C**



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12. Ordinary water contain one part of heavy water per 6000 parts of water by weight. The number of heavy water molecules present in a drop of water of volume 0.01 mL is (density of water 1 g/mL)

A.  $2.5 \times 10^{16}$

B.  $5 \times 10^{17}$

C.  $5 \times 10^{16}$

D.  $7.5 \times 10^{16}$

**Answer: C**



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13. A gaseous mixture contains oxygen and nitrogen in the ratio 1:4 by weight. The ratio of their number of molecules is

A. 1:4

B. 4:1

C. 7:31

D. 3:16

**Answer: C**



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**14.** An  $\alpha$  - particle changes into a Helium atom. In the course of one year the volume of Helium collected from a sample of Radium was found to be  $1.12 \times 10^{-2} mL$  at STP. The number of  $\alpha$  particles emitted by the sample of Radium in the same time is

A.  $6 \times 10^{17}$

B.  $3 \times 10^{17}$

C.  $1.5 \times 10^{17}$

D.  $1.2 \times 10^{18}$

**Answer: B**



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**15.** The number of oxygen atoms present in 50 g of calcium carbonate is

A.  $6.023 \times 10^{23}$

B.  $30.1 \times 10^{23}$

C.  $9.025 \times 10^{23}$

D.  $1.206 \times 10^{24}$

**Answer: C**



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**16.** The mixture containing the same number of molecules as that of 14 g of  $CO$  is

- A. 14 g of nitrogen + 16 g of oxygen
- B. 7 g of nitrogen + 16 g of oxygen
- C. 14 g of nitrogen + 8 g of oxygen
- D. 7g of nitrogen + 8g of oxygen

**Answer: D**



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**17.** The number of atoms of hydrogen present in 1.5 mole of  $H_2O$  is

- A. 1N
- B. 2N
- C. 3N
- D. 0.5N

**Answer: C**



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18. Which of the following contains the maximum number of atoms?

A. 10g of  $\text{CaCO}_3$

B. 4g of hydrogen

C. 9g of  $\text{NH}_4\text{NO}_3$ .

D. 1.8 g of  $\text{C}_6\text{H}_{12}\text{O}_6$

**Answer: B**



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19. Which contains more number of molecules?

A. 1 mole of carbon dioxide

B. 4 g of hydrogen

C. 33.6 litres of oxygen at STP

D. 6g of helium

**Answer: B**



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**20.** Which of the following gases has the highest density under standard conditions?

A.  $CO$

B.  $N_2O$

C.  $C_3H_8$

D.  $SO_2$

**Answer: D**



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21. Which of the following is heaviest?

- A. 50 g of iron
- B. 5 moles of nitrogen
- C. 0.1 gram atom of silver
- D.  $10^{23}$  atoms of carbon

**Answer: B**



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22. The density of a gas is 2, relative to nitrogen, under the same conditions. The molecular weight of the gas is

- A. 5.6
- B. 28
- C. 56
- D. 14

**Answer: C**



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**23.** The density of a gas at STP is 1.5 g/L. Its molecular weight is

A. 22.4

B. 33.6

C. 33.6

D. 44.8

**Answer: C**



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**24.** 7g of nitrogen occupies a volume of 5 litres under certain conditions.

Under the same conditions one mole of a gas, having molecular weight 56, occupies a volume of



A. 40 L

B. 20 L

C. 10 L

D. 80 L

**Answer: B**



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**25.** Henry thinks that a mole contains  $6.023 \times 10^{24}$  molecules. Hence the mass of Henry's mole of Nitrogen is

A. 2.8 g

B. 28g

C. 280 g

D. 0.28g

**Answer: C**

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26. One mole of oxygen ( $O_2$ ) is present in the following mass of sulphuric acid

A. 98g

B. 24.5g

C. 196g

D. 49g

**Answer: D**

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27. The number of gram - atoms of sulphur in 2 moles of peroxydisulphuric acid is

A. 2

B. 3

C. 1

D. 4

**Answer: D**



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**28.** Four ten litre flasks are separately filled with the gases hydrogen, helium, oxygen and ozone at the same temperature and pressure. The ratio of the total number of atoms of these gases present in different flasks would be

A. 1:2:3:2

B. 2:1:2:3

C. 1:3:2:2

D. 1:1:1:1

**Answer: B**



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**29.** Which of the following has number of molecules present equal to those present in 16 grams of oxygen

A.  $16gO_3$

B.  $32gSO_2$

C.  $16gSO_2$

D. All the above

**Answer: B**



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**30.** If the relative atomic mass of oxygen is 64 units, the molecular mass of CO becomes

A. 112

B. 128

C. 28

D. 7

**Answer: A**



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**31.** Both 22 grams of  $\text{CO}_2$  and 8 grams of methane contain the following carbon atoms

A.  $3 \times 10^{23}$

B.  $12 \times 10^{23}$

C.  $6 \times 10^{23}$

D.  $1.5 \times 10^{23}$

**Answer: C**

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32. What is the mole percentage of  $O_2$  in a mixture of 7g of  $N_2$  and 8g of  $O_2$ ?

A. 25 %

B. 75 %

C. 50 %

D. 40 %

**Answer: C**

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33. The number of oxygen molecules present in 100 grams of limestone is

A.  $4N_o$

B.  $3N_o$

C.  $1.5N_o$

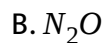
D.  $N_o$

**Answer: C**



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**34.** 7.5 g of a gas occupies 5.6 litres at STP. The gas is



**Answer: A**



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35.  $3.011 \times 10^{22}$  atoms of an element weighs 1.15 g. The atomic mass of the element is

- A. 23
- B. 10
- C. 16
- D. 35.5

**Answer: A**



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36. Equivalent weights 36. A bivalent metal has 12 equivalent weight. The molecular weight of its oxide is

- A. 16
- B. 32
- C. 40



D. 52

**Answer: C**



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**37.** Molecular weight of Mohr's salt is 392. Its equivalent weight when it is oxidised by  $\text{KMnO}_4$  in acidic medium is

A. 392

B. 196

C. 130.6

D. 78.5

**Answer: A**



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38. The equivalent weights of 'S' in  $SCI_2$  and  $S_2CI_2$  are in the ratio

A. 1:2

B. 2:1

C. 1:1

D. 1:4

**Answer: A**



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39. The equivalent weight of a metal in different compounds are 18.6 and

28. Atomic mass of the metal would be

A. 18.6

B. 28

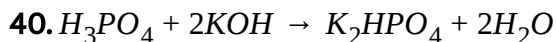
C. 46.6

D. 56

**Answer: D**



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Based on the above reaction equivalent weight of  $H_2PO_4$  is

A. 196

B. 98

C. 49

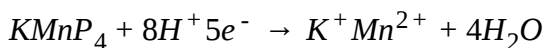
D. 32.67

**Answer: C**



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**41.** The following reaction occurs in acidic medium



what is the equivalent weight of  $KMnO_4$ ?

[Molecular weight of  $KMnO_4 = 158$ ]

- A. 79.0
- B. 31.6
- C. 158.0
- D. 39.5

**Answer: B**



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**42.** An alkane has C/H ratio (by mass) of 5.1428. Its molecular formula is

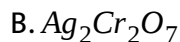
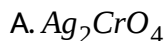
- A.  $C_5H_{12}$
- B.  $C_6H_{14}$
- C.  $C_8H_{18}$
- D.  $C_7H_{16}$

**Answer: B**



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**43.** Analysis of a compound yields the following percentage composition. 65.03 % of Ag, 15.68 % Cr, 19.29 % O. The simplest formula of the compound is [Cr At.wt=52]



**Answer: A**



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**44.** The percentage of nitrogen in Magnesium nitride is

A. 14

B. 28

C. 42

D. 56

**Answer: B**



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**45.** The percentage of silica in sodium silicate is approximately (Si=28)

A. 25

B. 40

C. 50

D. 60

**Answer: C**



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**46.** The mass of water (in grams) in one mole of crystalline hypo is

A. 18

B. 90

C. 158

D. 248

**Answer: B**



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**47.** 0.66 g of a compound gave 112 ml of nitrogen at STP in the Dumas method. The percentage of Nitrogen in the compound is

A. 25

B. 41.5

C. 42.4

D. 21.2

**Answer: D**



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**48.** 0.36g of an organic compound on combustion gave 1.1g of  $CO_2$  and 0.54g of  $H_2O$ . The percentages of carbon and Hydrogen in the compound are

A. 75,25

B. 60, 40

C. 83.33, 16.67

D. 77.8, 22.2

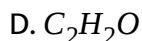
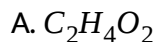
**Answer: C**



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49. 60g of a compound on analysis gave  $C = 24g$ ,  $H = 4g$  and  $O = 32g$ . Its empirical formula is

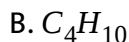
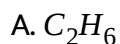


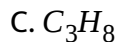
**Answer: B**



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50. A gaseous alkane requires five times its volume of oxygen under the same conditions for complete combustion. The molecular formula of the alkane is





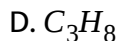
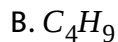
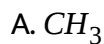
**Answer: C**



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51. Four grams of hydrocarbon ( $C_xH_y$ ) on complete combustion gave 12grams of  $CO_2$ . What is the empirical formula of the hydrocarbon ?

( $C = 12, H = 1$ )

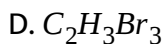
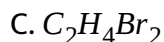
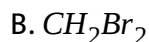


**Answer: D**



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52. A carbon compound contains 12.8% Carbon, 2.1% Hydrogen, 85.1% Bromine. The molecular weight of the compound is 187.9. Calculate the molecular formula.

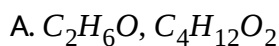


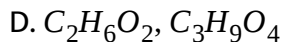
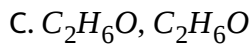
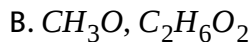
**Answer: C**



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53. An organic compound having C, H and O has 13.13% H, 52.14% C and 34.73% O. its molar mass is 46.068 g. What are its empirical and molecular formulae?





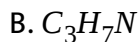
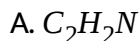
**Answer: C**



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54. An organic compound contains

$C = 40\%$ ,  $H = 13.33\%$  and  $N = 46.67\%$ . Its empirical formula is



**Answer: C**



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55. Suppose the elements X and Y combine to form two compounds  $XY_2$  and  $X_2Y_2$ . When 0.1 mole of  $XY_2$  weighs 10 g and 0.05 mole of  $X_3Y_2$  weighs 9 g, the atomic weights of X and Y are

A. 40, 30

B. 60, 40

C. 20, 30

D. 30, 20

**Answer: A**



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56. The volume of 0.025M  $Ca(OH)_2$  solution which can neutralise 100 ml of  $10^{-4}M H_3PO_4$  is

A. 10 ml

B. 60 ml

C. 0.6 ml

D. 2.8 ml

**Answer: C**



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**57.** The number of ions present in 1 ml of  $0.1M\text{CaCl}_2$  solution is

A.  $1.8 \times 10^{20}$

B.  $6.0 \times 10^{20}$

C.  $1.8 \times 10^{19}$

D.  $1.8 \times 10^{21}$

**Answer: A**



**Watch Video Solution**

58. The molality of 2 % (W/W) NaCl solution nearly

A. 0.02 m

B. 0.35 m

C. 0.25 m

D. 0.45 m

**Answer: B**



**Watch Video Solution**

59. 100 ml of 2M HCl solution completely neutralises 10 g. of a metal carbonate. Then the equivalent weight of the metal is

A. 50

B. 20

C. 12

D. 100

**Answer: B**



**Watch Video Solution**

**60.** The Molarity of 200 ml of  $HCl$  solution which can neutralise 10.6 g. of anhydrous  $Na_2CO_3$  is

A. 0.1M

B. 1 M

C. 0.6 ml

D. 0.75 M

**Answer: B**



**Watch Video Solution**

**61.** What is the weight (in g) of  $Na_2CO_3$  (molar mass= 106) present in 250 mL of its 0.2 M solution?



A. 0.53

B. 5.3

C. 1.06

D. 10.6

**Answer: B**



**Watch Video Solution**

62. 40 ml of  $\underline{x} \text{MKMnO}_4$  solution is required to react completely with 200 ml of 0.02 M oxalic acid solution in acidic medium. The value of  $\underline{x}$  is

A. 0.04

B. 0.01

C. 0.03

D. 0.02

**Answer: A**

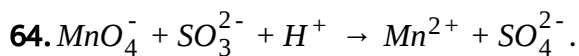
 [Watch Video Solution](#)

63. Which of the following is dependent on temperature ?

- A. Weight percentage
- B. Molality
- C. Molarity
- D. Mole fraction

Answer: C

 [Watch Video Solution](#)



The number of  $H^+$  ions involved is

- A. 2
- B. 6

C. 8

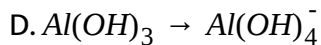
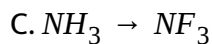
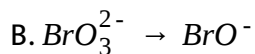
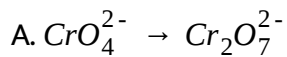
D. 16

**Answer: B**



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**65.** Which of the following change requires a reducing agent



**Answer: B**



**Watch Video Solution**

66.  $Cr(OH)_3 + H_2O_2 \xrightarrow{\text{Alkali}} CrO_4^{2-} + H_2O$  the number of  $OH^-$  required to balance the above equation

A. 1

B. 3

C. 4

D. 6

Answer: C



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67. In the reaction the stoichiometry coefficients of  $Cr_2O_7^{2-}$ ,  $NO_2^-$  and  $H^+$  respectively are  $Cr_2O_7^{2-} + NO_2^- + H^+ \rightarrow Cr^{3+} + NO_3^- + H_2O$

A. 1, 3, 8

B. 1, 4, 8

C. 1, 3, 12

D. 1, 5, 12

**Answer: A**



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**68.** The oxidation number of V in  $Rb_4[HV_{10}O_{28}]$  is

A. +3

B. +5

C. +7

D. +6

**Answer: B**



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69. The number of moles of  $MnO_4^-$  and  $Cr_2O_7^{2-}$  separately required to oxidise 1 mole of  $FeC_2O_4$  each in acidic medium respectively

A. 0.5 , 0.6

B. 0.6 , 0.4

C. 0.4 , 0.5

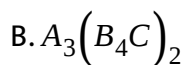
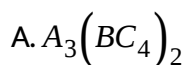
D. 0.6 , 0.5

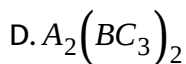
**Answer: D**



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70. A compound contains atoms of three elements A, B and C. If the oxidation number of A is +2, B is +5 and that of C is -2, the possible formula of compound is



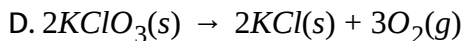
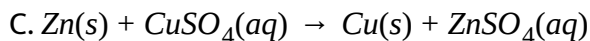
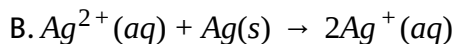


**Answer: A**



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71. Which one of the following is an example of disproportionation reaction?



**Answer: A**



**Watch Video Solution**

72.  $KMnO_4$  reacts with KI, in basic medium to form  $I_2$  and  $MnO_2$ . When 250 mL of 0.1M KI solution is mixed with 250 mL of 0.02 M  $KMnO_4$ , in basic medium, what is the number of moles of  $I_2$  formed?

- A. 0.015
- B. 0.0075
- C. 0.005
- D. 0.01

**Answer: A**



**Watch Video Solution**

73. What is the oxidation state of Fe in the product formed when acidified potassium ferrocyanide  $K_4[Fe(CN)_6]$  is treated with hydrogen peroxide?

- A. +2



B. +3

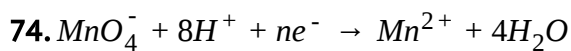
C. +1

D. +6

**Answer: B**



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The value of n is

A. 5

B. 4

C. 2

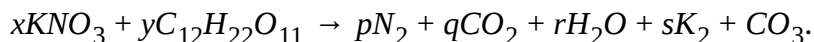
D. 3

**Answer: A**



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75. Balance the following equation by choosing the correct option



A. 

$x$	$y$	$p$	$q$	$r$	$s$
36	55	24	24	5	48

B. 

$x$	$y$	$p$	$q$	$r$	$s$
48	5	24	36	55	24

C. 

$x$	$y$	$p$	$q$	$r$	$s$
24	24	36	55	48	5

D. 

$x$	$y$	$p$	$q$	$r$	$s$
24	48	36	24	5	55

Answer: B



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76. X litre of carbon monoxide is present at mSTP. It is completely oxidised to  $\text{CO}_2$ . Formed is 11.207 l. What is the value of X in litres?

A. 22.414

B. 11.207

C. 5.6035

D. 44.828

**Answer: B**



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77. Acetylene can be prepared from calcium carbonate by a series of reactions. The mass of 80% calcium carbonate required to prepare 2 moles of acetylene is

A. 200 g

B. 160 g

C. 250 g

D. 320 g

**Answer: C**



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78. Liquid benzene burns in oxygen according to  $2C_6H_6(l) + 15O_2(g) \rightarrow 12CO_2(g) + 6H_2O(g)$ . How many litres of oxygen are required for complete combustion of 39g of liquid  $C_6H_6$  (atomic wt. of C=12, O=16)?

A. 11.2

B. 22.4

C. 42

D. 84

**Answer: D**



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79. Phosphine on decomposition produces phosphorus and hydrogen. When 100 ml of phosphine are decomposed the change in volume under laboratory conditions is

- A. 50 ml increase
- B. 50 ml decrease
- C. 900 ml decrease
- D. 75 ml increase

**Answer: A**



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**80.** One mole of fluorine reacted with two moles of hot concentrated KOH.

The products formed are KF,  $H_2O$  and  $O_2$ . The molar ratio of KF,  $H_2O$  and  $O_2$  respectively is

- A. 1:1:2
- B. 2:1:0.5
- C. 1:2:1
- D. 2:1:2

**Answer: B**



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**81.** The atomic masses of two elements A and B are 20 and 40 respectively.

If  $x$  gm of A contains  $Y$  atoms, how many atoms are present in  $2x$  gm of B

A.  $2y$

B.  $y/2$

C.  $y$

D.  $4y$

**Answer: C**



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**82.** In the formation of  $Al_2O_3$  from  $Al$  and  $O_2$ , if 1.5 mole of oxygen is used up, the mass of aluminium that reacted is

A. 27g

B. 54 g

C. 108 g

D. 81 g

**Answer: B**



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**83.** The weight of  $MgCO_3$  required for the preparation of 12g of  $MgSO_4$  by reacting with sulphuric acid is

A. 8.4 g

B. 4.2 g

C. 16.8g

D. 12.6g

**Answer: A**

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84. 0.01 mole of iodoform ( $\text{CHI}_3$ ) reacts with Ag powder to produce a gas whose volume at NTP is

A. 224 ml

B. 112 ml

C. 336 ml

D. None

**Answer: B**

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85. Air contains 20% by volume of oxygen. The volume of air required for the complete combustion of 1L of methane under the same conditions is

A. 2L



B. 4L

C. 10L

D. 0.4L

**Answer: C**



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**86.** When 20 ml of methane and 20 ml of oxygen are exploded together and the reaction mixture is cooled to laboratory temperature. The resulting volume of the mixture is

A. 40 ml

B. 20ml

C. 30ml

D. 10ml

**Answer: B**

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87. How many litres of  $CO_2$  at STP will be formed when 100 of  $0.1M H_2SO_4$  reacts with excess of  $Na_2CO_3$ ?

A. 22.4

B. 2.24

C. 0.224

D. 5.6

Answer: C

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88. When a sample of baking is strongly ignited in a crucible, it suffered a loss in weight of 3.1 g. The mass of baking soda is

A. 16.8g

B. 8.4g

C. 11.6g

D. 4.2g

**Answer: B**



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**89.** 1g of Mg is burnt in a vessel containing 0.5 g of oxygen. The remaining unreacted is

A. 0.25 g of Mg

B. 0.1 g of Mg

C. 0.1 g of  $O_2$

D. 0.75 g of Mg

**Answer: A**



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90. 25.5 g of  $H_2O_2$  solution on decomposition gave 1.68 L of  $O_2$  at STP. The percentage strength by weight of the solution is

A. 30

B. 10

C. 20

D. 25

**Answer: C**



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91. A gas mixture contains acetylene and carbondioxide. 20 lit of this mixture requires 20 lit of oxygen under the same conditions for complete combustion. The percentage by volume of acetylene in the mixture is

A. 50 %

B. 40 %

C. 60 %

D. 75 %

**Answer: B**



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**92.** What is the volume (lit) of oxygen required at STP to completely convert 1.5 moles of sulphur into sulphurdioxide

A. 11.2

B. 22.4

C. 33.6

D. 44.8

**Answer: C**



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**93.** In Haber's process 50.0 g of  $N_2(g)$  and 10.0 g of  $H_2(g)$  are mixed to produce  $NH_3(g)$ . What is the number of moles of  $NH_3(g)$  formed?

A. 3.33

B. 2.36

C. 2.01

D. 5.36

**Answer: A**



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**94.** The number of significant figures in 10500

A. Three

B. Four

C. Five

D. Can be any of these

**Answer: A**



**Watch Video Solution**

**95.** 314.000 has how many significant figures?

A. 6

B. 3

C. 5

D. 4

**Answer: A**



**Watch Video Solution**

**96.** The prefix femto stands for

A.  $10^9$

B.  $10^{-12}$

C.  $10^{-15}$

D.  $10^5$

**Answer: C**



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**97.** Three students namely A, B, C have done an experiment two times individually, for which the correct value is 2.00g. The results are given below

	Experiment - 1	Experiment - 2
Student A	1.95	1.93
Student B	1.94	2.05
Student C	2.01	1.99

Whose results are accurate and precise?

A. C

B. B



C. A

D. A and B

**Answer: A**



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## PRACTICE EXERCISE

1. The number of molecules in one litre of water is (density of water = 1g/mL)

A.  $6 \times 10^{23}/22.4$

B.  $3.33 \times 10^{25}$

C.  $3.33 \times 10^{23}$

D.  $3.33 \times 10^{23}$

**Answer: B**

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2. A sample of municipal water contains one part of urea (molecular wt = 60) per million parts of water by weight. The number of urea molecules in a drop of water of volume 0.05ml is

A.  $2.5 \times 10^{14}$

B.  $5 \times 10^{14}$

C.  $5 \times 10^{13}$

D.  $5 \times 10^{15}$

**Answer: B**

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3. Argon is formed in meteorites due to cosmic events. Each cosmic event produces one argon atom. If  $1.12 \times 10^{-3} \text{ mL}$  of argon is formed at STP from 10kg of a meteorite, the number of cosmic events that occurred is

A.  $4 \times 10^{16}$

B.  $1.5 \times 10^{16}$

C.  $6 \times 10^{16}$

D.  $9 \times 10^{16}$

**Answer: A**



**Watch Video Solution**

4. Air contains nitrogen and oxygen in the volume ratio of 4:1. The average molecular weight of air is

A. 30

B. 28

C. 32

D. 28.8

**Answer: D**

 [Watch Video Solution](#)

5. The number of atoms present in 142g of Chlorine is

A.  $6 \times 10^{23}$

B.  $1.2 \times 10^{24}$

C.  $2.4 \times 10^{24}$

D.  $3.6 \times 10^{24}$

**Answer: C**

 [Watch Video Solution](#)

6. The mass of oxygen present in 0.5 mole of  $P_4O_{10}$  is (at. wt. P=31, O=16)

A. 160 g

B. 80 g

C. 240 g

D. 124 g

**Answer: B**



**Watch Video Solution**

7. 10g of Calcium carbonate contains

A. 10 moles of  $\text{CaCO}_3$

B. 1 gram atom of Calcium

C.  $6 \times 10^{22}$  atoms of Calcium

D. 0.1 g of Calcium

**Answer: C**



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8. The number of gram atoms of hydrogen present in 1.5 mole of hydrogen sulphide is

A. 3

B. 2

C. 1

D. 0.5

**Answer: A**



**Watch Video Solution**

9. The ratio between the number of atoms in equal masses of Hydrogen and Helium is

A. 1:2

B. 2:1

C. 1:4

D. 4:1

**Answer: D**



**Watch Video Solution**

**10.** 11.2L of O<sub>2</sub> at STP has the same mass as

- A. 11.2L of Methane at STP
- B. 22.4L of Methane at STP
- C. 33.6L of Methane at STP
- D. 44.8L of Methane at STP

**Answer: B**



**Watch Video Solution**

**11.** 7g of nitrogen contains the same number of molecules as

- A. 8g of oxygen
- B. 16g of oxygen
- C. 8g of carbon monoxide
- D. 22g of carbon dioxide

**Answer: A**



**Watch Video Solution**

**12.** The number of molecules in one litre of air at STP is

- A.  $6 \times 10^{23}$
- B.  $6 \times 10^{23}/22400$
- C.  $6 \times 10^{23}/22.4$
- D. data insufficient

**Answer: C**



**Watch Video Solution**



13. Which of the following contains the maximum number of atoms?

A. 10g of  $\text{CaCO}_3$

B. 4g of hydrogen

C. 9g of  $\text{NH}_4\text{NO}_3$

D. 1.8 g of  $\text{C}_6\text{H}_{12}\text{O}_6$

**Answer: B**



**Watch Video Solution**

14. Which of the following contains the least number of molecules ?

A. 1g of hydrogen

B. 2g of nitrogen

C. 4g of oxygen

D. 11g of carbondioxide

**Answer: B**



**Watch Video Solution**

**15.** Which of the following has the least mass?

A. one gram atom of magnesium

B. 0.9 mole nitric oxide

C. 22.4 lit of nitrogen at STP

D.  $6.02 \times 10^{24}$  molecules of oxygen

**Answer: A**



**Watch Video Solution**

## LIST - 1

A) 22.4 lit. at STP

B)  $18.069 \times 10^{23}$  atoms

16. C) 108 gm. of silver

D)  $2.69 \times 10^{19}$  molecules

## LIST - 2

1) 1 cc of  $N_2$  at STP

2) 1 mole

3) 4 gm. of Helium at STP

4) 2gm. of  $H_2$  at room temperature

5) 18 gm. of water

The correct match

A. 

<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
3	1	2	4

B. 

<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
3	5	2	1

C. 

<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
3	5	1	2

D. 

<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
3	4	2	1

**Answer: B****Watch Video Solution**

LIST - 1

A) 1 mole of

lead nitrate

B) 1 mole of ammonium  
nitrate

LIST-2

1) 44 g of oxide

2) 28 g of nitrogen

3) 48 g of oxygen

4) 92 g of  $\text{NO}_2$

5) 46 g of  $\text{NO}_2$

17. C) 1 mole of  
ammonium nitrite

D) 1 mole of potassium  
chlorate

The correct match is

A. 

<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
5	1	2	3

B. 

<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
4	2	1	5

C. 

<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
5	4	2	3

D. 

<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
3	2	4	1

**Answer: A**



**Watch Video Solution**

## LIST - 1

## LIST - 2

(Charge of 1 mole ions)

- |                      |                       |
|----------------------|-----------------------|
| A) Azide ion         | 1) $4 \times 96,500C$ |
| 18. B) Aluminate ion | 2) $2 \times 96,500C$ |
| C) Ferrocyanide ion  | 3) $5 \times 96,500C$ |
| D) Dichromate ion    | 4) $96,500C$          |
|                      | 5) $3 \times 96,500C$ |

The correct match is

A.  $\begin{array}{cccc} \underline{A} & \underline{B} & \underline{C} & \underline{D} \\ 1 & 4 & 3 & 2 \end{array}$

B.  $\begin{array}{cccc} \underline{A} & \underline{B} & \underline{C} & \underline{D} \\ 4 & 3 & 5 & 2 \end{array}$

C.  $\begin{array}{cccc} \underline{A} & \underline{B} & \underline{C} & \underline{D} \\ 5 & 2 & 4 & 1 \end{array}$

D.  $\begin{array}{cccc} \underline{A} & \underline{B} & \underline{C} & \underline{D} \\ 4 & 5 & 1 & 2 \end{array}$

**Answer: D**



**Watch Video Solution**

19. Vapour density of a compound is 39. It contains carbon and hydrogen atoms in the ratio 1 : 1. Its molecular formula is

A.  $CH$

B.  $C_3H_3$

C.  $C_6H_6$

D.  $C_8H_8$

**Answer: C**



**Watch Video Solution**

**20.** 10ml of an alkane on complete combustion gave 40ml of  $CO_2$  under the same conditions. The formula of the alkane is

A.  $C_2H_6$

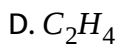
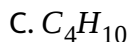
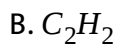
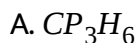
B.  $C_3H_8$

C.  $C_5H_{12}$

D.  $C_4H_{10}$

**Answer: D**

21. 15 c.c. of gaseous hydrocarbon required 45 c.c. of oxygen for complete combustion and 30 c.c. of carbondioxide is formed. The formula of the hydrocarbon is



**Answer: D**

22. Two elements 'A' and 'B' (atomic weights 75 and 16 respectively) combine to give a compound having 75.8 % of 'A'. The compound has the formula (St. John's)

A.  $AB$

B.  $A_2B$

C.  $AB_2$

D.  $A_2B_3$

**Answer: D**



**Watch Video Solution**

**23.** 4g of a hydrocarbon on complete combustion gave 12.571g of  $CO_2$  and 5.143 g of water. The compound may be

i)  $C_2H_4$  ii)  $CH_4$  iii)  $C_3H_8$  iv)  $C_4H_8$

The correct combination is

A. Only (i) is correct

B. Only (ii) is correct

C. Only (ii) & (iii) are correct

D. (i) & (iv) are correct



**Answer: B**



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**24.** The simplest formula of a compound containing 50 % of element A (at.wt=10) and 50 % of element B (at. wt = 20) is

A.  $AB$

B.  $A_2B$

C.  $AB_2$

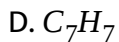
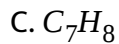
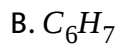
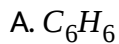
D.  $A_2B_3$

**Answer: B**



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**25.** A hydrocarbon was found to contain 91.3 % C. The molecular formula of the compound is

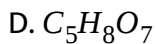
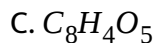
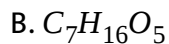
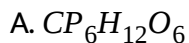


**Answer: C**



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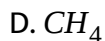
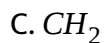
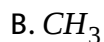
**26.** The molecular weight of an organic compound is 180. Its empirical formula is  $CH_2O$ . Its molecular formula is



**Answer: A**

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27. An organic compound containing C and H has 92.3% of carbon. Its empirical formula is

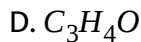
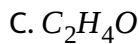


**Answer: A**

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28. An organic compound is found to contain  $C = 54.5\%$ ,  $O = 36.4\%$  and  $H = 9.1\%$  by mass. Its empirical formula is





**Answer: C**



**Watch Video Solution**

LIST - 1    LIST - 2

A)  $\text{C}_2\text{H}_6$     1) 90% of carbon

B)  $\text{C}_2\text{H}_6$     2) 75% of carbon

29. C)  $\text{C}_2\text{H}_4$     3) 80% of carbon

D)  $\text{C}_3\text{H}_4$     4) 85.7% of carbon

5) 60% of carbon

The correct match is

A.  $\begin{array}{cccc} \underline{A} & \underline{B} & \underline{C} & \underline{D} \\ 2 & 3 & 4 & 1 \end{array}$

B.  $\begin{array}{cccc} \underline{A} & \underline{B} & \underline{C} & \underline{D} \\ 5 & 1 & 2 & 4 \end{array}$

C.  $\begin{array}{cccc} \underline{A} & \underline{B} & \underline{C} & \underline{D} \\ 3 & 2 & 4 & 1 \end{array}$

D.  $\begin{array}{cccc} \underline{A} & \underline{B} & \underline{C} & \underline{D} \\ 2 & 1 & 5 & 3 \end{array}$

**Answer: A**



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**30.** In the reaction between acidified  $KMnO_4$  and  $FeSO_4$  solution, the number of electrons involved in the process is

A. 2

B. 5

C. 10

D. 6

**Answer: B**



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**31.** When 0.1 mole of  $BaCl_2$  is treated with 0.5 mole of  $Na_3PO_4$ , the maximum number of moles of Barium phosphate formed is

A. 0.25

B. 0.033

C. 0.283

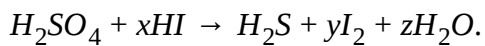
D. 0.33

**Answer: B**



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**32.** In a balanced equation



The values of x,y and z are

A. 3, 5 & 2

B. 4, 8 & 5

C. 8, 4 & 4

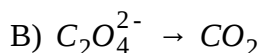
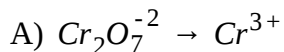
D. 5, 3 & 4

Answer: C

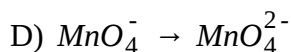
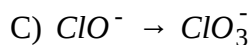


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LIST - 1



33.



LIST - 2

1) 2 electrons are involved

2) 1 electron is involved

3) 5 electrons are involved

4) 4 electrons are involved

5) 6 electrons are involved

The correct match is

A. 

<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
5	1	4	2

B. 

<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
2	5	3	4

C. 

<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
3	4	2	1

D. 

<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
1	2	3	4

Answer: A



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LIST - 1

LIST - 2

34. A)  $MnO_4^- \rightarrow Mn^{2+}$  1) 2  $H^+$  ions are required  
B)  $NH_2^- \rightarrow NO_2^-$  2) 3  $H^+$  ions are required  
C)  $CN^- \rightarrow CNO^-$  3) 8  $H^+$  ions are required  
D)  $Cr(OH)_3 \rightarrow Cr^{3+}$  4) 4  $H^+$  ions are required  
5) 6  $H^+$  ions are required

The correct match is

A.  $\begin{array}{cccc} \underline{A} & \underline{B} & \underline{C} & \underline{D} \\ 5 & 4 & 2 & 3 \end{array}$

B.  $\begin{array}{cccc} \underline{A} & \underline{B} & \underline{C} & \underline{D} \\ 3 & 4 & 1 & 5 \end{array}$

C.  $\begin{array}{cccc} \underline{A} & \underline{B} & \underline{C} & \underline{D} \\ 3 & 5 & 1 & 2 \end{array}$

D.  $\begin{array}{cccc} \underline{A} & \underline{B} & \underline{C} & \underline{D} \\ 5 & 2 & 3 & 5 \end{array}$

Answer: C



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35. When three moles of ozone completely reacts with  $SO_2$ , the number of moles of oxygen formed is



A. 3

B. 2

C. zero

D. 1

**Answer: C**



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**36.** 4g of hydrogen is burnt with 4g of oxygen. How many grams of water can be formed?

A. 0.5

B. 2.5

C. 4.5

D. 8

**Answer: C**

 [Watch Video Solution](#)

37. How much sulphur is to be burnt to produce 0.224 lit of  $\text{SO}_2$  at NTP?

A. 0.03 g

B. 0.32 g

C. 3.2 g

D. 32 g

**Answer: B**

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38. A mixture of 26ml of  $\text{H}_2$  and 24ml of  $\text{O}_2$  is exploded. After cooling the tube contains unreacted

A. 2ml of  $\text{H}_2$

B. 14 ml of  $\text{H}_2$

C. 23 ml of  $H_2$

D. 11 ml of  $O_2$

**Answer: D**



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**39.** To get 5.6 lit of  $CO_2$  at STP weight of  $CaCO_3$  to be decomposed is

A. 100g

B. 50g

C. 25g

D. 75g

**Answer: C**



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40. The volume of chlorine that can completely react with 100mg of hydrogen at STP is

- A. 1120 ml
- B. 1.12 ml
- C. 11.2 ml
- D. 112 ml

**Answer: A**



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41. When 10ml of  $H_2$  and 12.5 ml of  $Cl_2$  are allowed to react, the final mixture contains under the same conditions

- A. 22.5 ml of HCl
- B. 12.5 ml of HCl
- C. 20 ml of HCl and 2.5 ml of  $Cl_2$

D. 20 ml of HCl only

**Answer: C**



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**42.** The mass of 80 % pure calcium carbonate required to prepare 11.2 L of  $\text{CO}_2$  at STP is

A. 50g

B. 62.5g

C. 40g

D. 75g

**Answer: B**



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43. The volume of chlorine required for the complete reaction of 10 litres of  $H_2S$  at STP is  $[Cl_2 + H_2S \rightarrow 2HCl + S]$

A. 22.4L

B. 5 lit

C. 10 lit

D. 2.5 lit

**Answer: C**



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44. 6.5g of Zn is dissolved in excess of  $H_2SO_4$ . The weight of  $ZnSO_4$  formed and the volume of  $H_2$  gas liberated at STP are ( $Zn = 65$ )

A. 161 g, 2.24 L

B. 16.1 g, 2.24 L

C. 16.1g, 22.4 L

D. 16.1g, 11.2 L

**Answer: B**



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**45.** The volume of oxygen obtained when 9.60g ozone undergoes decomposition at STP is

A. 112 ml

B. 224 ml

C. 672 ml

D. 6.72 L

**Answer: D**



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46. 10g of a mixture of  $\text{CaCO}_3$  and  $\text{Na}_2\text{CO}_3$  on ignition suffered a loss in weight of 2.2g. The mass ratio of  $\text{CaCO}_3$  and  $\text{Na}_2\text{CO}_3$  is

- A. 1 : 1
- B. 1 : 1.4
- C. 1.4 : 1
- D. 1.75 : 1

**Answer: A**



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47. The mass of pure magnesite that suffers a loss in weight of 10g on ignition is

- A. 42g
- B. 19g
- C. 21g



D. 4.2g

**Answer: B**



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**48.** 60 gms of limestone on heating produced 22g of  $CO_2$ . The percentage of  $CaCO_3$  in limestone is

A. 80 %

B. 60 %

C. 83.3 %

D. 87.66 %

**Answer: C**



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49. What is the volume (in litres) of  $\text{CO}_2$  liberated at STP, when 2.12gms of sodium carbonate (MW=106) is treated with excess dilute HCl?

- A. 2.28
- B. 0.448
- C. 44.8
- D. 22.4

**Answer: B**



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50. In which of the following compounds the weight percentage of 'C' and 'H' are 80 and 20 respectively?

- A.  $\text{CH}_4$
- B.  $\text{C}_2\text{H}_4$
- C.  $\text{C}_2\text{H}_6$

D.  $C_6H_6$

**Answer: C**



**Watch Video Solution**

51. Two grams of sulphur is completely burnt in oxygen to form  $SO_2$ . In this reaction, what is the volume (in litres) of oxygen consumed at STP? (At.wts. of sulphur and oxygen are 32 and 16 respectively)

A. 16/22.414

B. 22.414/16

C. 22.414/32

D. 32/22.414

**Answer: B**



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52. What is the volume (inL) of oxygen required at STP to completely convert in 1.5 moles of sulphur into sulphur dioxide?

A. 11.2

B. 22.4

C. 33.6

D. 44.8

**Answer: C**



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## LIST - 1

A) 3 gram atom  
of oxygen

B) 2 gram atom  
of oxygen

C) 0.5 gram atom  
of oxygen

D) One gram atom  
of oxygen

## LIST - 2

1) 8.5 gr. of  $H_2O_2$

2) 11.2 lt. of  $CO_2$   
at STP

3) 22.4 lt. of  
Ozone

4) 49 grams of  
Sulphuric acid

5) One mole of  $CaCO_3$

53.

The correct match is

A. 

<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
1	4	2	3

B. 

<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
5	3	2	1

C. 

<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
4	3	5	2

D. 

<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
5	4	1	2

Answer: D



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54. Assuming that petrol is octane ( $C_8H_{18}$ ) and has a density of 0.8 gm/ml, 1.425 litres of petrol on complete combustion will consume

- A. 50 moles of  $O_2$
- B. 100 moles of  $O_2$
- C. 125 mole of  $O_2$
- D. 200 moles of  $O_2$

**Answer: C**



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55. The mass of oxygen required for the rusting of 4.2g of iron is  
( $Fe = 56$ )

- A. 1.2 g
- B. 1.8g
- C. 2.4 g

D. 3.2g

**Answer: B**



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**56.** 4.2g of baking soda on strong ignition in an open container leaves a residue of mass

A. 2.65 g

B. 3.1 g

C. 2.1g

D. 3.35g

**Answer: A**



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57. What weight of Al will be completely oxidised by 44.8 lit of oxygen at STP?

- A. 18g
- B. 37.8g
- C. 50.4g
- D. 72g

**Answer: D**



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58. 26c.c of  $\text{CO}_2$  is passed over red hot coke. The volume of CO evolved is (under the same condition)

- A. 15 c.c
- B. 10 c.c
- C. 32 c.c



D. 52 c.c

**Answer: D**



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**59.** If 2 litres of butane is completely burnt the volume of  $CO_2$  obtained under the same conditions would be

A. 2 lit

B. 4 lit

C. 6 lit

D. 8 lit

**Answer: D**



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60. The volume of  $O_2$  required for the combustion of 10 lit of methane under the same condition is

- A. 10 lit
- B. 22.4 lit
- C. 20 lit
- D. 2 lit

**Answer: C**



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61. The mass of zinc ( $Zn=65$ ) required to produce 224 ml of  $H_2$  at STP on treatment with dilute  $H_2SO_4$  is

- A. 6.5 g
- B. 0.65 g
- C. 3.25 g

D. 0.065 g

**Answer: B**



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**62.** One mole of aluminium can completely oxidise

A. 1.0 mole of HCl

B. 1.5 mole of HCl

C. 2.0 mole of HCl

D. 3.0 mole of HCl

**Answer: D**



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**63.** The volume of oxygen required at STP for the complete combustion of 2.2 g of propane

- A. 56 L
- B. 5.6 L
- C. 11.2 L
- D. 22.4 L

**Answer: B**



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**64.** 5.041 has how many significant figures?

- A. 1
- B. 2
- C. 3
- D. 4

**Answer: D**



**Watch Video Solution**

**65.** The number of significant figures in  $N_0 = 6.022 \times 10^{23}$  i.e., Avogadro's number is

A. Three

B. Four

C. five

D. Can be any of these

**Answer: B**



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**66.** In which of the following numbers all zeros are significant?

A.  $4.0\text{E-}5$

B. 0.006

C. 20

D. 0.8

**Answer: C**



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**67.** The value of Plank's constant is  $6.62618 \times 10^{-34}\text{Js}$ . The number of significant figures in it is:

A. Six

B. Five

C. Three

D. Thirty four

**Answer: A**

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**68.** 81.4g sample of ethyl alcohol contains 0.002g of water. The amount of pure ethyl alcohol (to the proper number of significant figures) is:

A. 81.398 g

B. 81.40 g

C. 81.4 g

D. 81 g

**Answer: C**

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**69.** The Rydberg's constant is  $1.097373177 \times 10^7 m^{-1}$ . It can be expressed to three significant figures as:

A.  $1.0974 \times 10^7 m^{-1}$

B.  $1.09 \times 10^7 m^{-1}$

C.  $1.10 \times 10^7 m^{-1}$

D.  $1.10^7 m^{-1}$

**Answer: C**



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**70.** The correctly reported difference of 16.4215 and 6.01 will have significant figures equal to

A. Three

B. Four

C. Five

D. Six

**Answer: B**



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## PROBLEM

1. What is the percentage weight of metallic element in the constitution of calcium carbonate?



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2. Two oxide of metal M have 27.6 % and 30 % oxygen by weight. If the formula of the first oxide is  $M_3O_4$  what is the formula of second oxide?



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3. Copper forms two oxides following law of variable proportions. One gram of each oxide in hydrogen gas gave 0.799 g and 0.888 g of the metal respectively. Give the composition of these oxides.



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4. What is the volume ratio of the product gases in the decomposition of phosphorus pentachloride?



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5. The weight percentages of carbon in carbon dioxide and carbon disulphide are respectively 27.27% and 15.79%. What is the composition of oxide of sulphur, if the weight percentage of oxygen is 50?



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6. If relative masses of He is taken as one unit, what is that of magnesium?



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7. The relative abundance of  $^{12}\text{C}$  and  $^{13}\text{C}$  are respectively 98.892 and 1.108. If the atomic masses of  $^{12}\text{C}$  and  $^{13}\text{C}$  are 12 u and 13.0035 u, respectively, calculate the average atomic mass of carbon.



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8. Neon is naturally available as  $^{20}\text{Ne}$  and  $^{22}\text{Ne}$  with average atomic mass 20.2. Calculate the relative abundance of heavier isotope.



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9. 3 litres each of Nitrogen and Hydrogen measured at STP are allowed to react together. Find the volumes of the gases after the reaction and also the weight of Ammonia formed in the reaction.



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10. Calculate the charge of one electron?



**Watch Video Solution**

11. Calculate the mass of one mole of electrons?



**Watch Video Solution**

12. How many moles are present in 54 grams of glucose?



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13. What is the density of carbondioxide at STP?



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14. What is the molecular mass of water?



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15. How many atoms are present in one cc of helium gas at STP?



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16. What is the ratio of number of molecules, if the mass ratio of  $N_2$  and  $O_2$  is 4:1?



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17. How many gram atoms are present in 4000 amu of calcium ?



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18. Find the charge on one gram ion of nitride ?



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**19.** Calculate the effective molecular weight of air



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**20.** When gypsum is totally dehydrated, what is the percentage weight loss ?



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**21.** Natural abundance of heavy water in water is 1 : 6000. How many heavy water molecules are present in one drop of water ? (one mL water is 20 drops)



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**22.** A solution is prepared by adding 4g of a solute A to 36 of water. Calculate the mass percent of the solute.



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**23.** Calculate the molarity of a solution prepared by dissolving its 4g NaOH in enough water to form 250mL of the solution.



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**24.** The density of 3M solution of NaCl is  $1.25 \text{ g mL}^{-1}$ . Calculate molality of the solution.



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**25.** The density of 4% (w/v) NaOH solution is 1.02 g/ml. What is the molality of the solution ?

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26. Find the normality of oxalic acid solution containing 63 g of crystalline oxalic acid in 500 ml of solution.

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27. Find the mass of  $\text{Na}_2\text{CO}_3$  required to prepare 3250 ml of 0.5N solution.

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28. Equivalent weights of  $\text{Na}_2\text{CO}_3$  and  $\text{Al}_2(\text{SO}_4)_3$

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29. Calculate the equivalent weight of  $\text{KMnO}_4$







[Watch Video Solution](#)

30. Calculate the equivalent weight of ferrous sulphate (a) as salt and (b) as reductant.



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31. What is gram equivalent weight of hydrogen peroxide as reductant?



[Watch Video Solution](#)

32. What is the equivalent weight of potassium dichromate in acidic medium ?



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33. What is the equivalent weight of oxalate ion  $C_2O_4^{-2}$  as reductant?



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 [Watch Video Solution](#)

**34.** What is the weight percent of oxygen in Glucose ?



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**35.** The weight percentage of iron in heamo-globin is 0.33. If the approximate molecular weight of heamoglobin is 68000, how many iron atoms are present in the molecule? (At.wt. of Fe is 56)



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**36.** An organic compound having C, H and S elements contains 4% sulphur. The minimum molecular weight of the compound is



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**37.** A commercial sample of common salt has 45.5 % chlorine. What is the weight percentage of pure sodium chloride in the sample?



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**38.** A compound contains 26.57 % potassium, 35.36 % chromium and the remaining oxygen. What is its empirical formula? (At.wt. of K=39.1, Cr=52, O=16)



**Watch Video Solution**

**39.** An organic compound contains carbon, hydrogen, oxygen and nitrogen in the weight ratio 3 : 1 : 8 : 3.5. Calculate its empirical formula.



**Watch Video Solution**

**40.** Combustion of 0.277g of an organic compound gave 0.66g carbondioxide and 0.337g water. Vapour density of the compound is equal to 37. Calculate its molecular formula.



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**41.** An organic compound on analysis was found to contain 16.27 % carbon. 0.67 % Hydrogen, 72.2 % chlorine. The V.D. of the compound is equal to 73.75. Calculate the empirical formula and molecular formula of the compound.



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**42.** Combustion of 0.202 g of a carbon compound gave 0.361 g of carbon dioxide and 0.147g of water. Determine the empirical formula of the compound.



**Watch Video Solution**

43. A carbon compound contains 12.8% Carbon, 2.1% Hydrogen, 85.1% Bromine. The molecular weight of the compound is 187.9. Calculate the molecular formula.



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44. The weight ratio of elements carbon, nitrogen and hydrogen in a compound of molecular mass 108 is 18:2:7. What is its molecular formula?



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45. The empirical formula an organic substance is  $CH_2O$ . If  $3 \times 10^{22}$  molecules of the substance has a mass of one sixth of mass of one gram mole of water, find the hybridisation of carbon atoms in the compound.



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46. Justify that the reaction :  $2\text{Cu}_2\text{O}(\text{s}) + \text{Cu}_2\text{S}(\text{s}) \rightarrow 6\text{Cu}(\text{s}) + \text{SO}_2(\text{g})$  is a redox reaction. Identify the species oxidised/reduced, which acts as an oxidant and which acts as a reductant.



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47. Can oxygen exhibit positive oxidation numbers in its compounds?



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48. What are the oxidation numbers of : (a) S in  $\text{H}_2\text{SO}_4$ , (b) Mn in  $\text{MnO}_4^-$  (c) N in  $\text{NH}_4^+$  and (d) Al in  $\text{AlO}_2^-$  (e) Mn in  $\text{MnO}_4^{2-}$



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49. What is the oxidation state of chromium in potassium dichromate?



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50. Oxidation number of oxygen in  $KO_2$  is



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51. Calculate the oxidation numbers of sulphur in  $H_2SO_5$  and in  $H_2S_2O_8$



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52. Using Stock notation, represent the following compounds :

$HAuCl_4$ ,  $Ti_2O$ ,  $FeO$ ,  $Fe_2O_3$ ,  $CuI$ ,  $CuO$ ,  $MnO$  and  $MnO_2$ .



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53. Oxidation number of the metal ion in the compound

$[CO(NH_3)_5Cl]Cl_2$  is +3. Calculate the oxidation number of the complex ion.



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54. The oxidation number of iron in brown ring complexes +x. What is value of x.



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55. Mention whether each of the following conversion involves oxidation or reduction.

a)  $HCl \rightarrow HOCl$ , b)  $KMnO_4 \rightarrow K_2MnO_4$  and c)  $HNO_3 \rightarrow NaNO_3$



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56. One mole of  $AO_2^-$  is oxidised to  $A^{n+}$  in acidic solutions by 0.4 mole of permanganate. Calculate the value of n in  $A^{n+}$ .



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57. Write the oxidation number of Hg in amalgam.



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58. One mole of hydrazine loses 10 moles of electrons. If all the hydrogen content is present in the product, the oxidation number of hydrogen in product is  $+x$ . What is value of  $x$ .



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59. Calculation of oxidation number of nitrogen in ammonium nitrite  
 $NH_4NO_2$



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60. Is the decomposition of magnesite a redox reaction ?



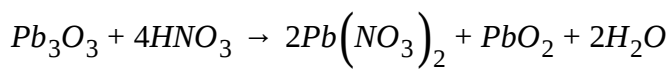
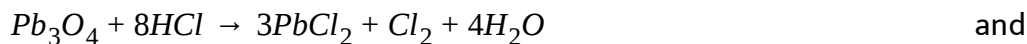
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61. Name the halogen that does not undergo disproportionation. Write the reason.



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62. Why do the following reactions proceed differently?



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63. Reaction between hydrogen sulphide and sulphurdioxide gives sulphur. Which type of redox reaction is this?



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64. How many electrons and protons are present in the balanced half equation?  $\text{NO}_2^- \rightarrow \text{NO}$



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65. How many hydroxyl ions are required for the conversion:  $\text{CN}^-_{(aq)}$  to  $\text{CNO}^-_{(aq)}$



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66. One gram atom of aluminium can reduce how many moles of chromic oxide?



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67. How many electrons are transferred in the oxidation of nitrite by hydrogen peroxide?

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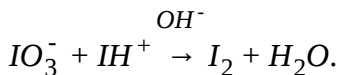
68. What is the ratio of coefficients of caustic soda and zinc metal in the reaction between zinc and NaOH?

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69.  $xKI + yH_2SO_4 \rightarrow I_2 + SO_2 + KHSO_4$ . In the above balanced equation, what are x and y?

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70. Calculate the mole coefficient of  $H^+$  in the balanced equation.

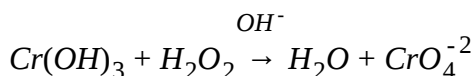
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71. In the reaction between dilute nitric acid and magnesium metal, (a) how many moles of  $HNO_3$  reacts with a gram atom of metal? and (b) how many moles of  $HNO_3$  is oxidised by a gram atom of metal?



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72. How many moles of  $OH^-$  are present in the balanced equation?



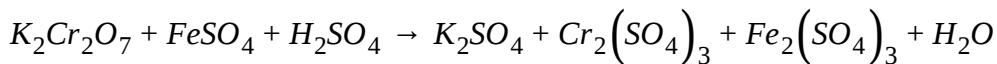
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73. How many moles of acidified permanganate are required to oxidise one mole of ferrous oxalate?



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74.



a) How many electrons are transferred

b) What is the mole coefficient of  $H_2O$ , in the above reaction?



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75. How many grams of 80 % pure marble stone on calcination can give 14 grams of quick lime?



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76. 10 grams of a hydrated sodium carbonate,  $Na_2CO_3 \cdot xH_2O$ , on strong heating loses a weight of 6.29 grams. Report the value of x.



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**77.** Calculate the percent weight loss suffered by sodium bicarbonate on strong heating?



**Watch Video Solution**

**78.** What volume of carbonmonoxide at 2 atm and  $273^{\circ}\text{C}$  is required in order to produce 5.6 grams of metal by the reduction of ferric oxide?



**Watch Video Solution**

**79.** Certain mass of potassium chlorate is thermally decomposed and 3.36 L of  $\text{O}_2$  is collected at STP. What will be the weight of the residue in the experiment?



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**80.** A sample of magnesium is partially oxidised to magnesia. 3 grams of such sample is treated with excess dilute sulphuric acid and the hydrogen collected measures 1.12 L at STP. What is the weight ratio of metal and metal oxide in the sample?



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**81.** 6 grams of magnesite mineral on heating liberated carbondioxide which measures 1.12 L at STP. What is the percentage purity of mineral?



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**82.** What volume of hydrogen at STP required to reduce 7.95 grams of cupric oxide to give metal?



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**83.** 30mL of mixture of methane and ethane in  $x : y$  ratio of volumes on combustion gave 40mL of carbon dioxide. If 30mL of mixture is taken in  $y:x$  ratio, what is the volume of carbon dioxide obtained under similar conditions?



**View Text Solution**

**84.** Calculate the volume of air, contained 21 % of oxygen by volume required for the complete combustion of 10 L of ethylene under similar conditions



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**85.** What is the volume of ammonia obtained starting from 2 L of nitrogen, if the conversion is only 6 % efficient in the given conditions?



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**86.** The production cost of hydrogen from a mineral acid using zinc is Rs. 12 per mole. How many electrons is worth of one rupee?



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**87.** 5.3 grams of anhydrous sodium carbonate is treated with dilute hydrochloric acid to give carbondioxide. In order to produce the same amount of gas. How many graphite atoms are to be oxidised?



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**88.** 11.2 L of oxygen STP and 8 grams of calcium are allowed to react. What volume of which chemical is left unreacted?



**Watch Video Solution**

**89.** 0.4 mole of orthophosphoric acid and 1.0 mole of calcium hydroxide were allowed to react. Calculate the maximum number of moles of

calcium phosphate formed.



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**90.** 4 grams of each pure hydrochloric acid and pure caustic soda are together dissolved in water. What weight of sodium chloride is obtained?



**View Text Solution**

**91.** Add  $6.65 \times 10^4$  and  $8.95 \times 10^3$ .



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**92.** Give the answer for  $2.5 \times 1.25$  in significant figures.



**View Text Solution**

1. Potassium permanganate oxidises oxalic acid in sulphuric acid medium to give potassium sulphate, manganous sulphate, carbon dioxide and water.



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2. Sulphuric acid oxidises hydroiodic acid to iodine and forms hydrogen sulphide and water.



[Watch Video Solution](#)

3. Manganese dioxide oxidises hydrochloric acid to chlorine and gives manganous chloride and water.



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4. Chlorine reacts with cold dilute caustic soda to give sodium chloride, sodium hypochlorite and water.



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5. Permanganate oxidises sulphite to sulphate in acidic solutions.



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6. Iodate oxidises chromic hydroxide and gives iodide and chromate in basic medium.



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7. Chromium metal in basic medium is oxidised in air to give chromic tetrahydroxide anion.



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8. Write phosphorous reacts with aqueous caustic soda to give hypophosphite and phosphine.



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9. Acetylene is oxidised by permanganate in acidic solutions to liberate carbondioxide.



**Watch Video Solution**

10. Calculate the weight of calcium carbonate required to produce carbondioxide that is sufficient for conversion of one decimole sodium carbonate to sodium bicarbonate.



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11. What weight of magnesia is obtained by complete combustion of two grams of metal?



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12. When 50 gm of a sample of sulphur was burnt in air 4% of the sample was left over. Calculate the volume of air required at STP containing 21% oxygen by volume.



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13. What is the weight of calcium carbonate required for the production of 1 L of carbon dioxide at  $27^{\circ}\text{C}$  and 750 mm, by the action of dilute hydrochloric acid?



Watch Video Solution

**14.** Calculate the volume of  $O_2$  at STP required to burn completely 70 ml of acetylene.



**Watch Video Solution**

**15.** 2 L of hydrogen and 2.5 L of chlorine are allowed react in diffused light. Write the volume composition of the component gases after reaction.



**Watch Video Solution**

**16.** 100 mL of phosphorus pentachloride is totally decomposed to its trichloride at 1 atm and  $546^\circ C$ . How many molecules of chlorine are formed?



**Watch Video Solution**



17. Methane undergoes slow atmospheric oxidation and produces carbonmonoxide. If  $2 \times 10^{22}$  oxygen molecules are used in such oxidation, what weight of methane is consumed?



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18. 50.0 kg of  $N_2(g)$  and 10.0 kg of  $H_2(g)$  are mixed to produce  $NH_3(g)$ . Calculate the  $NH_3(g)$  formed. Identify the limiting reagent in the production of  $NH_3$  in this situation.



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19. 100 mL of each acetylene and oxygen are mixed. The mixture is strongly heated to complete the reaction and colled back to room temperature. What is the maximum volume of carbondioxide obtained. Why?



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20. A jug contains 2L of milk. Calculate the volume of the milk in  $m^3$ .



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21. How many seconds are there in 2 days ?



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### Subjective Exercise -1 (Long answer questions)

1. State the law of definite proportions. Suggest one problem to understand the law by working out that problem.



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### Subjective Exercise -1 (Short answer questions)

1. Define and explain molar mass.



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2. State and explain the law of conservation of mass.



**Watch Video Solution**

3. State and explain the law of multiple proportions.



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4. State and explain the law of multiple proportions.



**Watch Video Solution**

5. State and explain Gay-Lussac's law of combining volumes.



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6. Explain the mole concept.



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7. There is no need that a given species must always possess equivalent weight always constant? Is it true? Explain.



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8. The equivalent weight of sulphuric acid is given as 98. How far it is true when sulphuric acid is a dibasic acid?



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9. Calculate the molecular weight of aluminum sulphate  $Al_2(SO_4)_3$



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10. Calculate the molar masses of  $C_{12}H_{22}O_{11}$  and  $CaCO_3$ .



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11. Find out the number of moles of sodium bicarbonate present in 5.08 gm of sodium bicarbonate ( $NaHCO_3$ ).



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12. Calculate the number of moles of helium in 6.46 gm of helium (at wt. of helium =4)



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13. Calculate the number of moles of zinc in 23.3 gm of zinc.



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### Subjective Exercise -1 (Very short answer questions)

1. What is the weight of 0.0590 mole of aspirin ( $C_9H_8O_4$ )



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2. Find the ratio of volumes of  $H_2$  and  $O_2$  reactions and also to the water vapour formed under similar condition when 1000 ml of  $H_2$  reacts with 500 ml  $O_2$  to form 1000 ml of water vapour.



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3. How many moles of glucose are there in

a) 540 gm glucose b) 900 gm glucose



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4. How many glucose molecules are present in 5.23 gm of glucose



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5. Calculate the volume occupied by 2 moles of  $\text{NO}_2$  at STP.



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6. Calculate the number of molecules present in  $1.12 \times 10^{-7}$  c.c. of a gas at STP (c.c.- cubic centimeters =  $\text{cm}^3$ ).



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7. Calculate the real mass of one carbon atom



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## Subjective Exercise -2 (Short answer questions)

1. Distinguish between empirical and molecular formula



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2. How is empirical formula of a compound determined ?



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3. Give methods for estimating percentage of element.



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4. Write the systematic approach of arriving at molecular formula of a substance.



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### Subjective Exercise -3 (Long answer questions)

1. Explain the different types of redox reactions.



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2. Explain the role of redox reactions in titrimetre processes and galvanic cells.



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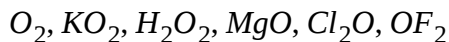
### Subjective Exercise -3 (Short answer questions)

1. Calculate the oxidation number of hydrogen in different states making use of the following formulae.  $H$ ,  $HCl$ ,  $H_2O$ ,  $NaH$



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2. Calculate the oxidation number of oxygen in the following:



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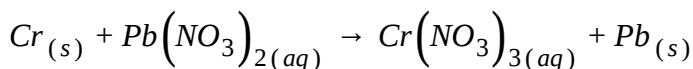
3. What is general oxidation number of oxygen in its compounds?

Mention two exceptions, giving one example each, where oxygen shows other than general oxidation state.



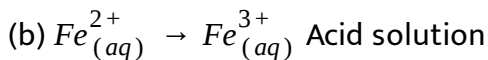
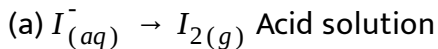
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4. Balance the following equation by the oxidation number method.



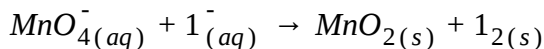
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5. Balance the following half reactions by ion-electron method.



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6. Balance the following redox reaction in basic medium by ion-electron method :



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7. Explain any two types of redox reactions with examples.



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8. Write the electrode reactions in a Daniel cell.

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9. Chemical analysis a carbon compound gave following percentage composition by weight of the element present, carbon = 10.06%, hydrogen = 0.84%, chlorine = 89.10%. Calculate the empirical formula of the compound.

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10. A carbon compound on analysis gave the following percentage composition, carbon 14.5%, hydrogen 1.8%, chlorine 64.46%, oxygen 19.24%. Calculate the empirical formula of the compound.

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11. 0.2g of an organic compound on analysis give 0.147g of carbondioxide, 0.12 g of water and 74.6 c,c of nitrogen at S.T.P. Calculate the weight percentages of constituents.



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12. The empirical formula of a compound is  $CH_2O$ . Its molecular weight is 90. Calculate the molecular formula of the compound.



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13. A compound contains 4.07% hydrogen, 24.27% carbon and 71.65% chlorine. Its molar mass is 98.96 g. What are its empirical and molecular formulas ?



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14. Combustion of 0.6gm of an organic compound gave 1.17gm of carbondioxide. 0.84 gm of water. Vapour density of the compound is equal to 22.4. The compound contains carbon, hydrogen and nitrogen. Calculate the molecular formula.



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15. For two redox couple  $A^{2+}/A$  and  $B^2/B$  the reduction potential values are  $-1.28V$  and  $+0.34V$ . Which is a strong reduction agent? Can both of them displace  $H_2$  from dilute hydro chloric acid? Why?

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16. How are the end points of titrations detected in the following reactions ?

a)  $MnO_4^{-2}$  oxidises  $Fe^{2+}$

b)  $Cr_2O_7^{2-}$  oxidises  $Fe^{2+}$

c)  $Cu^{+2}$  oxidises  $I^-$

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Subjective Exercise -3 (Very short answer questions)

1. What is oxidation - reduction reaction or redox reaction ? Give one example.



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2. Chemical decomposition need not involve redox process. Answer it with one example



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3. Aluminothermit process is an example for which type of redox change?  
Which substance is the reducing agent here?



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4. What are disproportionate reactions? Give example.



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5. What is comproportionation reactions? Give example.

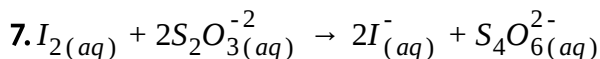


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6. What is the role of a salt bridge in a daniel cell?



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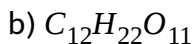
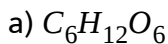


For the above titrimetric reaction how is the end point determined?



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8. Calculate the oxidation number of carbon in the following:







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9. What is the oxidation number of manganese in  $KMnO_4$ ?



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10. Calculate the oxidation number of sulphur in  $SO_4^{2-}$ ?



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11. What is the oxidation number of managanese in  $MnSO_4$ ?



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12. Calculate the oxidation number of iron in  $Fe_3O_4$ ?



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13. Calculate the oxidation number of sulphur in  $H_2S_2O_8$ ? (Hint: Two of the oxygens form peroxide bond)



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14. What is the common oxidation number of halogens, when they are in combined state with metals?



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15. Write the formulae for the following compounds.

a) Mercury (II) chloride

b) Nickel (II) sulphate

c) Tin (IV) oxide

d) Thallium (I) sulphate

e) Iron (III) sulphate

f) Chromium (III) oxide.



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16. While sulphur dioxide and hydrogen peroxide act as oxidising as well as reducing agents in their reactions, ozone and nitric acid act only as oxidants. Why?



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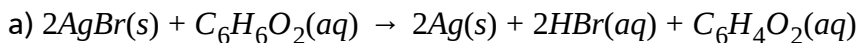
17. Consider the elements Cs, Ne, I and F.

- a) Identify the element that exhibits only negative oxidation state.
- b) Identify the element that exhibits only positive oxidation state.
- c) Identify the element that exhibit both positive and negative oxidation states
- d) Identify the element which neither exhibit the negative nor does the positive oxidation state.

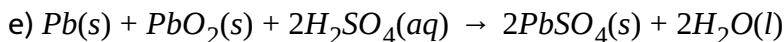
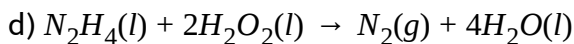
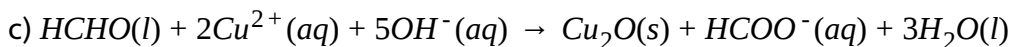
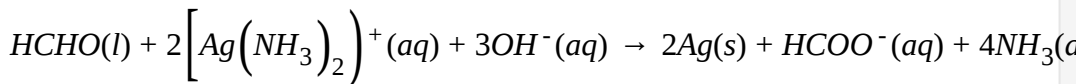


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**18.** Identify the substance oxidised, reduced, oxidising agent and reducing agent for each of the following reactions :

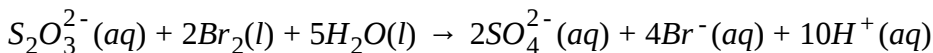
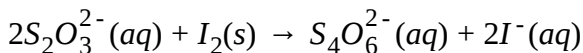


b)



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**19.** Consider the reactions



Why does the same reductant, thiosulphate react differently with iodine and bromine ?



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20. Why does the same reductant, thiosulphate react differently with iodine and bromine ?



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21. Using the standard electrode potentials predict if the reaction between the following is feasible.

(a)  $Fe^{3+}(aq)$  and  $I_{aq}^-$  (b)  $Ag_{aq}^+$  and  $Cu_s$



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22. Given the standard electrode potentials

$K^+ / K = -2.93V$ .  $Ag^+ / Ag = 0.80V$ .

Which among them has greater reducing power ?



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**23.** Predict the products of electrolysis in each of the following:

(i) An aqueous solution of  $AgNO_3$  with silver electrodes.

(ii) An aqueous solution of  $AgNO_3$  with platinum electrodes.

(iii) A dilute solution of  $H_2SO_4$  with platinum electrodes.

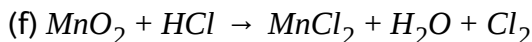
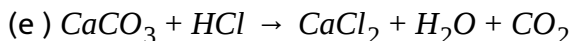
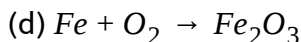
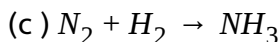
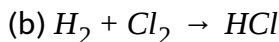
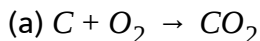
(iv) An aqueous solution of  $CuCl_2$  with platinum electrodes.

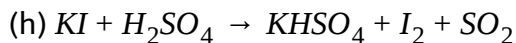


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### Subjective Exercise -4 (Short answer questions)

**1.** Balance the following equations and write down the stoichiometric proportions.





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2. Calculate the volumes of gases after the reaction and also the weight of  $CO_2$  formed when 1 litre of oxygen reacts with 3 times of carbon monoxide measured at STP.



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3. The approximate production of sodium carbonate per month is  $424 \times 10^6$ g. While that of methyl alcohol is  $320 \times 10^6$  gm. Which is produced more in terms of moles ?



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4. What amount of  $CaO$  is produced by 1 gm of calcium with oxygen.



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5. What weight of  $O_2$  is obtained when 0.245gm of  $KClO_3$  decomposes completely to  $KCl$  and  $O_2$ :



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6. How much of lime,  $CaO$  can be obtained by the calcination of 400 gm of lime stone?



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7. What volume of  $CO_2$  is obtained at STP by heating 4 g of  $CaCO_3$  ?



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8. What is the value ( in litres) of  $CO_2$  liberated at STP when 2.12 g of sodium carbonate (mol.wt.106) is treated with



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9. What is the weight of  $NaHCO_3$  required to give 0.56 lit of  $CO_2$  at STP on heating ?



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10. What volume of  $NH_3$  is formed when 2.24lit of  $N_2$  combine with 4.48 litres of  $H_2$  at STP.



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11. An astronaut receives the energy required in his body by the combustion of 34g of sucrose per hour. How much oxygen he has to carry

along with him for his energy requirement in a day?



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**12.** Calculate the volume of oxygen gas required at STP conditions for the complete combustion of 10 cc of methane gas at  $20^{\circ}\text{C}$  and 770mm pressure.



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**13.** What is the weight of calcium carbonate required for the production of 1 L of carbon dioxide at  $27^{\circ}\text{C}$  and 750 mm, by the action of dilute hydrochloric acid?

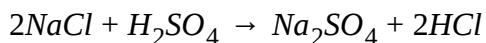


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**14.** Calculate the volume of  $\text{H}_2$  liberated at  $27^{\circ}\text{C}$  and 760 mm of Hg pressure by action by 0.6 g magnesium with excess of dil HCl.

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15. Calculate the amount of 90%  $H_2SO_4$  required for the preparation of 420 kg HCl.

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16. Calculate the weight of lime ( $CaO$ ) that can be prepared by heating 200 kg of lime stone ( $CaCO_3$ ) which is 90 % pure.

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17. Calculate the amount of water (g) produced by the combustion of 16 g of methane.

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18. How many moles of methane are required to produce 22g  $\text{CO}_2$  after combustion?



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19. Which is cheaper for generating hydrogen gas by action of excess acid is on

Zn metal

(b) Mg assuming the price of Zn is Rs 10/per kg and Mg as Rs 25/-per kg.



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### Subjective Exercise -5 (Short answer questions)

1. Write on scientific notation.



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2. What are significant figures.



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### Subjective Exercise -5 (Very short answer questions)

1. What is the factor label method?



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2. What is unit factor.



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3. Is zero a significant figure ?



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4. Add 12, 11, 18 and 1.012 and report in significant figures.



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## Objective Exercise -1

1. Chemical equation is balanced according to the law of

- A. Multiple proportions
- B. Reciprocal proportions
- C. Conservation of mass
- D. Definite proportions

**Answer: C**



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2. Two gaseous samples were analysed. One contained 1.2 g of carbon and 3.2 g of oxygen. The other contained 27.3% carbon and 72.7% oxygen. The experimental data is in accordance with

- A. Law of conservation of mass
- B. Law of definite proportions
- C. Law of reciprocal proportions
- D. Law of multiple proportions

**Answer: B**



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3. Percentage of copper and oxygen in samples of  $\text{CuO}$  obtained by different methods were found to be the same. This proves the law of

- A. Constant proportions
- B. Reciprocal proportions

C. Multiple proportions

D. Conservation of mass

**Answer: A**



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4. (A) : The law of conservation of mass holds good for all reactions. (B) : Nuclear reactions can not proceed according to law of conservation of mass.

- A. Both A and R are true and R is the correct explanation of A
- B. Both A and R are true but R is not the correct explanation of A
- C. A is true and R is false
- D. R is true and A is false

**Answer: D**



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5. "The total mass of reactants is always equal to the total mass of products in a chemical reaction." This statement is known as

- A. Law of conservation of mass
- B. Law of definite proportions
- C. Law of equivalent weights
- D. Law of combining masses

**Answer: A**



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6. In the reaction between hydrogen and oxygen gives water vapour, the ratio of volumes is 2 : 1 : 2. This illustrates the law of

- A. conservation of mass
- B. combining weights

C. combining volumes

D. all the above

**Answer: C**



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7. Law of combining volumes was proposed by

A. Lavoisier

B. Gay Lussac

C. Avogadro

D. Dalton

**Answer: B**



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8. Two samples of lead oxide were separately reduced to metallic lead by heating in a current of hydrogen. The weight of lead from one oxide was half the weight of lead obtained from the other oxide. The data illustrates.

- A. Law of reciprocal proportions
- B. Law of constant proportions
- C. Law of multiple proportions
- D. Law of equivalent proportions

**Answer: C**



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9. One part of an element A combines with two parts of B (another element). Six parts of element C combine with four parts of element B. If A and C combine together the ratio of their masses will be governed by:

- A. law of definite proportions
- B. law of multiple proportions
- C. law of reciprocal proportions
- D. law of conservation of mass

**Answer: C**



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**10.** 14g of element X combine with 16 g of oxygen. On the basis of this information, which of the followings is a correct statement?

- A. The element X could have an atomic weight of 7 and its oxide is  $\text{XO}$
- B. The element X could have an atomic weight of 14 and its oxide formula is  $\text{X}_2\text{O}$
- C. The element X could have an atomic weight of 7 and its oxide is  $\text{X}_2\text{O}$

D. The element X could have an atomic weight of 14 and its oxide is



**Answer: C**



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11. Chemical equation is balanced according to the law of

- A. Multiple proportions
- B. constant proportions
- C. reciprocal proportions
- D. Conservation of mass

**Answer: D**



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12.

LIST - 1

A) Law of conservation of Mass

B) Avogadro's Law

C) Gay-Lussac's Law of combining volumes

D) Law of conservation of energy

LIST - 2

1)  $V_1/V_2 = n_1/n_2$

2)  $2H_{2(s)} + O_{2(g)} \rightarrow 2H_2O_{(s)}$

3)  $12g \text{ of } C + 32g \text{ of } O_2 = 44g CO_2$

5)  $H_{2(g)} + Cl_{2(g)} \rightarrow 2HCl_{(g)}, \Delta H = -184.6 \text{ kJ}$

A. A-3, B-1, C-4, D-5

B. A-3, B-1, C-5, D-4

C. A-3, B-1, C-2, D-5

D. A-1, B-2, C-4, D-5

**Answer: A**



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13. Carbon and oxygen combine to form two oxides, carbon monoxide and carbond dioxide in which the ratioi of the weights of carbon and oxygen is respectively 12:16 and 12:32. these figures illustrate the

- A. Law of multiple proportions
- B. Law of reciprocal proportions
- C. Law of conservation of mass
- D. Law of constant proportions

**Answer: A**



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**14.** Two elements X (at.mass 16) and Y (at. mass 14) combine to form compounds A, which combine with a fixed mass of X in A, B and C is 1:3:5. If 32 parts by mass of X combines with 84 parts by mass of Y in B, then in C 16 parts by mass of X will combine with

- A. 14 parts by mass of Y
- B. 42 parts by mass of Y
- C. 70 parts by mass of Y
- D. 84 parts by mass of Y

**Answer: C**



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15. 4.4g of an oxide of nitrogen gives 2.24L of nitrogen and 60g of another oxide of nitrogen gives 22.4L of nitrogen at S.T.P. The data illustrates

- A. Law of conservation of mass
- B. Law of constant proportions
- C. Law of multiple proportions
- D. Law of reciprocal proportions

**Answer: C**



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16. Which one of the following is an isobar of  ${}^6_{14}\text{C}$  ?



A.  ${}_6C^{13}$

B.  ${}_6C^{12}$

C.  ${}_7C^{14}$

D.  ${}_7N^{15}$

**Answer: C**



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**17. The molar volume of any gas at STP is**

A. 1 litre

B. 22.414 lit

C.  $6.02 \times 10^{23}$  lit

D. 22.414 ml

**Answer: B**



**Watch Video Solution**

18. One gram - atom of oxygen is

- A. 1 g of oxygen
- B. 16g of oxygen
- C. 22.4 g of oxygen
- D. 8g of oxygen

**Answer: B**



**Watch Video Solution**

19. One gram molecule of oxygen is

- A. 16 gms of oxygen
- B. 32 gms of oxygen
- C. 8 gms of oxygen

D. 1 gms of oxygen

**Answer: B**



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**20.** Avogadro number is

A. The number of atoms in one gram-atomic- weight

B. The number of molecules in one gram:

C. The number of atoms in 0.012 kg of C-12

D. all of these

**Answer: D**



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21. A mole is defined so

- A) the amount of substance containing the same number of chemical units as the number of atoms in exactly 12g of  $C^{12}$
- B) the amount of substance containing Avogadro number of chemical units
- C) the unit for expressing amount of a substance

A. The amount of substance containing the same number of chemical units as the number of atoms in exactly 12g of  $C^{12}$

B. The amount of substance containing Avogadro number of chemical units

C. The unit for expressing amount of a substance

D. All the above

**Answer: D**



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**22.** The mass of a mole of hydrogen atoms is

A. 1.008g

B. 2.016g

C.  $6.02 \times 10^{23}g$

D. 1.008amu

**Answer: A**



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**23.** The molar mass of hydrogen is

A. 1.008g

B. 2.016g

C.  $6.02 \times 10^{23}g$

D. 2.016 amu

**Answer: B**



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24. One mole of atoms of oxygen represents

A.  $6.02 \times 10^{23}$  atoms of oxygen

B. 32 g of oxygen

C. 22.4L of  $O_2$  at STP

D. 8g of oxygen

Answer: A



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25. The number of molecules in one litre of air at STP is

A.  $\frac{6.02 \times 10^{23}}{32}$

B.  $\frac{6.02 \times 10^{23}}{22.4}$

C.  $32 \times 22.4$

D.  $\frac{32}{22.4}$

**Answer: B**



**Watch Video Solution**

**26.** Which of the following contains the least number of molecules ?

A. 0.5 g atom of Zn

B. 0.645g of Zn

C. 0.25 mole of Zn

D.  $6.45 \times 10^{20}$  amu of Zn

**Answer: D**



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27. Air contains nitrogen and oxygen in the volume ratio of 4:1. The average molecular weight of air is

- A. 30
- B. 28.8
- C. 28
- D. 14.4

**Answer: B**



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28. The number of gram atoms of hydrogen present in 1.5 mole of hydrogen sulphide is

- A. 3
- B. 2
- C. 1.5



D. 1

**Answer: A**



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**29.** One mole of molecules of dioxygen represents

A.  $6.02 \times 10^{23}$  molecules of oxygen

B. 8gms of oxygen

C. 16g of  $O_2$

D. 11.2L of  $O_2$  at STP

**Answer: A**



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**30.** One mole of sodium represents

A.  $6.02 \times 10^{23}$  atoms of sodium

B. 46 gms of sodium

C. 11g of sodium

D. 34.5 g of sodium

**Answer: A**



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**31.** The charge present on 1 mole electrons is

A. 96500 Coulombs

B. Coulomb

C.  $1.60 \times 10^{-19}C$

D. 0.1 Faraday

**Answer: A**



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32. The weight of 0.1 mole of  $\text{Na}_2\text{CO}_3$  is

A. 106g

B. 10.6g

C. 5.3g

D.  $6.02 \times 10^{22}g$

**Answer: B**



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33. The molar mass of a substance is 20g. The molecular mass of the substance is

A. 20g

B. 20amu

C. 10g

D. 10amu

**Answer: B**



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**34.** Avogadro number of helium atoms have a mass of

A. 2g

B. 4g

C. 8g

D.  $4 \times 6.02 \times 10^{23}g$

**Answer: B**



**Watch Video Solution**

**35.** The volume of two moles of oxygen at STP

A. 22.4L

B. 11.2L

C. 40L

D. 44.8L

**Answer: D**



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**36.** The following property of a gas does not vary with pressure and temperature.

A. density

B. volume of a mole

C. volume

D. vapour density

**Answer: D**

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37. The ratio between the number of molecules in equal masses of nitrogen and oxygen is

A. 7:8

B. 1:9

C. 9:1

D. 8:7

**Answer: D**

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38. The gas which is twice as dense as oxygen under the same conditions is

A. Ozone

B. Sulphur trioxide

C. Sulphur dioxide

D. Carbon dioxide

**Answer: C**



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**39.** 1 mole of water vapour is condensed to liquid at  $25^{\circ}\text{C}$ . Now this water contains

i) 3 moles of atoms

ii) 1 mole of hydrogen molecules

iii) 10 moles of electrons

iv) 16 g of oxygen The correct combination is

A. (i) and (ii)

B. (i) and (iii)

C. (i) & (iv)

D. All are correct

**Answer: D**



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**40.** A chemical equation is always balanced with respect which one of the following

(i) Number of atoms (ii) Number of molecules

(iii) Number of moles (iv) Mass

A. Only i is correct

B. Only iii correct

C. Only iv Correct

D. Both i & iv correct

**Answer: D**



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41. Which of the following has highest mass?

A. One gram atom of Iron

B. 5 moles of  $N_2$

C.  $10^{24}$  carbon atoms

D. 44.8 lit of He at SIP

Answer: B



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42. 1 gram of hydrogen contains  $6 \times 10^{23}$  atoms. Then 4 grams of He contains

A.  $6 \times 10^{23}$  atoms

B.  $12 \times 10^{23}$  atoms

C.  $24 \times 10^{23}$  atoms

D.  $1.5 \times 10^{23}$  atoms

**Answer: A**



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**43.** Elements 'A' and 'B' combine in the ratio of their

- A. Atomic weights
- B. Molecular weights
- C. Equivalent weights
- D. Mass numbers

**Answer: C**



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**44.** Mg of a substance when vaporized occupy a volume of 5.6 litre at NTP.

The molecular mass of the substance will be:

A. M

B. 2M

C. 3M

D. 4M

**Answer: D**



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**45.** Which among the following is the heaviest?

A. One mole of oxygen

B. One molecule of sulphur trioxide

C. 100 moles of hydrogen

D. 44 g of carbon dioxide

**Answer: C**



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46. Molecular weight of orthophosphoric acid is  $M$ . Its equivalent weight is

A.  $3M$

B.  $M$

C.  $\frac{M}{2}$

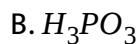
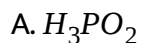
D.  $\frac{M}{3}$

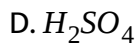
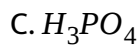
**Answer: D**



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47. Which of the following acid has the same molecular weight and equivalent weight





**Answer: A**



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**48.** The equivalent mass of  $CaCO_3$

A. 100

B. 50

C. 33.3

D. 25

**Answer: B**



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49. 0.5g of a metal on oxidation gave 0.79g of its oxide. The equivalent mass of the metal is

- A. 10
- B. 14
- C. 20
- D. 40

**Answer: B**



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50. The vapour density of a volatile chloride of a metal is 59.5 and the equivalent mass of the metal is 24. The atomic mass of the element will be

- A. 96
- B. 48

C. 24

D. 12

**Answer: B**



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**51. Which one of the relationship is wrong?**

A. 2 Vapour Density -Mol. Mass

B. At. Mass = Eq. mass  $\times$  valency

C. At. Mass =  $\frac{6.4}{\text{Sp. Heat}}$

D. Valency =  $\frac{\text{Mol. Mas}}{\text{Eq. mass}}$

**Answer: D**



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52. Total number of atoms in 44g of  $\text{CO}_2$  is

A.  $6.02 \times 10^{23}$

B.  $6.02 \times 10^{24}$

C.  $1.806 \times 10^{24}$

D.  $18.06 \times 10^{22}$

**Answer: C**



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53. The flask A and B of equal size contain 2g of  $\text{H}_2$  and 2g of  $\text{N}_2$  respectively at the same temperature. The number of molecules in flask

A. same as those in flask B

B. less than those in flask B

C. greater than those in flask B

D. exactly half than those in flask B



**Answer: C**



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**54.** The following is not a fixed quantity

- A. atomic weight of an element
- B. equivalent weight of an element
- C. molecular weight of a compound
- D. formula weight of a substance

**Answer: B**



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**55.** Equivalent weights of  $K_2Cr_2O_7$  in acidic medium is

- A. 24.5

B. 49

C. 147

D. 296

**Answer: B**



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**56.** The equivalent weight of Bayer's reagent is

A. 31.6

B. 52.6

C. 79

D. 158

**Answer: B**



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57. Molecular weight of  $KMnO_4$  is "M". In a reaction  $KMnO_4$  is reduced to  $KMnO_2$ . The equivalent weight of  $KMnO_4$  is

A. M

B.  $\frac{M}{2}$

C.  $\frac{M}{3}$

D.  $\frac{M}{5}$

**Answer: A**



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58. When Ferrous sulphate acts as reductant, its equivalent weight is

A. twice that of its molecular weight

B. equal to its molecular weight

C. one-half of its molecular weight

D. one-third of its molecular weight

**Answer: B**



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**59.**  $2H_2O \rightarrow 4e^- + O_2 + 4H^+$ . The equivalent weight of oxygen is

A. 32

B. 16

C. 8

D. 4

**Answer: C**



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**60.** In acidic medium dichromate ion oxidises ferrous ion to ferric ion. If the grammolecular weight of potassium dichromate is 294 gm, its equivalent weight is

A. 294

B. 147

C. 49

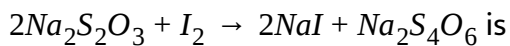
D. 24.5

**Answer: C**



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**61.** The equivalent weight of Hypo in the reaction [M = molecular weight]



A. M

B.  $\frac{M}{2}$

C.  $\frac{M}{3}$

D.  $\frac{M}{4}$

**Answer: A**

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62. The equivalent weight of  $\text{CuSO}_4$  when it is converted to  $\text{Cu}_2\text{I}_2$  [M = mol.wt]

A.  $\frac{M}{1}$

B.  $\frac{M}{2}$

C.  $\frac{M}{3}$

D.  $2M$

**Answer: A**

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63. The sulphate of an element contains 42.2% element. The equivalent mass would be

A. 17

B. 35

C. 51

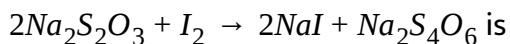
D. 68

**Answer: B**



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**64.** The equivalent weight of hypo in the reaction [M is molecular weight]



A. M

B.  $\frac{M}{2}$

C.  $\frac{M}{3}$

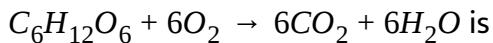
D. 2M

**Answer: B**



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65. The equivalent weight of glucose in the reaction



[M is molecular weight]

A.  $\frac{M}{4}$

B.  $\frac{M}{12}$

C.  $\frac{M}{24}$

D.  $\frac{M}{48}$

**Answer: C**

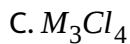


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66. The atomic weight of a metal (M) is 27 and its equivalent weight is 9, the formula of its chloride will be

A. MCl





**Answer: D**



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Medium

Equivalent weight of  $KMnO_4$

A) Acidic

a) 158

**67.** B) Neutral

b) 79

C) Strongly basic

c) 52.6

D) Weakly basic

d) 31.6

The correct match is

A. A-d, B-c, C-a, D-c

B. A-d, B-c, C-a, D-b

C. A-d, B-b, C-a, D-c

D. A-d, B-c, C-a, D-a

**Answer: A**



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**68.** The equivalent weight of a tetravalent element is 8, the relative vapour density of its oxide is

A. 16

B. 8

C. 64

D. 32

**Answer: D**



**Watch Video Solution**

**69.** For the reaction  $Fe_2S_3 + 5O_2 \rightarrow 2FeSO_4 + SO_2$  the equivalent weight of  $Fe_2S_3$  is-

A.  $\frac{M}{4}$

B.  $\frac{M}{16}$

C.  $\frac{M}{22}$

D.  $\frac{M}{20}$

**Answer: D**



**Watch Video Solution**

**70.** In the redox ionic equation

$2\text{MnO}_4^- + \text{Br}^- + \text{H}_2\text{O} \rightarrow 2\text{MnO}_2 + \text{BrO}_3^- + 2\text{OH}^-$  the equivalent weight of potassium permanganate of molar mass  $M \text{ g mol}^{-1}$  is

A.  $\frac{M}{5}$

B.  $\frac{M}{3}$

C.  $\frac{M}{6}$

D.  $\frac{M}{2}$

**Answer: B**



**Watch Video Solution**

**71.** The number of millimoles of  $H_2SO_4$  present in 5 litres of 0.2N  $H_2SO_4$  solution is

A. 500

B. 1000

C. 250

D.  $0.5 \times 10^{-3}$

**Answer: A**



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**72.** The number of Glucose molecules present in 10 ml of decimolar solution is

A.  $6.0 \times 10^{20}$

B.  $6.0 \times 10^{19}$

C.  $6.0 \times 10^{21}$

D.  $6.0 \times 10^{22}$

**Answer: A**



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**73.** 0.1 gram mole of urea is dissolved in 100g. of water. The molality of the solution is

A. 1m

B. 0.01M

C. 0.01M

D. 1.0M

**Answer: A**

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74. Aqueous NaOH solution is labelled as 10% by weight mole fraction of the solute in it is

- A. 0.05
- B. 0.476
- C. 0.052
- D. 0.52

**Answer: B**

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75. 6g. of Urea is dissolved in 90g. of water. The mole fraction of solute is

- A.  $\frac{1}{5}$
- B.  $\frac{1}{50}$

C. 1/51

D. 1/501

**Answer: C**



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LIST - 1

(Molecules)

A) Glucose

B) Oxalic acid

76. C) Inorganic Benzene

C) Inorganic Benzene

D) Oxygenated water

LIST - 2

(Empirical formula)

1)  $BNH_2$

2)  $CH_2O$

3)  $CH$

4)  $CHO_2$

4)  $CHO_2$

5)  $HO$

The correct match is

A. A-3, B-5, C-2, D-4

B. A-2, B-4, C-1, D-5

C. A-1, B-3, C-2, D-4

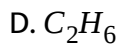
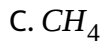
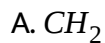
D. A-4, B-2, C-1, D-3

**Answer: B**



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77. A compound contains carbon and hydrogen in the mass ratio 3:1. The formula of the compound is



**Answer: C**



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78. The metal which can form an oxide having metal: oxygen ratio 2:3 is



A. Bi

B. Sn

C. Na

D. Ba

**Answer: A**



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**79.** An organic compound on analysis was found to contain 0.032% of sulphur. The molecular mass of the compound. If its molecule contains two sulphur atoms, is

A. 200

B. 2000

C. 20000

D. 200000

**Answer: D**



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**80.** The percentage of oxygen in  $\text{NaOH}$  is

A. 40

B. 6

C. 8

D. 20

**Answer: B**



**Watch Video Solution**

**81.** The empirical formula of acetic acid is the same as that of

A. Sucrose

B. Glucose

C. Oxalic acid

D. Formic acid

**Answer: B**



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**82.** A compound contains 90 % *C* and 10 % *H*. The empirical formula of the compound is

A.  $C_8H_{10}$

B.  $C_{15}H_{30}$

C.  $C_3H_4$

D.  $C_{15}H_{40}$

**Answer: C**



**Watch Video Solution**

83. 0.14 g of an element on combustion gives 0.28 g of its oxide. What is that element ?

- A. Nitrogen
- B. Carbon
- C. Fluorine
- D. Sulphur

**Answer: C**



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84. 60g of a compound on analysis gave  $C = 24g$ ,  $H = 4g$  and  $O = 32g$ . Its empirical formula is

- A.  $C_2H_4O_2$
- B.  $C_2H_2O_2$



**Answer: D**



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**85.** An alkaloid contains 17.28% of nitrogen and its molecular mass is 162.

The number of nitrogen atoms present in one molecule of the alkaloid is

A. 3

B. 4

C. 5

D. 6

**Answer: B**



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86. An organic compound containing C and H has 92.3% of carbon. Its empirical formula is

- A. alkyne
- B. alkene
- C. alkane
- D. cycloalkane

**Answer: A**



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87. The percentage of nitrogen in urea ( $\text{NH}_2\text{CONH}_2$ ), is

- A. 38.4
- B. 46.6
- C. 59.1
- D. 61.3

**Answer: B**



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**88.** 10 g of hydrofluoric acid gas occupies 5.6 lit of volume at STP . If the empirical formula of the gas is HF , then its molecular formula in the gaseous state will be

A. HF

B.  $H_3F_3$

C.  $H_2F_2$

D.  $H_4F_4$

**Answer: C**



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89. Two elements 'A' and 'B' (atomic weights 75 and 16 respectively) combine to give a compound having 75.8 % of 'A'. The compound has the formula (St. John's)

A. XY

B.  $X_2Y$

C.  $X_2Y_2$

D.  $X_2Y_3$

**Answer: D**



**Watch Video Solution**

90. An organic compound having C, H and S elements contains 4% sulphur. The minimum molecular weight of the compound is

A. 70

B. 140



C. 100

D. 65

**Answer: A**



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**91.** 5.6g of an organic compound on burning with excess of oxygen gave 17.6g of  $CO_2$  and 7.2g  $H_2O$ . The organic compound is

A.  $C_6H_6$

B.  $C_4H_8$

C.  $C_3H_8$

D.  $CH_3COOH$

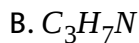
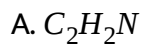
**Answer: B**



**Watch Video Solution**

92. An organic compound contains

$C = 40\%$ ,  $H = 13.33\%$  and  $N = 46.67\%$ . Its empirical formula is

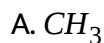


Answer: C



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93. An organic compound containing C and H has 92.3% of carbon. Its empirical formula is



D.  $CH$

**Answer: D**



**Watch Video Solution**

**94.** Gain of electron or electrons is termed

A. combustion

B. oxidation

C. reduction

D. neutralisation

**Answer: C**



**Watch Video Solution**

95. When Zn metal is added to  $\text{CuSO}_4$  solution, Cu is precipitated, it is due to

- A. Reduction of Zn
- B. Reduction of  $\text{Cu}^{2+}$
- C. Hydrolysis of  $\text{CuSO}_4$
- D. Reduction of  $\text{SO}_4^{2-}$

**Answer: B**



**Watch Video Solution**

96. Highest oxidation number that is exhibited by fluorine is

- A. -1
- B. 0
- C. +1
- D. +7

**Answer: B**



**Watch Video Solution**

**97.** Oxidation state of S. in  $S_8$  molecule is

A. 0

B. +2

C. +4

D. +6

**Answer: A**



**Watch Video Solution**

**98.** Oxidation state of Fe in  $K_4[Fe(CN)_6]$

A. +6

B. +4

C. +2

D. +5

**Answer: C**



**Watch Video Solution**

**99.** Oxidation number and valency of oxygen in  $OF_2$  are

A. +1, 2

B. +2, 2

C. +1, 1

D. +2, 1

**Answer: B**



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100. In which of the following the oxidation state of chlorine is +5?



Answer: B::C



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101. All elements commonly exhibit an oxidation state of

A. +1

B. -1

C. zero

D. +2

**Answer: B**



**Watch Video Solution**

**102.** The maximum oxidation state that fluorine exhibits is

A. -1

B. zero

C. +1

D. +2

**Answer: B**



**Watch Video Solution**

**103.** The element that always exhibits a negative oxidation state in its compounds is



A. Nitrogen

B. Oxygen

C. Fluorine

D. Chlorine

**Answer: C**



**Watch Video Solution**

**104.** The minimum oxidation state that nitrogen exhibits is

A. -2

B. -3

C. -4

D. -5

**Answer: B**



**Watch Video Solution**

**105.** In the conversion of  $K_2Cr_2O_7$  to  $K_2CrO_4$  the oxidation number of the following changes

- A. K
- B. Cr
- C. O
- D. None

**Answer: D**



**Watch Video Solution**

**106.** Oxidation state of N in  $N_3H$  is

- A.  $+1/3$
- B.  $+3$
- C.  $-1/3$

D. -1

**Answer: C**



**Watch Video Solution**

**107.** Oxidation number of C in  $CH_2O$  is

A. -2

B. +2

C. 0

D. 4

**Answer: C**



**Watch Video Solution**

**108.** Oxidation state of Ni in  $Ni(CO)_4$  is

A. 0

B. 4

C. 8

D. 2

**Answer: A**



**Watch Video Solution**

**109.** Chlorine is in +3 oxidation state in

A.  $\text{HCl}$

B.  $\text{HClO}_4$

C.  $\text{ICl}_3$

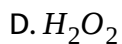
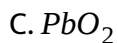
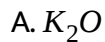
D.  $\text{ClF}_3$

**Answer: D**



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110. Oxygen exhibits positive oxidation number in the molecule



**Answer: B**



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111. The process reduction. involves

A. gains of electrons

B. loss of electrons

C. increase in the valency of negative part

D. decrease in the valency of positive part

**Answer: A**



**Watch Video Solution**

**112.** The oxidation number of 'Mn' in potassium permanganate is

A. 6

B. 7

C. 5

D. 8

**Answer: B**



**Watch Video Solution**

**113.** The oxidation number of 'N' in  $NH_3$  is

A.  $+1/3$

B. 0

C. -3

D. 1

**Answer: C**



**Watch Video Solution**

**114.** What is the oxidation state of carbon in carbondioxide?

A. +2

B. +4

C. +6

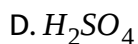
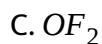
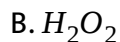
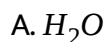
D. +1

**Answer: B**



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115. In which of the following compounds oxygen exhibits an oxidation state of +2?



Answer: C



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116. In the conversion of  $CrO_4^{-2} \rightarrow Cr_2O_7^{-2}$ , the oxidation number of oxygen

A. increase

B. decrease



C. become zero

D. remains unchanged

**Answer: D**



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117. (A) : Average oxidation number of chlorine in bleaching powder is zero.

(R) : Oxidation number of chlorine is always zero.

A. Both A and R are true and R is the correct explanation

B. Both A and R are true but R is not the correct explanation of A

C. A is true but R is false

D. A is false but R is true

**Answer: C**



**Watch Video Solution**

**118.** Oxidation number of carbon is zero in the compound

- A. methyl chloride
- B. chloroform
- C. glucose
- D. carbon tetrachloride

**Answer: C**



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LIST - 1

(Oxidation state)

A) + 3

**119.** B) + 1

C) 0

D) + 5

LIST - 2

(Substance)

1) Nitrogen

2) Nitrous oxide

3) Nitrate ion

4) Hydroxylamine

5) Nitrite ion

The correct match is

A. A-1, B-4, C-3, D-2

B. A-5, B-2, C-4, D-3

C. A-4, B-5, C-3, D-1

D. A-5, B-2, C-1, D-3

**Answer: D**



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**120.** If three electrons are lost by  $Mn^{3+}$ , its final oxidation state would be

A. 0

B. +6

C. +2

D. +4

**Answer: B**



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121. Oxidation number and Covalency of sulphur in  $S_8$  molecule are respectively

A. 6 and 8

B. 0 and 8

C. 0 and 2

D. 6 and 2

**Answer: C**



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122. The oxidation state of Barium in  $Ba(H_2PO_2)_2$  is

A. +3

B. +2

C. +1

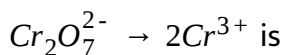
D. -1

**Answer: B**



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**123.** The number of electrons involved in the half reaction



A. 3

B. 6

C. 5

D. 10

**Answer: B**



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**124.** Sum of the oxidation numbers of carbon in acetaldehyde is

- A. -2
- B. +2
- C. -4
- D. -1

**Answer: A**



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**125.** In bleaching powder oxidation states of Cl are

- A. -1, +2
- B. -2, +1
- C. -1, +1
- D. -2, +1

**Answer: C**



**Watch Video Solution**

**126.** Oxidation number of sulphur in oleum ( $H_2S_2O_7$ ) is

A. +4

B. +2

C. -2

D. +6

**Answer: D**



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**127.** The compound formed in the brown ring test has the formula

$\left[Fe(H_2O)_5NO\right]SO_4$ . The oxidation state of iron in it is

A. +1

B. +2

C. +3

D. zero

**Answer: A**



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**128.** In the reaction of chlorine with dry slaked lime, the oxidation number of chlorine changes

i) from -1 to +1

ii) from +1 to -1

iii) from zero to -1

iv) from zero to +1

The correct combination is

A. Only ii and iii are correct



B. Only ii and iv are correct

C. Only i and ii are correct

D. All are correct

**Answer: B**



**Watch Video Solution**

**129.** When copper is added to a solution of silver nitrate, silver is precipitated. This is due to

i) oxidation of silver

ii) oxidation of copper

iii) oxidation of silver

iv) reduction of silver ion

The correct combination is

A. iii and iv are correct

B. i and ii are correct

C. ii and iv are correct

D. All are correct

**Answer: C**



**Watch Video Solution**

**130.** Average oxidation state of sulphur atoms in the thiosulphate ion

A. 5,0

B. +4, 0

C. +3.5

D. -2, + 6

**Answer: D**



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**131.** Oxidation numbers of sodium, mercury in sodium amalgam are

A. zero, zero

B. +1, - 1

C. -2, + 2

D. zero, +1

**Answer: A**



**Watch Video Solution**

**132.** Chlorine is passed into dilute cold KOH solution. What are the oxidation numbers of chlorine in the products formed ?

A. -1, + 5

B. -1, + 3

C. +1, + 7

D. +1, - 1

**Answer: D**



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**133.** The oxidation state of sulphur in  $Na_2S_4O$  is

A.  $3/2$

B.  $2/3$

C.  $5/2$

D.  $2/5$

**Answer: C**



**Watch Video Solution**

**134.** The oxidation number of sulphur in  $S_2O_8^{2-}$

A.  $+7$

B. +6

C. +4

D. +5

**Answer: B**



**Watch Video Solution**

**135.** Phosphorous exhibits highest oxidation state in

A.  $PH_3$

B.  $H_3PO_3$

C.  $Ca_3(PO_4)_2$

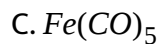
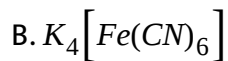
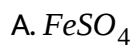
D.  $H_3PO_2$

**Answer: C**



**Watch Video Solution**

**136.** Iron has the lowest oxidation state in



**Answer: C**



**Watch Video Solution**

**137.** The oxidation number of Cr in  $CrO_5$  is

A. +10

B. +6

C. +4

D. +5

Answer: B



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LIST - 1      LIST - 2

A)  $NH_3$       1) Oxidant

B)  $KMnO_4$       2) Both oxidant and reductant

138. C)  $SO_2$       3) Neither oxidant nor reductant

D)  $He$       4) Reductant

5) Dehydrating agent

The correct match is

A. A-4,B-3,C-1,D-5

B. A-2,B-4,C-1,D-3

C. A-4,B-1,C-2,D-3

D. A-3,B-2,C-1,D-4

Answer: C



Watch Video Solution

**139.** In the reaction,  $I_2 + 2KClO_3 \rightarrow 2KIO_3 + Cl_2$

- i) Iodine is oxidised
- ii) Chlorine is reduced
- iii) Iodine displaces chlorine
- iv)  $KClO_3$  is decomposed

The correct combination is

- A. only i and iv are correct
- B. only iii and iv are correct
- C. i, ii and iii are correct
- D. all are correct

**Answer: C**



**Watch Video Solution**

**140.** Oxidation number of iron in  $Na_2[Fe(CN)_5NO]$

- A. +2



B. +3

C. +1

D. 0

**Answer: A**



**Watch Video Solution**

**141.** The oxidation number of phosphorus in sodium hypophosphite is

A. +3

B. +2

C. +1

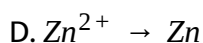
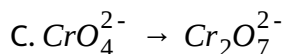
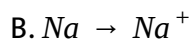
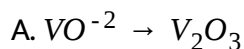
D. -1

**Answer: C**



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142. Which of the following reactions does not involve the change in oxidation state of metal?



**Answer: C**



**Watch Video Solution**

143. Oxidation state of oxygen in potassium superoxide is

A.  $-1/2$

B.  $-1$

C.  $-2$

D.  $0$

**Answer: A**



**Watch Video Solution**

**144.** (A): Oxidation state of carbon in  $C_6H_{12}O_6$  is zero.

(R) : Oxidation state of carbon in all organic compounds is zero.

- A. Both A and R are true and R is the correct explanation
- B. Both A and R are true but R is not the correct explanation of A
- C. A is true but R is false
- D. A is false but R is true

**Answer: B**



**Watch Video Solution**

**145.** Fluorine does not undergo disproportiona tion because

- A. Fluorine is always exhibit - 1 oxidation state
- B. Fluorine exhibit only two oxidation numbers
- C. Fluorine exhibit three oxidation numbers
- D. None of the above

**Answer: B**



**Watch Video Solution**

**146.** In the reaction,  $2\text{HgO} \rightarrow 2\text{Hg} + \text{O}_2$ ,  $\text{Hg}^{2+}$  act as

- A. Oxidising agent
- B. Reducing agent
- C. Oxidised
- D. none of the above

**Answer: A**



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**147.**  $2H_2O_2 \rightarrow 2H_2O + O_2$ . This reaction is

- A. Decomposition
- B. Combination
- C. Disproportionation
- D. 1 and 3 both

**Answer: C**



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**148.**  $K + Cl \rightarrow KCl$ . This is an example of

- A. oxidation
- B. reduction
- C. a redox reaction

D. none of these

**Answer: C**



**Watch Video Solution**

**149.** (A) :  $F_2 + NaOH \rightarrow NaF + OF_2 + H_2O$  is an example of redox reactions with respect to fluorine.

(R) : Fluorine shows universal oxidation state of -1 in all its compounds.

- A. Both A and R are true and R is the correct explanation
- B. Both A and R are true but R is not the correct explanation of A
- C. A is true but R is false
- D. A is false but R is true

**Answer: D**



**Watch Video Solution**

**150.** The conversion  $KMnO_4 \rightarrow K_2MnO_4$  is an example of

- A. oxidation half reaction
- B. reduction half reaction
- C. oxidation and reduction
- D. nither oxidation nor reduction

**Answer: B**



**Watch Video Solution**

**151.**  $PbS + 4H_2O_2 \rightarrow PbSO_4 + 4H_2O$ . In this reaction  $PbS$  undergoes

- A. oxidation
- B. reduction
- C. both
- D. none of these

**Answer: A**



**Watch Video Solution**

**152.**  $MnO_2 + 4HCl \rightarrow MnCl_2 + Cl_2 + 2H_2O$ , In the reaction  $MnO_2$  acts as

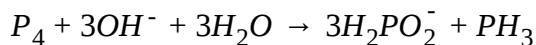
- A. oxidant
- B. reductant
- C. both
- D. none of these

**Answer: A**



**Watch Video Solution**

**153.** In the reaction



phosphorus is undergoing



- A. oxidation
- B. reduction
- C. Disproportionation
- D. hydrolysis

**Answer: C**



**Watch Video Solution**

**154.** Decomposition of  $H_2O_2$  is an example of

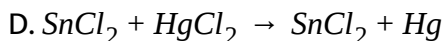
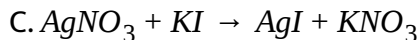
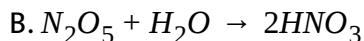
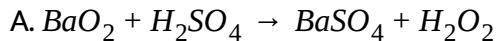
- A. neutralisation
- B. precipitation
- C. disproportionation
- D. hydrolysis

**Answer: C**



**Watch Video Solution**

155. Which of the following is an oxidation and reduction reaction?

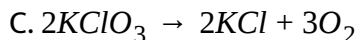
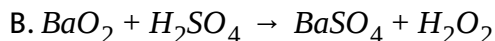
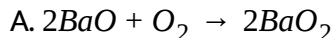


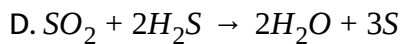
Answer: D



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156. Which of the following is not a redox reaction?





**Answer: B**



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**157.**  $2\text{CuI} \rightarrow \text{Cu} + \text{CuI}_2$ , the reaction is

A. Disproportionation reaction

B. Neutralisation reaction

C. Oxidation reaction

D. Reduction reaction

**Answer: A**



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**158.** In a reaction between zinc and iodine, in which zinc iodide is formed, what is being oxidised

- A. Zinc ions
- B. Iodide ions
- C. Zinc atom
- D. Iodine

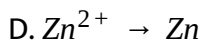
**Answer: C**



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**159.** Which one of the following reactions does not involve either oxidation or reduction

- A.  $VO_2^+ \rightarrow V_2O_3$
- B.  $Na \rightarrow Na^+$
- C.  $CrO_4^{2-} \rightarrow Cr_2O_7^{2-}$

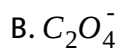


**Answer: C**



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**160.** In the reaction :  $C_2O_4^{2-} + MnO_4^- + H^+ \rightarrow Mn^{2+} + CO_2 + H_2O$ , the oxidising agent is



**Answer: A**



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161.  $4\text{ClO}_{3(aq)}^- \rightarrow 3\text{ClO}_{4(aq)}^- + \text{Cl}_{(aq)}^-$  is an example of

- A. Oxidation reaction
- B. Reduction reaction
- C. Disproportionation reaction
- D. Decomposition reaction

Answer: C



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162. The oxidation number of hydrogen in  $\text{CaH}_2$  and  $\text{NaH}$  are respectively

- A. -1 and -1
- B. +1 and +1
- C. +1 and -2
- D. -2 and -1

**Answer: A**



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**163.** In the reaction :  $Cl_2 + H_2S \rightarrow 2HCl + S$ , the oxidation number of S changes from

- A. 0 to 2
- B. 2 to zero
- C. -2 to zero
- D. -2 to -1

**Answer: C**



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**164.** Which of the following is redox reaction

A.  $H_2SO_4$  with NaOH

B. In atmosphere,  $O_3$  from  $O_2$  by lightning

C. Evaporation of  $H_2O$

D. Nitrogen oxide form nitrogen and oxygen by lighting

**Answer: D**



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**165.**  $C + O_2 \rightarrow CO_2$  the reaction is

A. Chemical combination

B. Decomposition reactions

C. Displacement reactions

D. Disproportionation reactions

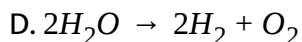
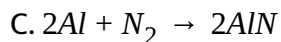
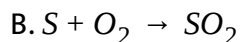
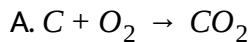
**Answer: A**



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**166.** Which of the following is not chemical combinations

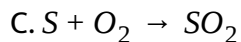
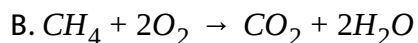
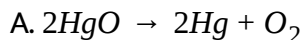


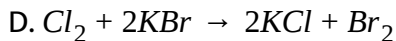
**Answer: D**



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**167.** Which of the following is decomposition reaction



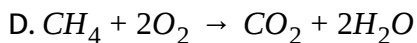
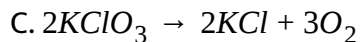
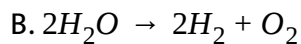
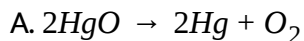


**Answer: A**



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**168.** Which of the following is not an example of disproportionation reaction?



**Answer: D**



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169. Following reaction describes the rusting of  $4Fe + 3O_2 \rightarrow 4Fe^{3+} + 6O^{2-}$ . Which one of the following statement is incorrect

A. This is an example of a redox reaction

B. Metallic iron is reduced to  $Fe^{3+}$

C.  $Fe^{3+}$  is an oxidising agent

D. Metallic iron is a reducing agent

Answer: B



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170. Which one of the following is not prepared from halide by chemical oxidation process

A.  $F_2$

B.  $Cl_2$

C.  $Br_2$

D.  $I_2$

**Answer: A**



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**171.** The reaction  $Br_2, Cl_2, I_2, P_4$  with NaOH involves

A. Decomposition

B. Displacement

C. Combination

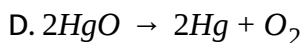
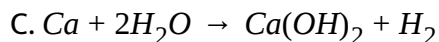
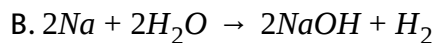
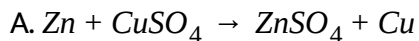
D. Disproportionation

**Answer: D**



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**172.** Which of the following is metal displacement reaction



**Answer: A**



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**173.**  $Zn + CuSO_4 \rightarrow ZnSO_4 + Cu$ ,  $Zn$  can act as

A. Oxidising agent

B. Reducing agent

C. Reduced

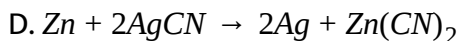
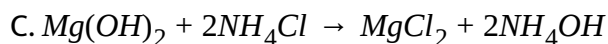
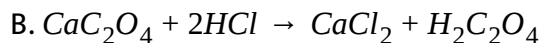
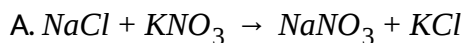
D. Oxidant

**Answer: B**



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**174.** Which of the following is a redox reaction?

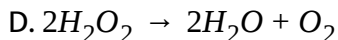
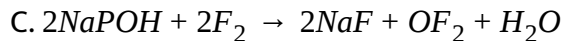
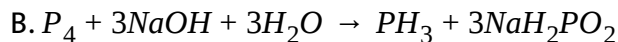
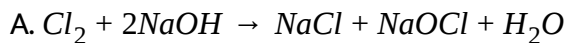


**Answer: D**



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**175.** Which of the following is not an example of disproportionation reaction?



**Answer: C**



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**176.** In the reaction  $3Mg + N_2 \rightarrow Mg_3N_2$

A. Magnesium is reduced

B. Magnesium is oxidised

C. Nitrogen is oxidized

D. Nitrogen is reductant

**Answer: B**



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177. Which one of the halogen is prepared by only electrolysis method

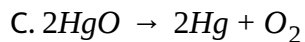
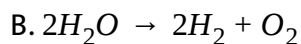
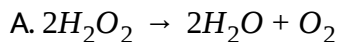


**Answer: C**

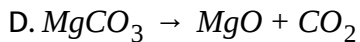


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178. Which of the following disproportionation reaction





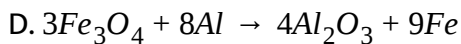
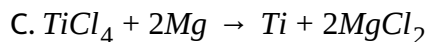
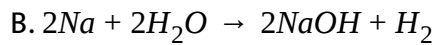
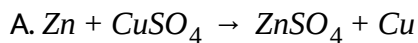


**Answer: A**



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**179.** Which of the following is not metal displacement



**Answer: B**



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**180.** In the reaction  $2Al + N_2 \rightarrow 2AlN$ , Al is

- A. Reduced
- B. Oxidised
- C. Oxidising agent
- D. None of the above

**Answer: B**



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**181.** When P reacts with caustic soda. The products are  $PH_3$  and  $NaH_2PO_2$ . This reaction is an example of

- A. Oxidation reaction
- B. Reduction reaction
- C. Oxidation and reduction
- D. Neutralization reaction

**Answer: C**

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**182.** Among the following ion the one that cannot undergo disproportionation



**Answer: D**

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**183.**  $3\text{Cl}_2 + 6\text{NaOH} \rightarrow 5\text{NaCl} + \text{NaClO}_3 + 3\text{H}_2\text{O}$ , chlorine gets

A. Oxidised

B. Reduced

C. Both 1 & 2

D. None of these

**Answer: C**



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**184.** Which reactions are useful to prepare Hydrogen in the laboratory

A. Decomposition

B. Displacement

C. Combination

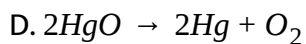
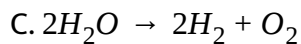
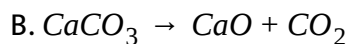
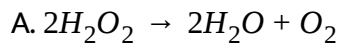
D. Disproportionation

**Answer: B**



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**185.** In which of the following reaction there is no change in oxidation state



**Answer: B**



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**186.** In  $C + H_2O \rightarrow CO + H_2$ ,  $H_2O$  acts as

A. Oxidising agent

B. Reducing agent

C. 1 and 2 both

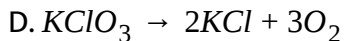
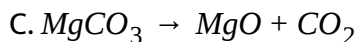
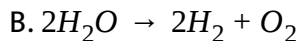
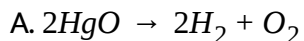
D. None of these

**Answer: A**



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**187.** The reaction is Decomposition but it's not redox reaction



**Answer: C**



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**188.** Which one of the following generally gets displaced by more electro positive metals in nonmetal displacement reactions.



**Answer: A**



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**189.**  $KIO_3 + 5KI + 6HCl \rightarrow 3I_2 + 6KCl + 3H_2O$  Correct statement of this reaction is

A.  $I^-$  is reduced to  $I_2$

B.  $IO_3^-$  is oxidised to  $I_2$

C.  $IO_3^-$  is reduced to  $I_2$

D. Oxidation number of I decreases from 01 (in KI) to zero (in  $I_2$ )

**Answer: C**

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**190.** When three moles of ozone completely reacts with  $SO_2$ , the number of moles of oxygen formed is

- A. 1
- B. 2
- C. 3
- D. zero

**Answer: C**

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**191.** In the reaction  $SO_2 + \frac{1}{2}O_2 \rightarrow SO_3$  the change in the oxidation state of vanadium is form  $V^{5+}$  to

- A.  $V^{2+}$



B.  $V^{4+}$

C.  $V^{3+}$

D.  $V^{6+}$

**Answer: B**



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**192.** In the reaction  $3Br_2 + 6CO_3^{2-} + 3H_2O \rightarrow Br^- + BrO_3^- + 6HCO_3^-$

A. Bromine is oxidised and carbonate is reduced

B. Bromine is reduced and water is oxidised

C. Bromine is neither reduced nor oxidised

D. Bromine is both reduced and oxidised

**Answer: D**



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**193.** The oxidation numbers of Mn in  $MnO_4^-$  and  $[Mn(CN)_6]^{3-}$  are respectively.

A. +7 and +3

B. +6 and +3

C. +7 and +2

D. +6 and +2

**Answer: A**



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**194.** Number of moles of hydrogen peroxide that can oxidise one mole of lead sulphide to lead sulphate is

A. 1

B. 2

C. 4

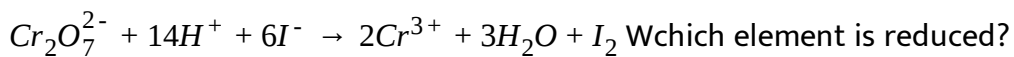
D. 8

**Answer: C**



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**195.** In the reaction



A. H

B. Cr

C. O

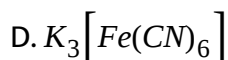
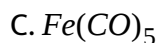
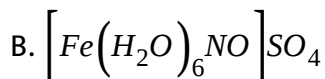
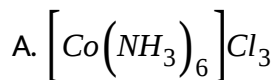
D. I

**Answer: B**



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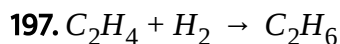
**196.** In which of the following compounds transition metal is in zero oxidation state ?



**Answer: C**



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In terms of redox reaction notations

A)  $C_2H_4$  is reduced

B)  $H_2$  is oxidised

A. A is true, but B is false

B. A is false, but B is true

C. Both A and B are true

D. Neither A nor B is true

**Answer: C**



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**198.** Which group P-block elements show highest positive oxidation state ?

A. Group 16

B. Group 17

C. Group 18

D. Group 15

**Answer: C**



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199.  $4\text{ClO}_3^-{}_{(aq)} \rightarrow 3\text{ClO}_4^-{}_{(aq)} + \text{Cl}^-{}_{(aq)}$  is an example of

- A. Oxidation reaction
- B. Reduction reaction
- C. Decomposition reaction
- D. Disproportionation reaction

**Answer: D**



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200. Excess of KI reacts with  $\text{CuSO}_4$  solution and then  $\text{Na}_2\text{S}_2\text{O}_3$  solution is added to it. Which of the statements is incorrect for this reaction?

- A.  $\text{Na}_2\text{S}_2\text{O}_3$  is oxidised
- B.  $\text{CuI}_2$  is formed
- C.  $\text{Cu}_2\text{I}_2$  is formed

D. Evolved  $I_2$  is reduced

**Answer: C**



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**201.** Six grams each of magnesium and oxygen was allowed to react. Assuming that the reaction is complete, the mass of MgO formed in the reaction is

A. 42 grams

B. 28 grams

C. 21 grams

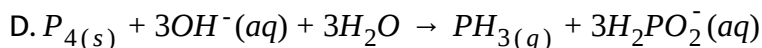
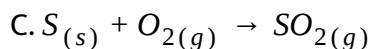
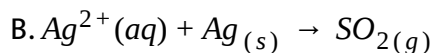
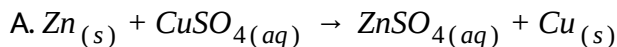
D. 10 grams

**Answer: D**



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202. Which one of the following is an example of disproportionation reaction?



Answer: D



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203. The strength of an aqueous solution of  $\text{I}_2$  can be determined by titrating the solution with standard solution of

A. Oxalic acid

B. Sodium thiosulphate

C. Sodium hydroxide



D. Mohr's salt

**Answer: B**



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**204.** In the standardization of  $\text{Na}_2\text{S}_2\text{O}_3$  using  $\text{K}_2\text{Cr}_2\text{O}_7$  by iodometry, the equivalent weight of  $\text{K}_2\text{Cr}_2\text{O}_7$  is

- A. (molecular weight)/2
- B. (molecular weight)/6
- C. (molecular weight)/3
- D. same as molecular weight

**Answer: B**



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**205.** The role of starch in iodometric titrations is that

- A. it acts an oxidant
- B. it is reducing agent
- C. it acts as indicator
- D. it is a medium

**Answer: C**



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**206.** Number of moles of  $FeSO_4$  that can reduce one mole of permanganate in aqueous acid solution is

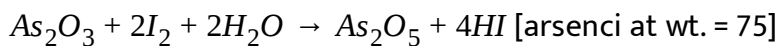
- A. 2
- B. 4
- C. 5
- D. 7

**Answer: C**



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**207.** Equivalent weight of  $As_2O_3$  in the following equation



A. 49.5

B. 94.9

C. 99

D. 156.6

**Answer: A**



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**208.** Which of the following statement is correct for a galvanic cell?

- A. Reduction occurs at cathode
- B. Oxidation occurs at anode
- C. Electrons flow from anode to cathode
- D. All the statements are correct

**Answer: D**



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**209.** In an electrochemical cell

- A. Potential energy changes into kinetic energy
- B. Kinetic energy changes into potential energy
- C. Chemical energy changes into electrical energy
- D. Electrical energy changes into chemical energy

**Answer: C**



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**210.** The electrode potential of an electrode is

- A. The potential applied to the electrode
- B. The ionization potential of the material of the electrode
- C. The tendency of the electrode to loose or gain electrons when it is  
in contact with its ions
- D. The poten energy of the electrons in an electrode.

**Answer: C**



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**211.** Which of the following may not be present in all galvanic cells

- A. Electrolyte
- B. Cathode

C. Anode

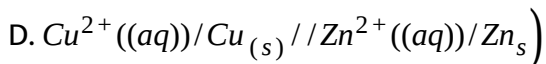
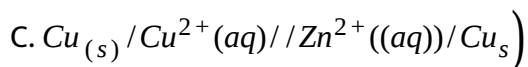
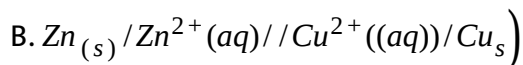
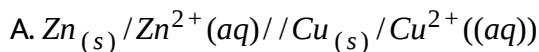
D. Saltbridge

**Answer: D**



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**212.** Daniel cell is shown as



**Answer: B**



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**213.** Which of the following metals will not react with solution of  $\text{CuSO}_4$  ?

A. Fe

B. Zn

C. Mg

D. Ag

**Answer: D**



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**214.** In the copper zinc cell

A. Reduction occurs at the copper cathode

B. Oxidation occurs at the copper cathode

C. Reduction occurs at the anode

D. Chemical energy is converted to light energy

**Answer: A**



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**215.** The mass of  $\text{CO}_2$  obtained when 2g of pure limestone is calcined is

A. 44g

B. 0.22g

C. 0.88g

D. 8.8g

**Answer: C**



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**216.** What is the weight of oxygen that is required for the complete combustion of 2.8 kg of ethylene?



- A. 2.8kg
- B. 6.4kg
- C. 96.0kg
- D. 9.6kg

**Answer: D**



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**217.** Xg of Ag was dissolved in  $HNO_3$  and the solution was treated with excess of NaCl when 2.87g of AgCl was precipitated. The value of X is

- A. 1.08g
- B. 2.16g
- C. 2.70g
- D. 1.62g

**Answer: B**

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**218.** 1.2g of Mg (At. mass 24) will produce MgO equal to

A. 0.05mol

B. 40g

C. 40mg

D. 4g

**Answer: B**

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**219.** 30 g of marble stone on heating produced 11g of  $\text{CO}_2$ . The percentage of  $\text{CaCO}_3$  in marble is

A. 0.75

B. 0.8

C. 0.833

D. 0.866

**Answer: C**



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**220.** The weight of oxygen required to completely react with 27g of Al is

A. 8g

B. 16g

C. 32g

D. 24g

**Answer: D**



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**221.** The number of moles of  $CO_2$  produced when 3 moles of  $HCl$  react with excess of  $CaCO_3$  is

- A. 1
- B. 1.5
- C. 2
- D. 2.5

**Answer: B**



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**222.** The weight of a pure sample of  $KClO_3$  to be decomposed in order to get 0.96g of  $O_2$  is

- A. 2.45g
- B. 1.225g
- C. 9.90g

D. None

**Answer: C**



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**223.** 6g of Mg reacts with excess of an acid. The amount of hydrogen produced would be

A. 0.5g

B. 1g

C. 2g

D. 4g

**Answer: C**



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**224.** The number of moles of  $Fe_2O_3$  formed when 5.6 lit of  $O_2$  reacts with 5.6g of Fe?

- A. 0.125
- B. 0.01
- C. 0.05
- D. 0.1

**Answer: A**



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**225.** What volume of  $H_2$  at NTP is required to convert 2.8g of  $N_2$  in to  $NH_3$  ?

- A. 2240ml
- B. 22400ml
- C. 6.72lit

D. 224lit

**Answer: C**



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**226.** The number of P-OH bonds present in pyrophosphoric acid and hypophosphoric acid is respectively.

A. 120

B. 24

C. 36

D. 12

**Answer: D**



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**227.** The volume of  $CO_2$  obtained by the complete decomposition of one mole of  $NaHCO_3$  at STP is

- A. 22.4
- B. 11.2L
- C. 44.8L
- D. 4.48L

**Answer: B**



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**228.** Aluminium reacts with hydrogen chloride to produce  $H_2$  according to the equation  $2Al + 6HCl \rightarrow 2AlCl_3 + 3H_2$

Then 2grams of  $H_2$  would be produced from

- A. 1 mole of Al
- B. 2 moles of Al



C.  $\frac{2}{3}$  mole of Al

D.  $\frac{3}{2}$  mole of Al

**Answer: C**



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**229.** A peroxidase enzyme contains 2% selenium( $\text{Se}=80$ ). The minimum molecular weight of the enzyme is

A. 1000

B. 2000

C. 4000

D. 800

**Answer: C**



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**230.** The amount of Mg in gms. to be dissolved in dilute  $H_2SO_4$  to liberate  $H_2$  which is just sufficient to reduce 160g of ferric oxide is

A. 24

B. 48

C. 72

D. 96

**Answer: C**



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**231.** The mass of 80 % pure  $H_2SO_4$  required to completely neutralise 60g of  $NaOH$  is

A. 92g

B. 58.8g

C. 73.5g

D. 98g

**Answer: B**



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**232.** Haemoglobin contains 0.33 % iron ( $\text{Fe}=56$ ). The molecular weight of haemoglobin is 68000. The number of iron atoms in one molecule of haemoglobin is .

A. 2

B. 3

C. 4

D. 5

**Answer: C**



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**233.** The number of moles of KI required to produce 0.4 mole  $K_2HgI_4$  is

- A. 1
- B. 3
- C. 16
- D. 1.6

**Answer: D**



**Watch Video Solution**

**234.** The number of molecules of  $CO_2$  liberated by complete combustion of 0.1 g of graphite in air is

- A.  $3.01 \times 10^{22}$
- B.  $6.02 \times 10^{23}$
- C.  $6.02 \times 10^{22}$
- D.  $3.01 \times 10^{23}$

**Answer: C**



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**235.** 5 g of a sample of magnesium carbonate on treatment with excess of dilute hydrochloric acid gave 1.12 L of  $\text{CO}_2$  at STP . The percentage of magnesium carbonate in the mixture is

A. 42

B. 40

C. 84

D. 80

**Answer: C**



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**236.** Phosphine on decomposition produces phosphorus and hydrogen. When 100 ml of phosphine are decomposed the change in volume under laboratory conditions is

- A. 50mL increase
- B. 500mL decrease
- C. 900mL decrease
- D. None

**Answer: A**



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**237.** 0.00025 has how many significant figures?

- A. 5
- B. 3
- C. -4

D. 2

**Answer: D**



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**238.** The proper value of significant figures in  $38.0 + 0.0035 + 0.00003$  is.

A. 38

B. 38.0035

C. 38.00353

D. 38

**Answer: D**



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**239.** The number of significant figures in electronic charge  $1.602 \times 10^{-19} \text{ C}$

A. 1

B. 2

C. 3

D. 4

**Answer: D**



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**240.** The correctly reported answer of the addition of 4.523, 2.3 and 6.24 will have significant figures

A. Two

B. Three

C. Four

D. Five

**Answer: A**





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**241.** After rounding 1.235 and 1.225 to three significant figures, we will have their answers respectively as

A. 1.23, 1.22

B. 1.24, 1.123

C. 1.23, 1.23

D. 1.24, 1.22

**Answer: D**



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**242.** The number of significant figures in it are

A. One

B. Two

C. Three

D. Infinite

**Answer: D**



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**243.** On dividing 0.25 by 22.1176, the actual answer is 0.011303. The correctly reported answer will be

A. 0.011

B. 0.01

C. 0.0113

D. 0.013

**Answer: A**



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**244.** 8.281 has how many significant figures?

A. 1

B. 2

C. 3

D. 4

**Answer: D**



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**245.** The number of significant figures in 0.0045 are

A. Two

B. Three

C. Four

D. Five

**Answer: A**



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**246.** Which of the following is incorrect about SI units ?

- A. Density in  $kgm^{-3}$
- B. Force in Newtons
- C. Pressure in Pascals
- D. Amount of the substance in  $mol L^{-1}$

**Answer: D**



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**247.** Plank's constant has the dimensions of

- A. Force

B. Work

C. Angular momentum

D. Torque

**Answer: B**



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**248.** Which of the following units represents the largest amount of energy?

A. Calorie

B. erg

C. Joule

D. Electron-volt

**Answer: C**



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**249.** Which of the following statement is correct?

- A. There is no difference between precision and accuracy.
- B. A good precision always means good accuracy
- C. Accuracy means that all measured values of an experiment are close to the actual value.
- D. A measurement may have good accuracy but poor precision.

**Answer: C**



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**250.** The actual product of 4.327 and 2.8 is 12.1156. The correctly reported answer will be

- A. 12
- B. 12.1

C. 12.12

D. 12.116

**Answer: A**



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## Objective Exercise -2

1. An unbalanced chemical equation is against the law of

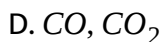
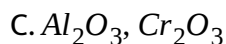
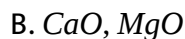
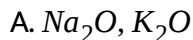
- A. The law of gaseous volumes
- B. The law of constant proportions
- C. The law of mass action
- D. The law of conservation of mass

**Answer: D**



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2. Which of the following pairs can be cited as an example to illustrate the law of multiple proportion?



**Answer: D**



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3. In compound A, 1.00 g nitrogen unites with 0.57 g oxygen. In compound B, 2.00g nitrogen combines with 2.28 g oxygen. In compound C, 3.00 g nitrogen combines with 5.13 g oxygen. These results obey the following law.

A. Law of constant proportion



- B. Law of multiple proportion
- C. Law of reciprocal proportion
- D. Dalton.s law of partial pressure

**Answer: B**



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**4.** The law of multiple proportions is illustrated by the two compounds

- A. Sodium chloride and sodium bromide
- B. Ordinary water and heavy water
- C. Caustic soda and caustic potash
- D. Sulphur dioxide and sulphur trioxide.

**Answer: D**



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5. A sample of pure carbon dioxide, irrespective of its source contains 27.27 % carbon and 72.73% oxygen. The data support

- A. Law of constant composition
- B. Law of conservation of mass
- C. Law of reciprocal proportions
- D. Law of multiple proportions

**Answer: A**



**Watch Video Solution**

6. Hydrogen combines with oxygen to form  $H_2O$  in which 16 g of oxygen combine with 2g of hydrogen . Hydrogen also combines with carbon to form  $CH_4$  in which 2 g of hydrogen combine with 6 g of carbon . If carbon and oxygen combine together then they will do show in the ratio of

- A. 6:16

B. 6:18

C. 1:2

D. 12:24

**Answer: A**



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7. Two elements X and Y have atomic weight of 14 and 16 . They form a series of compounds , A , B , C with fixed mass of X , Y is present in the ratio 1:2:3:4:5 . If the compound A has 28 parts by weight of X and 16 parts by weight of Y , then the compound C will have 28 parts by weight of X and

A. 32 parts by weight of Y

B. 48 parts by weight of Y

C. 64 parts by weight of Y

D. 80 parts by weight of Y

**Answer: B**



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8.  $n$  g of substance X reacts with  $m$  g of substance Y to form  $p$  g of substance R and  $q$  g of substance S . This reaction can be represented as ,  $X + Y = R + S$  . The relation which can be establish in the amounts of the reactants and the products will be

A.  $n-m=p-q$

B.  $n+m=p+q$

C.  $n=m$

D.  $p=q$

**Answer: B**



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9. A sample of calcium carbonate ( $\text{CaCO}_3$ ) has the following percentage composition : Ca = 40 % C = 12 % , O = 48 % . If the law of constant proportions is true , then the weight of calcium in 4 g of a sample of calcium carbonate from another source will be

A. 0.016g

B. 0.16g

C. 1.6g

D. 16g

**Answer: C**



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10. One mole of  $\text{CH}_4$  contains

A.  $6.02 \times 10^{23}$  atoms of hydrogen

B. 4gm atoms of hydrogen

C. 3g of carbon

D.  $1.81 \times 10^{23}$  molecules of  $CH_4$

**Answer: B**



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**11.** The number of molecules in one litre of water is (density of water = 1g/mL)

A.  $6 \times 10^{23}/22.4$

B.  $3.33 \times 10^{25}$

C.  $3.33 \times 10^{23}$

D.  $3.33 \times 10^{24}$

**Answer: B**



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12. The number of water molecules in a drop of water weighing 5 mg is

A.  $6.023 \times 10^{22}$

B.  $3.0125 \times 10^{21}$

C.  $1.67 \times 10^{20}$

D.  $1.67 \times 10^{21}$

**Answer: C**



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13. The mass of oxygen required to prepare 2 moles of water is

A. 16g

B. 32g

C. 8g

D. 64g

**Answer: B**



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**14.** The ratio between the number of molecules in equal masses of  $CH_4$  and  $SO_2$  is

A. 1 : 1

B. 4 : 1

C. 1 : 4

D. 2 : 1

**Answer: B**



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**15.** The number of sulphur atoms present in 0.2 mole of sodium thiosulphate is



(N=Avogadro number)

A. 4N

B. 0.2N

C. 0.4N

D. 0.1N

**Answer: C**



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**16.** The number of nitrogen molecules present in 1c.c of gas at NTP is

A.  $2.67 \times 10^{22}$

B.  $2.67 \times 10^{21}$

C.  $2.67 \times 10^{20}$

D.  $2.67 \times 10^{19}$

**Answer: D**

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17. The density of water is  $1\text{g/mL}$ . Assuming that there are no intermolecular spaces between water molecules in liquid water, the volume of a water molecule is

A.  $1.5 \times 10^{-23}\text{ml}$

B.  $6 \times 10^{-23}\text{ml}$

C.  $3 \times 10^{-23}\text{ml}$

D.  $3 \times 10^{-22}\text{ml}$

**Answer: C**

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18. Ordinary water contain one part of heavy water per 6000 parts of water by weight. The number of heavy water molecules present in a drop of water of volume  $0.01\text{ mL}$  is (density of water  $1\text{ g/mL}$ )

A.  $2.5 \times 10^{16}$

B.  $5 \times 10^{17}$

C.  $5 \times 10^{16}$

D.  $7.5 \times 10^{16}$

**Answer: C**



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**19.** A gaseous mixture contains oxygen and nitrogen in the ratio 1:4 by weight. The ratio of their number of molecules is

A. 1 : 4

B. 4 : 1

C. 7 : 32

D. 3 : 16

**Answer: C**

20. An  $\alpha$  - particle changes into a Helium atom. In the course of one year the volume of Helium collected from a sample of Radium was found to be  $1.12 \times 10^{-2} \text{ mL}$  at STP. The number of  $\alpha$  particles emitted by the sample of Radium in the same time is

A.  $6 \times 10^{17}$

B.  $3 \times 10^{17}$

C.  $1.5 \times 10^{17}$

D.  $1.2 \times 10^{18}$

**Answer: B**

21. The number of oxygen atoms present in 50 g of calcium carbonate is

A.  $6.023 \times 10^{23}$

B.  $30.1 \times 10^{23}$

C.  $9.035 \times 10^{23}$

D.  $1.206 \times 10^{24}$

**Answer: C**



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**22.** The mixture containing the same number of molecules as that of 14 g of  $CO$  is

A. 14g of nitrogen +16g of oxygen

B. 7g of nitrogen +16g of oxygen

C. 14g of nitrogen +8g of oxygen

D. 7g of nitrogen +8g of oxygen

**Answer: D**

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23. The number of atoms of hydrogen present in 1.5 mole of  $H_2O$  is

- A. 1N
- B. 2N
- C. 3N
- D. 0.5N

Answer: C

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24. Which of the following contains the maximum number of atoms?

- A. 10g of  $CaCO_3$
- B. 4g of hydrogen
- C. 9g of  $NH_4NO_3$

D. 1.8g of  $C_6H_{12}O_6$

**Answer: B**



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**25.** Which contains more number of molecules?

A. 1 mole of carbon dioxide

B. 4g of hydrogen

C. 6g of helium

D. 33.6 litres of oxygen at STP

**Answer: B**



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26. Which of the following gases has the highest density under standard conditions?

A. CO

B.  $N_2O$

C.  $C_3H_8$

D.  $SO_2$

**Answer: D**



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27. Which of the following is heaviest?

A. 50g of iron

B. 5 moles of nitrogen

C. 0.1 gram atom of silver

D.  $10^{23}$  atoms of carbon



**Answer: B**



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**28.** The density of a gas is 2, relative to nitrogen, under the same conditions. The molecular weight of the gas is

A. 5.6

B. 28

C. 56

D. 14

**Answer: C**



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**29.** The density of a gas at STP is 1.5 g/L. Its molecular weight is

A. 22.4

B. 33.6g

C. 33.6

D. 44.8

**Answer: C**



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**30.** 7g of nitrogen occupies a volume of 5 litres under certain conditions.

Under the same conditions one mole of a gas, having molecular weight 56, occupies a volume of

A. 40L

B. 20L

C. 10L

D. 80L

**Answer: B**



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**31.** Henry thinks that a mole contains  $6.023 \times 10^{24}$  molecules. Hence the mass of Henry's mole of Nitrogen is

A. 2.8g

B. 28g

C. 280g

D. 0.28g

**Answer: C**



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**32.** A copper plate of 20 cm x 10 cm is to be plated with silver of 1 mm thickness on both the sides. Number of moles of silver required for

plating is (density of silver =  $10.8 \text{ g m /cc}$ )\_\_\_\_\_

A.  $1.2 \times 10^{24}$

B.  $2.4 \times 10^{24}$

C.  $1.2 \times 10^{13}$

D.  $2.4 \times 10^{23}$

**Answer: A**



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**33.** One mole of oxygen ( $O_2$ ) is present in the following mass of sulphuric acid

A. 98g

B. 24.5g

C. 196g

D. 49g

**Answer: D**



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**34.** The number of gram - atoms of sulphur in 2 moles of peroxydisulphuric acid is

A. 2

B. 3

C. 1

D. 4

**Answer: D**



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**35.** Four ten litre flasks are separately filled with the gases hydrogen, helium, oxygen and ozone at the same temperature and pressure. The

ratio of the total number of atoms of these gases present in different flasks would be

A. 1:2:3:2

B. 2:1:2:3

C. 1:3:2:2

D. 1:1:1:1

**Answer: B**



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**36.** Which of the following has number of molecules present equal to those present in 16 grams of oxygen

A. 16 g  $O_3$

B. 32 g  $SO_2$

C. 16 g  $SO_2$

D. All the above

**Answer: B**



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**37.** If the relative atomic mass of oxygen is 64 units, the molecular mass of CO becomes

A. 112

B. 128

C. 28

D. 7

**Answer: A**



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38. Both 22 grams of  $CO_2$  and 8 grams of methane contain the following carbon atoms

A.  $3 \times 10^{23}$

B.  $12 \times 10^{23}$

C.  $6 \times 10^{23}$

D.  $1.5 \times 10^{23}$

**Answer: C**



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39. What is the mole percentage of  $O_2$  in a mixture of 7g of  $N_2$  and 8g of  $O_2$ ?

A. 0.25

B. 0.75

C. 0.5



D. 0.4

**Answer: C**



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**40.** The number of oxygen molecules present in 100 grams of limestone is

A.  $4N_0$

B.  $3N_0$

C.  $1.5N_0$

D.  $N_0$

**Answer: C**



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41. 7.5 g of a gas occupies 5.6 litres at STP. The gas is

A. NO

B.  $N_2O$

C. CO

D.  $CO_2$

**Answer: A**



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42. Total number of sulphate ions present in 3.92 g of chromic sulphate is

(Cr=52, S=32, O=16)

A.  $1.8 \times 10^{22}$

B.  $1.8 \times 10^{23}$

C.  $1.2 \times 10^{21}$

D.  $6 \times 10^{23}$

**Answer: A**



**Watch Video Solution**

**43.** 48 g of Mg contains the same number of atoms as 160 g of another element . The atomic mass of the element is

A. 24

B. 320

C. 80

D. 40

**Answer: C**



**Watch Video Solution**

**44.** Bell metal contains 80% copper . The mass of Bell metal which contain  $1.5 \times 10^{20}$  atoms of copper is (Cu = 64)

- A. 2mg
- B. 20mg
- C. 40mg
- D. 12.8mg

**Answer: B**



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**45.** Number of atoms in 558.5 gm Fe (At.wt of Fe = 55.85 g  $\text{mol}^{-1}$ ) is

- A. Twice that in 60 g carbon
- B.  $6.023 \times 10^{22}$
- C. Half that in 8g He
- D.  $558.6 \times 6.023 \times 10^{23}$

**Answer: A**



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46. 1 mole of each of  $\text{Ca}(\text{OH})_2$  and  $\text{H}_3\text{PO}_4$  are allowed to react under dilute conditions . The maximum number of moles of  $\text{Ca}_3(\text{PO}_4)_2$  formed is

- A. 1
- B.  $1/2$
- C.  $1/3$
- D. 3

**Answer: C**



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47. The mass of  $1.5 \times 10^{26}$  molecules of a substance is 16 kg . The molecular mass of the substance is

- A. 64g

B. 64amu

C. 16amu

D. 32amu

**Answer: B**



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**48.** Which of the following has higher mass

A. electrons

B. silver

C. rombic

D. chloroform

**Answer: C**



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49. One mole ion which has two moles of charge

- A. sulphate
- B. nitrate
- C. nitrite
- D. phosphate

Answer: A



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50. Select wrong chemical reaction among the following

- A.  $8\text{NH}_3 + 3\text{Cl}_2 \rightarrow 6\text{NH}_4\text{Cl} + \text{N}_2$
- B.  $2\text{Ca}(\text{OH})_2 + 2\text{Cl}_2 \rightarrow \text{Ca}(\text{OCl})_2 + \text{CaCl}_2 + 2\text{H}_2\text{O}$
- C.  $2\text{NaOH} + \text{Cl}_2 \rightarrow 2\text{NaCl} + \text{H}_2 + \text{O}_2$
- D.  $\text{MnO}_2 + 4\text{HCl} \rightarrow \text{MnCl}_2 + \text{Cl}_2 + 2\text{H}_2\text{O}$

**Answer: C**



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**51.** The mass and charge of one mole of electrons, respectively is

A.  $54.8 \times 10^{-7} \text{Kg}$ ,  $9.65 \times 10^4$  Coulomb

B.  $5.48 \times 10^{-7} \text{Kg}$ ,  $9.65 \times 10^3$  Coulomb

C.  $5.48 \times 10^{-7} \text{g}$ ,  $9.65 \times 10^4$  Coulomb

D.  $5.48 \times 10^{-7} \text{Kg}$ ,  $9.65 \times 10^4$  Coulomb

**Answer: D**



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**52.** Equivalent weights 36. A bivalent metal has 12 equivalent weight. The molecular weight of its oxide is



A. 16

B. 32

C. 40

D. 52

**Answer: C**



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**53.** Molecular weight of Mohr's salt is 392. Its equivalent weight when it is oxidised by  $KMnO_4$  in acidic medium is

A. 392

B. 196

C. 130.6

D. 78.5

**Answer: A**

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54. The equivalent weights of S in  $SCl_2$  and  $S_2Cl_2$  are in the ratio

A. 1 : 2

B. 2 : 1

C. 1 : 1

D. 1 : 4

**Answer: A**

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55. The equivalent weight of a metal in different compounds are 18.6 and

28. Atomic mass of the metal would be

A. 18.6

B. 28

C. 46.6

D. 56

**Answer: D**



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56. In the disproportionation reaction,  $3\text{HClO}_3 \rightarrow \text{HClO}_4 + \text{Cl}_2 + 2\text{O}_2 + 2\text{H}_2\text{O}$ , the equivalent mass of the oxidising agent is (molar mass of  $\text{HClO}_3 = 84.45$ )

A. 16.89

B. 32.22

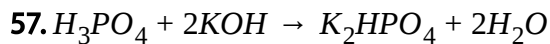
C. 84.45

D. 28.15

**Answer: A**



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Based on the above reaction equivalent weight of  $H_2PO_4$  is

A. 196

B. 98

C. 49

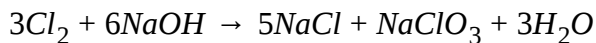
D. 32.67

**Answer: C**



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58. The equivalent weight of chlorine molecule in the equation



A. 42.6

B. 35.5

C. 59.1

D. 71

**Answer: A**



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59. Oxidation number of metal in the complex  $\left[Co(NH_3)_4Cl_2\right]^+$  is

A. +1

B. +2

C. +3

D. +6

**Answer: C**



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60. Sodium thiosulphate reacts with iodine to give iodide and tetrathionate. In this reaction  $S_2O_3^{2-}$  undergoes

- A. Oxidation
- B. Reduction
- C. Disproportionation
- D. Comproportionation

**Answer: A**



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61. Consider the following redox reaction in which compound .X. is a product.



The oxidation state of phosphorous in compound .X. is

- A. +1

B. +3

C. +4

D. +5

**Answer: A**



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**62.** Oxidation numbers of sulphur in  $H_2S_3$  molecule are

A. -1, -1 and -1

B. +1, +1 and +1

C. -1, 0 and -1

D. +1, 0 and -1

**Answer: C**



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63. The oxidation states of the most electronegative element in the products of the reaction between  $BaO_2$  with dilute  $H_2SO_4$  are

- A. 0 and -1
- B. -1 and -2
- C. -2 and 0
- D. -2 and +1

**Answer: B**



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64. Calculate the oxidation number of iron in  $Fe_3O_4$ ?

- A. 1/2
- B. 2/6
- C. 8/3
- D. 3/2



**Answer: C**



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65. One mole of  $N_2H_4$  loses 10 moles of electrons to form a new compound X . Assuming that all the nitrogen appears in the new compound , the oxidation state of nitrogen in X is (there is no change in the oxidation number of hydrogen)

A. -1

B. -3

C. +3

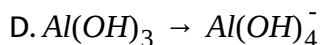
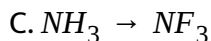
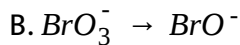
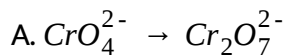
D. +5

**Answer: C**



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66. Which of the following change requires a reducing agent



Answer: B



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67. What is the oxidation state of Fe in the product formed when acidified potassium ferrocyanide  $\text{K}_4[\text{Fe}(\text{CN})_6]$  is treated with hydrogen peroxide?

A. +2

B. +3

C. +1

D. +6

**Answer: B**



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**68.** In the reaction,  $H_2O_2 + PbS \rightarrow H_2O + PbSO_4$  the increase in the oxidation number of sulphur is

A. 2 units

B. 4 units

C. 6 units

D. 8 units

**Answer: D**



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69. Why is the highest oxidation state of a metal exhibited in its oxide or fluoride only ?

A. 1

B. 4

C. 6

D. 9

Answer: D



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70. Oxidation number of iodine in  $IO_3^-$ ,  $IO_4^-$ ,  $KI$  and  $I_2$  respectively are:

A. -1, -1, 0, +1

B. +3, +5, +7, 0

C. +5, +7, -1, 0

D. -1, -5, -1, 0

**Answer: C**



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**71.** Oxidation states of P in  $H_4P_2O_5$ ,  $H_4P_2O_6$  and  $H_4P_2O_7$  are respectively

:

A. +3, +5 and +4

B. +5, +3 and +4

C. +5, +4 and +3

D. +3, +4 and +5

**Answer: D**



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**72.** If three electrons are lost by  $Mn^{3+}$ , its final oxidation state would be

A. zero

B. +6

C. +2

D. +4

**Answer: B**



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**73.** Bromine reacts with hot aqueous alkali to give bromide and bromate.

What is the change that is brought about in oxidation state

A. -1 to +5

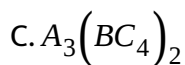
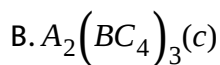
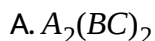
B. 0 to +5

C. -1 to +7

D. none of these

**Answer: B**

74. A, B and C are three elements forming part of a compound in oxidation states of +2, +5 and -2 respectively. What could be the compound?



**Answer: C**

75. (A): The difference in the successive oxidation states exhibited by transition elements is unity only.

(R) : d-Orbitals of transition elements are incompletely filled.

- A. Both A and R are true and R is the correct explanation
- B. Both A and R are true but R is not the correct explanation of A
- C. A is true but R is false
- D. A is false but R is true

**Answer: B**

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**76.** The oxidation number of sulphur in  $S_8$ ,  $S_2F_2$  and  $H_2S$  are

- A. 0, + 1 and + 2
- B. +2, + 1 and - 2
- C. 0, + 1 and + 2
- D. -2, + 1 and - 2

**Answer: A**

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77. The oxidation number of nitrogen in  $\text{NCl}_3$  is

- A. +3
- B. -3
- C. zero
- D.  $-1/3$

**Answer: B**



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78. What are the oxidation numbers of 'N' in  $\text{NH}_4\text{NO}_3$ ?

- A. +3 - 5
- B. -3, +5
- C. +3, +6

D. -2, +2

**Answer: B**



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79. The oxidation number of ..V.. in  $Rb_4Na[HV_{10}O_{28}]$  is

A. +3

B. +5

C. +7

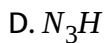
D. +6

**Answer: B**



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80. N has fractional oxidation number in



**Answer: D**



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**81.** In which one of the following compounds the oxidation number of iodine is fractional?



**Answer: D**

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82. Average oxidation number of iodine in  $KI_3$

A.  $+1/3$

B.  $-1/3$

C.  $+3$

D.  $-1$

**Answer: B**

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83. The oxidation state of phosphorus in  $Ba(H_2PO_2)_2$  is

A.  $+3$

B.  $+2$

C.  $+1$

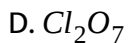
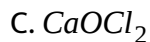
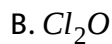
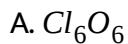
D. -1

**Answer: C**



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**84.** Chlorine has two different oxidation states in which of the following compound



**Answer: C**



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85.  $Cr(OH)_3 + H_2O_2 \xrightarrow{\text{Alkali}} CrO_4^{-2} + H_2O$  the number of  $OH^-$  required to balance the above equation

A. 1

B. 3

C. 4

D. 6

Answer: C



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86. Sodium carbonate of 92% purity is used in the reaction  $Na_2CO_3 + CaCl_2 \rightarrow CaCO_3 + 2NaCl$ . The number of grams of  $Na_2CO_3$  required to yield 1 gm of  $CaCO_3$

A. 8.5g

B. 10.5g

C. 11.52g

D. 1.152g

**Answer: D**



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**87.** Disproportionation products of one mole of  $MnO_4^{-2}$  in aqueous acidic medium are

A.  $2/3$  mole  $MnO_4^-$  and  $1/3$  mole of  $MnO_2$

B.  $1/3$  mole  $MnO_4^-$  and  $2/3$  mole of  $MnO_2$

C.  $1/3$  mole  $Mn_2O_7$  and  $1/3$  mole of  $MnO_2$

D.  $2/3$  mole  $Mn_2O_7$  and  $1/3$  mole of  $MnO_2$

**Answer: A**



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88. In the reaction the stoichiometry coefficients of  $Cr_2O_7^{2-}$ ,  $NO_2^-$  and  $H^+$  respectively are  $Cr_2O_7^{2-} + NO_2^- + H^+ \rightarrow Cr^{3+} + NO_3^- + H_2O$

A. 1,3 and 8

B. 1,4 and 8

C. 1,3 and 12

D. 1,5 and 12

Answer: A



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89. The number of moles of  $MnO_4^-$  and  $Cr_2O_7^{2-}$  separately required to oxidise 1 mole of  $FeC_2O_4$  each in acidic medium respectively

A. 0.5 , 0.6

B. 0.6 , 0.4

C. 0.4 , 0.5

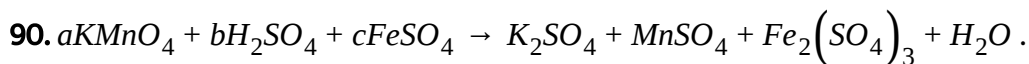


D. 0.6 , 0.5

**Answer: D**



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In this unbalanced stoichiometric equation the values of a , b and c respectively are

A. 2,8,10

B. 1,4,10

C. 2,10,8

D. 2,8,16

**Answer: A**



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91. Number of moles of KI (potassium iodide) required to produce 0.1 mole of  $K_2HgI_4$  is

A. 1.6

B. 0.8

C. 3.2

D. 0.4

**Answer: D**



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92. The weight of oxygen required to completely react with 27g of Al is

A. 8g

B. 16g

C. 32g

D. 24g

**Answer: D**



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**93.** Correct order of tendency to loss of electrons

A.  $Zn > Cu > Ag$

B.  $Zn < Cu < Ag$

C.  $Zn > Cu < Ag$

D.  $Cu > Zn > Ag$

**Answer: A**



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**94.** 20 ml of nitric oxide combines with 10 ml of oxygen at STP to give  $NO_2$

. The final volume will be

A. 30ml

B. 20ml

C. 10m

D. 40ml

**Answer: B**



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**95.** In the redox reaction



A.  $x=4, y=6$

B.  $x=3, y=8$

C.  $x=8, y=6$

D.  $x=8, y=3$

**Answer: D**

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96. How many moles of  $KMnO_4$  are required to oxidise one mole of ferrous oxalate in acidic medium ?

A. 7.5 moles

B. 0.2 moles

C. 0.6 moles

D. 0.4 moles

**Answer: C**

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97. When  $KMnO_4$  acts as an oxidizing agent and ultimately forms  $MnO_4^{2-}$ ,  $MnO_2$ ,  $Mn_2O_3$  and  $Mn^{2+}$ . The number of electrons transferred in each case respectively is

A. 1,3,4,5

B. 1,5,3,7

C. 4,3,1,5

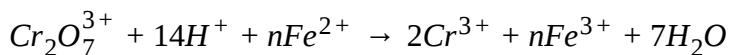
D. 3,5,7,1

**Answer: A**



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**98.** The value of  $n$  in the following equation if balanced



A. 2

B. 3

C. 7

D. 6

**Answer: D**

99. How many moles of magnesium phosphate,  $Mg_3(PO_4)_2$  will contain 0.25 mole of oxygen atoms ?

A. 0.02

B.  $3.125 \times 10^{-2}$

C.  $1.25 \times 10^{-2}$

D.  $2.5 \times 10^{-2}$

**Answer: B**

100. What is the volume (lit) of oxygen required at STP to completely convert 1.5 moles of sulphur into sulphurdioxide

A. 11.2

B. 22.4

C. 33.6

D. 44.8

**Answer: C**



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**101.** A copper plate of 20 cm x 10 cm is to be plated with silver of 1 mm thickness on both the sides. Number of moles of silver required for plating is (density of silver = 10.8 g m /cc)\_\_\_\_\_

A.  $1.2 \times 10^{24}$

B.  $2.4 \times 10^{24}$

C.  $1.2 \times 10^{13}$

D.  $2.4 \times 10^{13}$

**Answer: B**



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102. In the reaction  $MnO_4^- + SO_3^{2-} + H^+ \rightarrow Mn^{2+} + SO_4^{2-}$  the number of  $H^+$  ions involved is

A. 2

B. 6

C. 8

D. 16

**Answer: B**

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103. Number of moles of  $KMnO_4$  required to oxidize one mole of  $Fe(C_2O_4)$  in acidic medium is

A. 0.6

B. 0.167

C. 0.2

D. 0.4

**Answer: A**



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**104.** How many moles of acidified  $FeSO_4$  can be completely Oxidised by one mole of  $KMnO_4$

A. 10

B. 5

C. 6

D. 2

**Answer: B**



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105. In the balanced chemical reaction,  $IO_3^- + aI^- + bH^+ \rightarrow cH_2O + dI_2$ :

The coefficients a, b, c and d respectively correspond to

A. 5,6,3 and 3

B. 5,3,6 and 3

C. 3,5,3 and 6

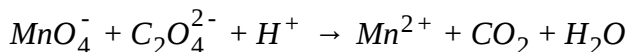
D. 5,6,5 and 5

**Answer: A**



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106. Coefficients of  $MnO_4^-$ ,  $C_2O_4^{2-}$  and  $H^+$  in the balanced reaction,



A. 2,3 and 8

B. 2,5 and 8

C. 2,3 and 16

D. 2,5 and 16

**Answer: D**



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**107.**  $5H_2O_2 + xCl_2O_2 + yOH^- \rightarrow xCl^- + zO_2 + 6H_2O$ . In this reaction the coefficient x,y and z are respectively.

A. 4,4 and 5

B. 2,2 and 4

C. 4,2 and 5

D. 2,2 and 5

**Answer: D**



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**108.** 1g of Mg is burnt in a vessel containing 0.5 g of oxygen. The remaining unreacted is

A. 0.25g of Mg

B. 0.1g of Mg

C. 0.01g of  $O_2$

D. 0.75g of Mg

**Answer: A**



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**109.** 25.5 g of  $H_2O_2$  solution on decomposition gave 1.68 L of  $O_2$  at STP.

The percentage strength by weight of the solution is

A. 30

B. 10

C. 20

D. 25

**Answer: C**



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**110.** Balance the following chemical reaction.

$MnO_4^- + SO_3^{2-} + H^+ \rightarrow Mn^{2+} + SO_4^{2-} + H_2O$ . The coefficient of  $MnO_4^-$ ,  $SO_3^{2-}$  and  $H^+$  in balanced reaction are ....., ..... and ..... respectively.

A. 5,2,6

B. 2,5,6

C. 6,5,2

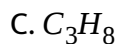
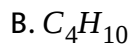
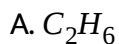
D. 2,6,5

**Answer: B**



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111. A gaseous alkane requires five times its volume of oxygen under the same conditions for complete combustion. The molecular formula of the alkane is

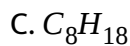
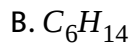
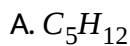


**Answer: C**



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112. An alkane has C/H ratio (by mass) of 5.1428. Its molecular formula is



D.  $C_7H_{16}$

**Answer: B**



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**113.** The percentage of nitrogen in Magnesium nitride is

A. 14

B. 28

C. 42

D. 56

**Answer: B**



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**114.** The percentage of silica in sodium silicate is approximately (Si=28)



A. 25

B. 40

C. 50

D. 60

**Answer: C**



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**115.** The element 'A' and 'B' combine together to give two compounds  $A_2B_3$  and  $AB_2$ . The weight of 0.2 mole of  $A_2B_3$  is 26 gm. The weight of 0.3 mole of  $AB_2$  is 24 g m. Then the atomic weight of A and B respectively

A. 15,20

B. 20,25

C. 20,30

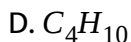
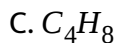
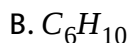
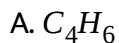
D. 25,30

**Answer: C**



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**116.** 10ml of an alkane on complete combustion gave 40ml of  $CO_2$  under the same conditions. The formula of the alkane is



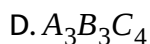
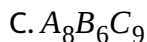
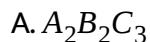
**Answer: D**



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**117.** The relative number of atoms of different elements in a compound are as follows , A = 1.33 , R = 1 and C = 1.5 . The empirical formula of the

compound is



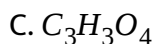
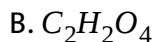
**Answer: C**



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**118.** A dibasic acid containing C,H and O was found to contain C=26.7% and H=2.2%. The vapour density of its dimethyl ester was found to be 73.

The molecular formula of the acid is



D.  $C_2H_4O_4$

**Answer: B**



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**119.** The mass of water (in grams) in one mole of crystalline hypo is

A. 18

B. 90

C. 158

D. 248

**Answer: B**



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**120.** 0.36g of an organic compound on combustion gave 1.1g of  $CO_2$  and 0.54g of  $H_2O$ . The percentages of carbon and Hydrogen in the compound are

- A. 75,25
- B. 60,40
- C. 83.33,16.67
- D. 77.8,22.2

**Answer: C**



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**121.** 0.66 g of a compound gave 112 ml of nitrogen at STP in the Dumas method. The percentage of Nitrogen in the compound is

- A. 25
- B. 41.5

C. 42.4

D. 21.2

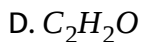
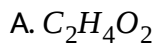
**Answer: D**



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**122.** 60g of a compound on analysis gave  $C = 24g$ ,  $H = 4g$  and  $O = 32g$ .

Its empirical formula is



**Answer: B**



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**123.** One mole of chlorine combines with certain weight of a metal giving 111 g of its chloride. The same amount of metal can displace 2 g of hydrogen from an acid. The atomic weight of the metal is:

A. 40

B. 20

C. 80

D. 60

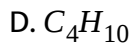
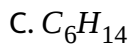
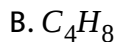
**Answer: A**



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**124.** 40 ml of a hydrocarbon undergoes combustion in 260 ml oxygen and gives 160 ml of  $CO_2$ . If all volumes are measured under similar conditions of temperature and pressure, the formula of the hydrocarbon is

A.  $C_3H_8$

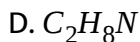
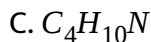
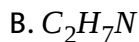
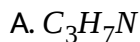


**Answer: D**



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**125.** A compound on analysis was found to contain 53.33 % C , 15.5 % H , and the rest nitrogen . The formula of the compound is



**Answer: B**

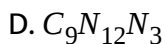
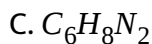
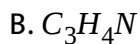
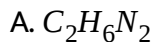


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126. In a compound C, H and N atoms are present in 9:1:3.5 by weight.

Molecular weight of compound is 108. Molecular formula of compound is

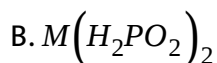
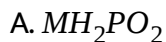


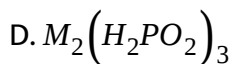
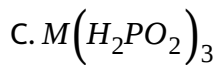
**Answer: C**



**Watch Video Solution**

127. The formula of metal phosphite is  $MHPO_3$ , the formula of the metal hypophosphite is



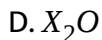
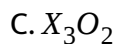
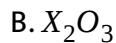
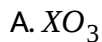


**Answer: B**



**Watch Video Solution**

**128.** An element X forms two oxides. Formula of the first oxide is  $XO_2$ . The first contains 50% of oxygen. If the second oxide contains 60% oxygen, the formula of the second oxide is



**Answer: A**



**Watch Video Solution**

129. 0.72 gm of an oxide of a metal M on reduction with  $H_2$  gave 0.64 g of the metal . The atomic weight of the metal is 64 . The empirical formula of the compound is

A.  $MO$

B.  $M_2O$

C.  $MO_2$

D.  $M_2O_3$

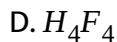
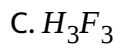
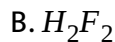
**Answer: B**



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130. 10 g of hydrofluoric acid gas occupies 5.6 lit of volume at STP . If the empirical formula of the gas is HF , then its molecular formula in the gaseous state will be

A. HF



**Answer: B**



**Watch Video Solution**

**131.** In the estimation of halogen 0.18 g of an organic compound gave 0.12 g of silver bromide. What is the percentage of bromine in the compound? (Molar mass of AgBr = 188, Atomic weight of Br= 80)

A. 30.64

B. 35.24

C. 34.84

D. 28.36

**Answer: D**

[Watch Video Solution](#)

**132.** four grams of hydrocarbon ( $C_xH_y$ ) on complete combustion gave 12grams of  $CO_2$ . What is the empirical formula of the hydrocarbon ?

( $C = 12, H = 1$ )

A.  $CH_3$

B.  $C_4H_9$

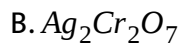
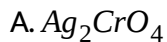
C. CH

D.  $C_3H_8$

**Answer: D**

[Watch Video Solution](#)

**133.** Analysis of a compound yields the following percentage composition. 65.03 % of Ag, 15.68 % Cr, 19.29 % O. The simplest formula of the compound is [Cr At.wt=52]

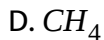
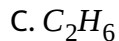
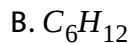
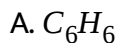


**Answer: A**



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**134.** In an organic compound containing C and H, the % C is 3 times to that of % H. What is the compound ?



**Answer: D**

 [Watch Video Solution](#)

**135.** The volume of  $0.025\text{M } \text{Ca}(\text{OH})_2$  solution which can neutralise 100 ml of  $10^{-4}\text{M } \text{H}_3\text{PO}_4$  is

- A. 10ml
- B. 60ml
- C. 0.6ml
- D. 2.8ml

**Answer: C**

 [Watch Video Solution](#)

**136.** The number of ions present in 1 ml of  $0.1\text{M } \text{CaCl}_2$  solution is

- A.  $1.8 \times 10^{20}$
- B.  $6.0 \times 10^{20}$

C.  $1.8 \times 10^{19}$

D.  $1.8 \times 10^{21}$

**Answer: A**



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**137.** When 100ml of 0.06M  $Fe(NO_3)_3$ , 50ml of 0.2M  $FeCl_3$  and 100ml of 0.26M  $Mg(NO_3)_2$ , are mixed, the concentration of  $NO_3^-$  ions in the final solution is

A. 0.028M

B. 0.32M

C. 0.12M

D. 0.28M

**Answer: D**



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**138.** The molality of 2% (W/W) NaCl solution nearly

A. 0.02m

B. 0.35m

C. 0.25m

D. 0.45m

**Answer: B**



**Watch Video Solution**

**139.** 100 ml of 2M HCl solution completely neutralises 10 g, of a metal carbonate. Then the equivalent weight of the metal is

A. 50

B. 20

C. 12

D. 100

**Answer: B**



**Watch Video Solution**

**140.** The Molarity of 200 ml of HCl solution which can neutralise 10.6 g. of anhydrous  $Na_2CO_3$  is

A. 0.1M

B. 1M

C. 0.6M

D. 0.75M

**Answer: B**



**Watch Video Solution**

**141.** The volume of  $CO_2$  formed when 1 litre of  $O_2$  reacted with 2 lit of CO under the same condition is

- A. 1L
- B. 2L
- C. 3L
- D. 1.5L

**Answer: B**



**Watch Video Solution**

**142.** 0.01 mole of iodoform ( $CHI_3$ ) reacts with Ag powder to produce a gas whose volume at NTP is

- A. 224ml
- B. 112ml
- C. 336ml

D. None

**Answer: B**



**Watch Video Solution**

**143.** Air contains 20% by volume of oxygen. The volume of air required for the complete combustion of 1L of methane under the same conditions is

A. 2L

B. 4L

C. 10L

D. 0.4L

**Answer: C**



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**144.** When 20 ml of methane and 20 ml of oxygen are exploded together and the reaction mixture is cooled to laboratory temperature. The resulting volume of the mixture is

A. 40ml

B. 20ml

C. 30ml

D. 10ml

**Answer: B**



**Watch Video Solution**

**145.** 3L Mixture of propane and butane on complete combustion at 298K and 1atm gave 10L  $CO_2$ . Calculate the composition of gas

A.  $1LC_3H_8, 2LC_4H_{10}$

B.  $2LC_3H_8, 1LC_4H_{10}$

C.  $1.5LC_3H_8$ ,  $1.5LC_4H_{10}$

D.  $0.75LC_3H_8$ ,  $2.25LC_4H_{10}$

**Answer: B**



**Watch Video Solution**

**146.** In the hydrogenation of phenyl ethylene  $C_6H_5CH = CH_2$  using a platinum catalyst the volume of hydrogen (measured at STP) that reacts with one mole of phenyl ethylene could be

A. 11.2L

B. 22.4L

C. 44.8L

D. 1L

**Answer: B**



**Watch Video Solution**

**147.** For the reaction  $A + 2B \rightarrow C$ : 5 moles of A and 8 moles of B will produce

- A. 5 moles of C
- B. 4 moles of C
- C. 8 moles of C
- D. 13 moles of C

**Answer: B**



**Watch Video Solution**

**148.** How many litres of  $CO_2$  at STP will be formed when 100 of  $0.1M H_2SO_4$  reacts with excess of  $Na_2CO_3$ ?

- A. 22.4
- B. 2.24

C. 0.224

D. 5.6

**Answer: C**



**Watch Video Solution**

**149.** When a sample of baking is strongly ignited in a crucible, it suffered a loss in weight of 3.1 g. The mass of baking soda is

A. 16.8g

B. 8.4g

C. 11.6g

D. 4.2g

**Answer: B**



**Watch Video Solution**



**150.** 1g of Mg is burnt in a vessel containing 0.5 g of oxygen. The remaining unreacted is

A. 0.25g of Mg

B. 0.1g of Mg

C. 0.1g of  $O_2$

D. 0.75g of Mg

**Answer: A**



**Watch Video Solution**

**151.** 7 g of a sample of sodium chloride on treatment with excess of silver nitrate gave 14.35 g of AgCl. The percentage of NaCl in the sample is

A. 0.8

B. 0.5

C. 0.658

D. 0.835

**Answer: D**



**Watch Video Solution**

**152.** 18.4g of a mixture of  $\text{CaCO}_3$  and  $\text{MgCO}_3$  on heating gives 4.0g of magnesium oxide. The volume of  $\text{CO}_2$  produced at STP in this process is

A. 1.12L

B. 4.48L

C. 2.24L

D. 3.36L

**Answer: B**



**Watch Video Solution**

**153.** 8 g of sulphur is burnt to form  $SO_2$  which is oxidised by chlorine water. The solution is treated with  $BaCl_2$  solution. The amount of  $BaSO_4$  precipitated is

- A. 1
- B. 0.5
- C. 0.25
- D. 0.125

**Answer: C**



**Watch Video Solution**

**154.** 0.8 mole of a mixture of CO and  $CO_2$  requires exactly 40 g of NaOH in solution for complete conversion of all the  $CO_2$  into  $Na_2CO_3$ . How many more moles of NaOH would it require for conversion into  $Na_2CO_3$ . If the mixture is completely oxidised to  $CO_2$ ?

A. 80g

B. 60g

C. 40g

D. 20g

**Answer: B**



**Watch Video Solution**

**155.** A mixture of  $\text{MgO}$  and  $\text{Mg}$  weighing 10 g is treated with excess of dil  $\text{HCl}$ . Then 2.24 lit of  $\text{H}_2$  gas was liberated under STP conditions . The mass of  $\text{MgO}$  present in the sample is

A. 2.4g

B. 7.6g

C. 8g

D. 2g

**Answer: B**



**Watch Video Solution**

**156.** 25.5 g of  $H_2O_2$  solution on decomposition gave 1.68 L of  $O_2$  at STP.

The percentage strength by weight of the solution is

A. 30

B. 10

C. 20

D. 25

**Answer: C**



**Watch Video Solution**

**157.** A gas mixture contains acetylene and carbondioxide. 20 lit of this mixture requires 20 lit of oxygen under the same conditions for complete

combustion. The percentage by volume of acetylene in the mixture is

- A. 0.5
- B. 0.4
- C. 0.6
- D. 0.75

**Answer: B**



**Watch Video Solution**

**158.** What is the volume (lit) of oxygen required at STP to completely convert 1.5 moles of sulphur into sulphurdioxide

- A. 11.2
- B. 22.4
- C. 33.6
- D. 44.8

**Answer: C**



**Watch Video Solution**

**159.** X litre of carbon monoxide is present at mSTP. It is completely oxidised to  $\text{CO}_2$ . Formed is 11.207 l. What is the value of X in litres?

A. 22.4

B. 11.2

C. 5.6

D. 44.8

**Answer: B**



**Watch Video Solution**

**160.** Acetylene can be prepared from calcium carbonate by a series of reactions. The mass of 80% calcium carbonate required to prepare 2

moles of acetylene is

A. 200g

B. 160g

C. 250g

D. 320g

**Answer: C**



**Watch Video Solution**

**161.** Sodium carbonate of 92% purity is used in the reaction  $Na_2CO_3 + CaCl_2 \rightarrow CaCO_3 + 2NaCl$ . The number of grams of  $Na_2CO_3$  required to yield 1 gm of  $CaCO_3$

A. 8.5g

B. 10.5g

C. 11.52g



D. 1.152g

**Answer: D**



**Watch Video Solution**

**162.** Liquid benzene burns in oxygen according to  $2C_6H_6(l) + 15O_2(g) \rightarrow 12CO_2(g) + 6H_2O(g)$ . How many litres of oxygen are required for complete combustion of 39g of liquid  $C_6H_6$  (atomic wt. of C=12, O=16)?

A. 11.2

B. 22.4

C. 42

D. 84

**Answer: D**



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**163.** Phosphine on decomposition produces phosphorus and hydrogen. When 100 ml of phosphine are decomposed the change in volume under laboratory conditions is

- A. 50mL increase
- B. 50mL decrease
- C. 900mL decrease
- D. 75mL increase

**Answer: A**



**Watch Video Solution**

**164.** Number of moles of  $KMnO_4$  required to oxidize one mole of  $Fe(C_2O_4)$  in acidic medium is

- A. 0.6
- B. 0.167

C. 0.2

D. 0.4

**Answer: A**



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**165.** 4.9 g of  $H_2SO_4$  decompedes x.g of NaCl to give 5g of sodium hydrogen sulphate and 1.825g of hydrochloric acid. Then .x. is

A. 6.92

B. 4.65

C. 2.925

D. 1.41

**Answer: C**



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**166.** Weight of one  $C_{60}H_{122}$  molecule is

A.  $3.72 \times 10^{23}g$

B.  $1.3 \times 10^{-19}g$

C.  $5.01 \times 10^{-21}g$

D.  $1.4 \times 10^{-21}g$

**Answer: D**



**Watch Video Solution**

**167.** If 5 ml of methane is completely burnt the volume of oxygen required and the volume of  $CO_2$  formed under the same conditions are

A. 10ml, 5ml

B. 5ml, 10ml

C. 5ml, 15ml

D. 10ml, 10ml

**Answer: A**



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**168.** How many moles of acidified  $FeSO_4$  can be completely Oxidised by one mole of  $KMnO_4$

A. 10

B. 6

C. 5

D. 2

**Answer: C**



**Watch Video Solution**

**169.** A mixture of methane and ethylene in the volume ratio  $x:y$  has a total volume of 30 ml . On complete combustion it gave 40 ml of  $CO_2$  . If

the ratio had been  $y:x$  , instead of  $x:y$  , what volume of  $CO_2$  could have been obtained ?

- A. 50ml
- B. 100ml
- C. 25ml
- D. 75ml

**Answer: A**



**Watch Video Solution**

**170.** One litre of a mixture of CO and  $CO_2$  is passed over red hot coke when the volume increased to 1.6 L under the same conditions of temperature and pressure . The volume of CO in the original mixture is

- A. 400ml
- B. 600ml
- C. 500ml

D. 800ml

**Answer: A**



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**171.** The atomic masses of two elements A and B are 20 and 40 respectively. If  $x$  gm of A contains  $Y$  atoms, how many atoms are present in  $2x$  gm of B

A.  $2y$

B.  $y/2$

C.  $y$

D.  $4y$

**Answer: C**



**Watch Video Solution**

**172.** In the formation of  $Al_2O_3$  from  $Al$  and  $O_2$ , if 1.5 mole of oxygen is used up, the mass of aluminium that reacted is

- A. 27g
- B. 54g
- C. 108g
- D. 81g

**Answer: B**



**Watch Video Solution**

**173.** The weight of  $MgCO_3$  required for the preparation of 12g of  $MgSO_4$  by reacting with sulphuric acid is

- A. 8.4g
- B. 4.2g
- C. 16.8g



D. 12.6g

**Answer: A**



**Watch Video Solution**

**174.** 100ml of  $KMnO_4$  solution is exactly reduced by 100ml of 0.5 M oxalic acid under acidic condition. The molarity of  $KMnO_4$  solution is

A. 0.1M

B. 0.2M

C. 0.05M

D. 0.5M

**Answer: B**



**Watch Video Solution**

**175.** 314.000 has how many significant figures?

A. 6

B. 3

C. 5

D. 4

**Answer: A**



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**176.** The nuclear cross section is measured in barn'. It is equal to

A.  $10^{-20}m^2$

B.  $10^{-30}m^2$

C.  $10^{-28}m^2$

D.  $10^{-14}m^2$

**Answer: C**



**Watch Video Solution**

**177.** The prefix femto stands for

A.  $10^9$

B.  $10^{-12}$

C.  $10^{-15}$

D.  $10^5$

**Answer: C**



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**178.** Three students namely A,B,C have done an experiment two time invdividual, for which the correct value is 2.00g. The result are

	Experiment-1	Experiment-2
Student A	1.95g	1.93g
Student B	1.94g	2.05g
Student C	2.01g	1.99g

Accurate and precise result is

- A. C
- B. B
- C. A
- D. A and B

**Answer: A**



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**179.** An iron ball has a mass of 35gms and a speed of 50m/s. If the speed can be measured with in accuracy of 2 % then the uncertainty in the position

A.  $1.507 \times 10^{-34}m$

B.  $1.507 \times 10^{-31}m$

C.  $1.507 \times 10^{-33}m$

D.  $4.507 \times 10^{-32}m$

**Answer: A**



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### Objective Exercise -3

1. Which of the following oxidation states are the most characteristic for lead and tin. respectively ?

A. +2, +4

B. +4, +4

C. +2, +2

D. +4, +2

**Answer: A**



**Watch Video Solution**

2. Mole fraction of the solute in a 1.00 molal aqueous solution is

A. 0.177

B. 0.0177

C. 0.344

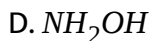
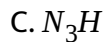
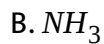
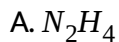
D. 1.77

**Answer: B**



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3. In which of the following compound nitrogen exhibits highest oxidation state?



**Answer: C**



**Watch Video Solution**

4. A mixture of potassium chlorate, oxalic acid and sulphuric acid is heated. During the reaction which element undergoes maximum change in the oxidation number?

A. S

B. H

C. Cl

D. C

**Answer: C**



**Watch Video Solution**

5. A mixture of potassium chlorate, oxalic acid and sulphuric acid is heated. During the reaction which element undergoes maximum change in the oxidation number?

A. S

B. H

C. Cl

D. C

**Answer: C**



**Watch Video Solution**



6. A mixture of potassium chlorate, oxalic acid and sulphuric acid is heated. During the reaction which element undergoes maximum change in the oxidation number?

A. S

B. H

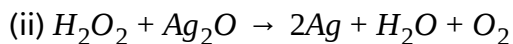
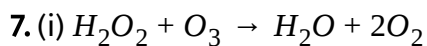
C. Cl

D. C

**Answer: C**



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Role of hydrogen peroxide in the above reaction is respectively

A. oxidising in (I) and reducing in (II)

B. reducing in (I) and oxidizing in (II)

C. reducing in (I) and (II)

D. oxidising in (I) and (II)

**Answer: C**



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8. In acidic medium  $H_2O_2$  changes  $Cr_2O_7^{2-}$  to  $CrO_5$  which has two (-O-O-) bonds. Oxidation state of Cr in  $CrO_5$  is

A. +5

B. +3

C. +6

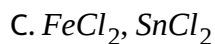
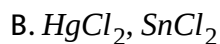
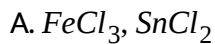
D. -10

**Answer: C**



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9. The pair of compounds that can exist together is

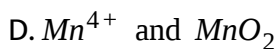
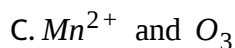
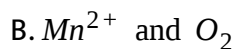
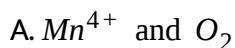


Answer: C



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10. The reaction of aqueous  $\text{KMnO}_4$  with  $\text{H}_2\text{O}_2$  in acidic conditions gives



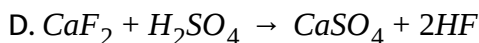
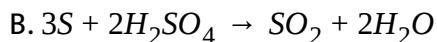
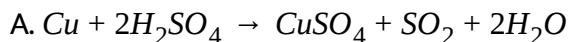
**Answer: B**



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**11.** Hot concentrated sulphuric acid is a moderately strong oxidizing agent.

Which of the following reactions does not show oxidizing behaviour ?



**Answer: D**



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**12.** Suppose the elements X and Y combine to form two compounds  $XY_2$  and  $X_2Y_2$ . When 0.1 mole of  $XY_2$  weighs 10 g and 0.05 mole of  $X_3Y_2$

weighs 9 g, the atomic weights of X and Y are

A. 40,30

B. 60,40

C. 20,30

D. 30,20

**Answer: A**



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**13.** It is because of inability of  $ns^2$  electrons of the valence shell to participate in bonding that

A.  $Sn^{4+}$  is reducing while  $Pb^{4+}$  is oxidising

B.  $Sn^{2+}$  is reducing while  $Pb^{4+}$  is oxidizing

C.  $Sn^{2+}$  is oxidising while  $Pb^{4+}$  is reducing

D.  $Sn^{2+}$  and  $Pb^{2+}$  are both oxidizing and reducing

**Answer: B**



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**14.** Which of the following is dependent on temperature ?

A. Weight percentage

B. Molality

C. Molarity

D. Mole fraction

**Answer: C**



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**PROBLEMS**

1. What is the percentage weight of metallic element in the constitution of calcium carbonate?



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2. Two oxide of metal M have 27.6 % and 30 % oxygen by weight. If the formula of the first oxide is  $M_3O_4$  what is the formula of second oxide?



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3. Copper forms two oxides following law of variable proportions. One gram of each oxide in hydrogen gas gave 0.799 g and 0.888 g of the metal respectively. Give the composition of these oxides.



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4. What is the volume ratio of the product gases in the decomposition of phosphorus pentachloride?



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5. The weight percentage of carbon dioxide and carbon disulphide are respectively 27.27 % and 15.79 % . What is the composition of oxide of sulphur, if the weight percentage of oxygen is 50?



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6. If relative masses of He is taken as one unit, what is that of magnesium?



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7. The relative abundance of  $^{12}\text{C}$  and  $^{13}\text{C}$  are respectively 98.892 and 1.108. If the atomic masses of  $^{12}\text{C}$  and  $^{13}\text{C}$  are 12 u and 13.0035 u, respectively, calculate the average atomic mass of carbon.



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8. Neon is naturally available as  $^{20}\text{Ne}$  and  $^{22}\text{Ne}$  with average atomic mass 20.2. Calculate the relative abundance of heavier isotope.



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9. 3 litres each of Nitrogen and Hydrogen measured at STP are allowed to react together. Find the volumes of the gases after the reaction and also the weight of Ammonia formed in the reaction.



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10. Calculate the charge of one electron?



**Watch Video Solution**

11. Calculate the mass of one mole of electrons?



**Watch Video Solution**

12. How many moles are present in 54 grams of glucose?



**Watch Video Solution**

13. What is the density of carbondioxide at STP?



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14. What is the molecular mass of water?



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15. How many atoms are present in one cc of helium gas at STP ?



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16. What is the ratio of number of molecules, if the mass ratio of  $N_2$  and  $O_2$  is 4:1?



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17. How many gram atoms are present in 4000 amu of calcium ?



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18. Find the charge on one gram ion of nitride ?



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**19.** Calculate the effective molecular weight of air



**Watch Video Solution**

**20.** When gypsum is totally dehydrated, what is the percentage weight loss ?



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**21.** Natural abundance of heavy water in water is 1 : 6000. How many heavy water molecules are present in one drop of water ? (one mL water is 20 drops)



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**22.** A solution is prepared by adding 4g of a solute A to 36 of water. Calculate the mass percent of the solute.



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**23.** Calculate the molarity of a solution prepared by dissolving its 4g NaOH in enough water to form 250mL of the solution.



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**24.** The density of 4 % (w/v) NaOH soluton is 31.02 g/ ml. What is the molality of the solution?



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**25.** Find the normality of oxalic and solution containing 63 g of crystalline oxalic acid in 500 ml of solution.

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26. Find the mass of  $Na_2CO_3$  required to prepare 3250 ml of 0.5N solution.

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27. Equivalent weights of  $Na_2CO_3$  and  $Al_2(SO_4)_3$

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28. Calculate the equivalent weight of  $KMnO_4$

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29. Calculate the equivalent weight of ferrous sulphate (a) as salt and (b) as reductant.

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30. What is gram equivalent weight of hydrogen peroxide as reductant?



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31. What is the equivalent weight of potassium dichromate in acidic medium ?



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32. The weight percentage of iron in heamo-globin is 0.33. If the approximate molecular weight of heamoglobin is 68000, how many iron atoms are present in the molecule? (At.wt. of Fe is 56)



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33. What is the weight percent of oxygen in Glucose ?



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**34.** A commercial sample of common salt has 45.5 % chlorine. What is the weight percentage of pure sodium chloride in the sample?



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**35.** A compound contains 26.57 % potassium, 35.36 % chromium and the remaining oxygen. What is its empirical formula? (At.wt. of K=39.1, Cr=52, O=16)



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**36.** An organic compound contains carbon, hydrogen, oxygen and nitrogen in the weight ratio 3 : 1 : 8 : 3.5. Calculate its empirical formula.



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**37.** Combustion of 0.277g of an organic compound gave 0.66g carbondioxide and 0.337g water. Vapour density of the compound is equal to 37. Calculate its molecular formula.



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**38.** An organic compound on analysis was found to contain 16.27 % carbon. 0.67 % Hydrogen, 72.2 % chlorine. The V.D. of the compound is equal to 73.75. Calculate the empirical formula and molecular formula of the compound.



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**39.** Combustion of 0.202 g of a carbon compound gave 0.361 g of carbon dioxide and 0.147g of water. Determine the empirical formula of the compound.



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40. The weight ratio of elements carbon, nitrogen and hydrogen in a compound of molecular mass 108 is 18:2:7. What is its molecular formula?



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41. A carbon compound contains 12.8% Carbon, 2.1% Hydrogen, 85.1% Bromine. The molecular weight of the compound is 187.9. Calculate the molecular formula.



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42. The empirical formula an organic substance is  $CH_2O$ . If  $3 \times 10^{22}$  molecules of the substance has a mass of one sixth of mass of one gram mole of water, find the hybridisation of carbon atoms in the compound.



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43. Combustion of 0.277g of an organic compound gave 0.66g carbondioxide and 0.337g water. Vapour density of the compound is equal to 37. Calculate its molecular formula.



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44. Justify that the reaction :  $2\text{Cu}_2\text{O}(\text{s}) + \text{Cu}_2\text{S}(\text{s}) \rightarrow 6\text{Cu}(\text{s}) + \text{SO}_2(\text{g})$  is a redox reaction. Identify the species oxidised/reduced, which acts as an oxidant and which acts as a reductant.



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45. Can oxygen exhibit positive oxidation numbers in its compounds?



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46. What is the oxidation state of chromium in potassium dichromate?



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47. What are the oxidation numbers of : (a) S in  $H_2SO_4$ , (b) Mn in  $MnO_4^-$  (c) N in  $NH_4^+$  and (d) Al in  $AlO_2^-$  (e) Mn in  $MnO_4^{2-}$



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48. Write the oxidation number of oxygen in (a)  $O_3$ , (b)  $MgO$ , (c)  $H_2O_2$ , (D)  $KO_2$  and (e)  $OF_2$



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49. Calculate the oxidation numbers of sulphur in  $H_2SO_5$  and in  $H_2S_2O_8$



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50. Using stock notation represent  $HAuCl_4$ .



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51. What is the oxidation number of iron in the brown ring complex compound?



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52. Oxidation number of the metal ion in the compound  $\left[CO(NH_3)_5Cl\right]Cl_2$  is +3. Calculate the oxidation number of the complex ion.



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53. One mole of hydrazine loses 10 moles of electrons. If all the nitrogen content is present in the product, what is the oxidation number of nitrogen in the product?



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54. Mention whether each of the following conversion involves oxidation or reduction.

a)  $HCl \rightarrow HOCl$ , b)  $KMnO_4 \rightarrow K_2MnO_4$  and c)  $HNO_3 \rightarrow NaNO_3$



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55. One mole of  $AO_2^-$  is oxidised to  $A^{n+}$  in acidic solutions by 0.4 mole of permanganate. Calculate the value of n in  $A^{n+}$ .



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56. Calculation of oxidation number of nitrogen in ammonium nitrite  $NH_4NO_2$



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57. Write the oxidation number of Hg in amalgam.



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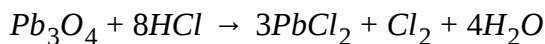
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58. Is the decomposition of magnesite a redox reaction ?

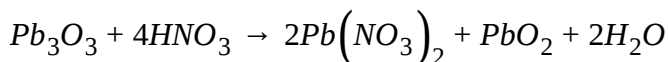


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59. Why do the following reactions proceed differently?



and



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60. Name the halogen that does not undergo disproportionation. Write the reason.



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61. Reaction between hydrogen sulphide and sulphurdioxide gives sulphur. Which type of redox reaction is this?



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62. How many hydroxyl ions are required for the conversion:  $CN_{(aq)}^-$  to  $CNO_{(aq)}^-$



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63. One gram atom of aluminium can reduce how many moles of chromic oxide?



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64. How many electrons and protons are present in the balanced half equation?  $NO_2^- \rightarrow NO$



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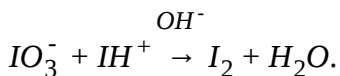
65. What is the ratio of coefficients of caustic soda and zinc metal in the reaction between zinc and NaOH?

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66.  $xKI + yH_2SO_4 \rightarrow I_2 + SO_2 + KHSO_4$ . In the above balanced equation, what are x and y?

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67. Calculate the mole coefficient of  $H^+$  in the balanced equation.

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68. How many electrons are transferred in the oxidation of nitrite by hydrogen peroxide?



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69. In the reaction between dilute nitric acid and magnesium metal, (a) how many moles of  $HNO_3$  reacts with a gram atom of metal? and (b) how many moles of  $HNO_3$  is oxidised by a gram atom of metal?



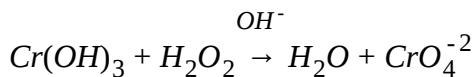
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70. How many moles of acidified permanganate are required to oxidise one mole of ferrous oxalate?



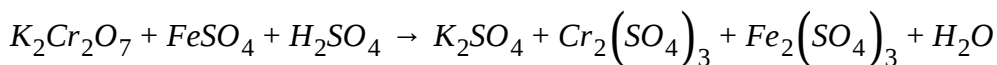
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71. How many moles of  $OH^-$  are present in the balanced equation?



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72.



a) How many electrons are transferred

b) What is the mole coefficient of  $H_2O$ , in the above reaction?



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73. 10 grams of a hydrated sodium carbonate,  $Na_2CO_3 \cdot xH_2O$ , on strong heating loses a weight of 6.29 grams. Report the value of  $x$ .



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**74.** Calculate the percent weight loss suffered by sodium bicarbonate on strong heating?



**Watch Video Solution**

**75.** How many grams of 80 % pure marble stone on calcination can give 14 grams of quick lime?



**Watch Video Solution**

**76.** Certain mass of potassium chlorate is thermally decomposed and 3.36 L of  $O_2$  is collected at STP. What will be the weight of the residue in the experiment?



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**77.** A sample of magnesium is partially oxidised to magnesia. 3 grams of such sample is treated with excess dilute sulphuric acid and the hydrogen collected measures 1.12 L at STP. What is the weight ratio of metal and metal oxide in the sample?



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**78.** What volume of hydrogen at STP required to reduce 7.95 grams of cupric oxide to give metal?



**Watch Video Solution**

**79.** 6 grams of magnesite mineral on heating liberated carbondioxide which measures 1.12 L at STP. What is the percentage purity of mineral?



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**80.** What volume of carbonmonoxide at 2 atm and  $273^{\circ}\text{C}$  is required in order to produce 5.6 grams of metal by the reduction of ferric oxide?



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**81.** Calculate the volume of air, contained 21 % of oxygen by volume required for the complete combustion of 10 L of ethylene under similar conditions



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**82.** What is the volume of ammonia obtained starting from 2 L of nitrogen, if the conversion is only 6 % efficient in the given conditions?



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**83.** 30 mL of mixture of methane and ethane in  $x:y$  ratio by volumes on combustion gave 40 mL of carbon dioxide. If 30 mL of mixture is taken in  $y:x$  ratio, what is the volume of carbondioxide obtained under similar conditions?



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**84.** 5.3 grams of anhydrous sodium carbonate is treated with dilute hydrochloric acid to give carbondioxide. In order to produce the same amount of gas. How many graphite atoms are to be oxidised?



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**85.** The production cost of hydrogen from a mineral acid using zinc is Rs. 12 per mole. How many electrons is worth of one rupee?



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**86.** 0.4 mole of orthophosphoric acid and 1.0 mole of calcium hydroxide were allowed to react. Calculate the maximum number of moles of calcium phosphate formed.



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**87.** 4 grams of each pure hydrochloric acid and pure caustic soda are together dissolved in water. What weight of sodium chloride is obtained?



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**88.** 11.2 L of oxygen STP and 8 grams of calcium are allowed to react. What volume of which chemical is left unreacted?



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**89.** Add  $6.65 \times 10^4$  and  $8.95 \times 10^3$ .



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90. Give the answer for  $2.5 \times 1.25$  in significant figures.



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91. Gaseous elements are monatomic or diatomic Comment.



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92. What is the percentage weight of metallic element in the constitution of calcium carbonate?



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93. If 3.1gm Phosphorous is present in a sample of  $Ca_3(PO_4)_2$  the what is the weight of oxygen in the sample?



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**94.** Copper forms two oxides following law of variable proportions. One gram of each oxide in hydrogen gas gave 0.799 g and 0.888 g of the metal respectively. Give the composition of these oxides.



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**95.** Two oxide of metal M have 27.6 % and 30 % oxygen by weight. If the formula of the first oxide is  $M_3O_4$  what is the formula of second oxide?



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**96.** The weight percentage of carbon dioxide and carbon disulphide are respectively 27.27 % and 15.79 % . What is the composition of oxide of sulphur, if the weight percentage of oxygen is 50?



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97. What is the volume ratio of the product gases in the decomposition of phosphorus pentachloride?



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98. if relative mass of He is taken as one unit, What is that of calcium?



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99. The relative abundance of  $^{12}\text{C}$  and  $^{13}\text{C}$  are respectively 98.892 and 1.108. If the atomic masses of  $^{12}\text{C}$  and  $^{13}\text{C}$  are 12 u and 13.0035 u, respectively, calculate the average atomic mass of carbon.



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100. Neon is naturally available as  $^{20}\text{Ne}$  and  $^{22}\text{Ne}$  with average atomic mass 20.2. Calculate the relative abundance of heavier isotope.



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**101.** What is the formula mass of gypsum?



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**102.** Calculate the mass of a fructose molecule.



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**103.** If 0.02 g of a volatile compound on heating displaces 11.2 ml of dry air at STP, the molecular weight of the compound is



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**104.** A hydrated metal chloride contains 27.8% metal and 48.5% halogen by weight. Specific heat of metal (M) is  $0.67 \text{ Jg}^{-1}$ . What is the valency of the metal?



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**105.** How many atoms are present in 2 grams of calcium? (GAW of Ca is 40g)



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**106.** What is avogram?



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**107.** Calculate the real mass of one carbon atom



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**108.** If a person spends one million rupees per sec, continously, how many years it takes to spend Avogadro number of rupees?

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109.  $10^{20}$  atoms of an element has a mass of 4 mg. What is the atomic mass of the element?

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110. Calculate the mass of one mole of electrons?

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111. How many moles are present in 108 grams of glucose?

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112. What is the density of carbondioxide at STP?

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**113.** What is the molecular mass of water?



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**114.** How many atoms are present in one cc of helium gas at STP?



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**115.** What is the ratio of number of molecules, if the mass ratio of  $N_2$  and  $O_2$  is 4:1?



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**116.** How many moles of oxygen atoms are present in 75 grams of pure calcium carbonate?



**Watch Video Solution**

**117.** How many gram atoms are present in 4000 amu of calcium ?



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**118.** Atomic mass of mercury is 200 and density is  $13.6 \text{ g cm}^{-3}$ . How many moles of metal are present in one litre ?



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**119.** Find the charge on one gram ion of nitride ?



**Watch Video Solution**

**120.** Calculate the effective molecular weight of air



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**121.**  $3.011 \times 10^{22}$  molecules are removed from a vessel containing 1680 cc of nitrogen at STP. How many moles are remaining ?



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**122.** An organic compound has 8 percent of sulphur by weight. What is its molecular weight of the compound?



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**123.** The weight percentage of iron in haemoglobin is 0.33. If the approximate molecular weight of haemoglobin is 68000, how many iron atoms are present in the molecule? (At.wt. of Fe is 56)



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**124.** What is the percent weight composition of water in plaster of paris?

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**125.** 0.2g of an organic compound on analysis give 0.147g of carbondioxide, 0.12 g of water and 74.6 c,c of nitrogen at S.T.P. Calculate the weight percentages of constituents.

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**126.** On heating 0.2g of an organic compound with a mixture of barium chloride and nitric acid, 0.466 g of barium sulphate was obtained. Calculate the percentage of sulphur

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**127.** An organic compound contains carbon, hydrogen, oxygen and nitrogen in the weight ratio 3: 1: 8: 3.5. Calculate its empirical formula.

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**128.** A compound contains 26.57 % potassium, 35.36 % chromium and the remaining oxygen. What is its empirical formula? (At.wt. of K=39.1, Cr=52, O=16)



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**129.** Combustion of 0.202 g of a carbon compound gave 0.361 g of carbon dioxide and 0.147g of water. Determine the empirical formula of the compound.



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**130.** A brominated alkane an analysis gave 12.8% carbon and 2.1%H. If its vapour density is 93.95, what is its molecular formula?



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**131.** A compound has molar of 98.98g. The analysis gave 24.27%C, 4.07%H and 71.6% Cl. Determine the molecular formula of alkane from which the chlorinated compound is obtained.



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**132.** Derived unit is



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**133.** How many mL is one  $m^3$  ?



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**134.** How many significant figures are these in Avogadro constant?



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**135.** Add 18.11, 12.0 and 2.021 and report the result in significant figures.



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**136.** Round off the following to report each in three significant figures :

(a) 13.821 (b) 4.256 and ( c) 162.5



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**137.** A  $m^3$  vessel at STP has oxygen gas. How many moles of oxygen are present?



**Watch Video Solution**

**138.** How many seconds are there in 7 days?



**Watch Video Solution**

**139.** How many grams of 80 % pure marble stone on calcination can give 14 grams of quick lime?



**Watch Video Solution**

**140.** 10 grams of a hydrated sodium carbonate,  $Na_2CO_3 \cdot xH_2O$ , on strong heating loses a weight of 6.29 grams. Report the value of x.



**Watch Video Solution**

**141.** Calculate the percent weight loss suffered by sodium bicarbonate on strong heating?



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**142.** Certain mass of potassium chlorate is thermally decomposed and 3.36 L of  $O_2$  is collected at STP. What will be the weight of the residue in the experiment?



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**143.** What volume of hydrogen at STP required to reduce 7.95 grams of cupric oxide to give metal?



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**144.** 6 grams of magnesite mineral on heating liberated carbondioxide which measures 1.12 L at STP. What is the percentage purity of mineral?



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**145.** How much minimum volume of CO at STP is needed to react completely with 0.112 L of  $O_2$  at 1.5 atm. Pressure and  $127^\circ C$  to give  $CO_2$ .



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**146.** 30 mL of mixture of methane and ethane in  $x:y$  ratio by volumes on combustion gave 40 mL of carbon dioxide. If 30 mL of mixture is taken in  $y:x$  ratio, what is the volume of carbondioxide obtained under similar conditions?



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**147.** Calculate the volume of air, contained 21 % of oxygen by volume required for the complete combustion of 10 L of ethylene under similar conditions



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**148.** The energy released by burning aluminium is  $807.5 \text{ kJ mol}^{-1}$ . How many atoms of the metal are to be burned to get 100kJ of energy released?



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**149.** The production cost of hydrogen from a mineral acid using zinc is Rs. 12 per mole. How many electrons is worth of one rupee?



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**150.** 11.2 L of oxygen STP and 8 grams of calcium are allowed to react. What volume of which chemical is left unreacted?



**Watch Video Solution**

**151.** 0.4 mole of orthophosphoric acid and 1.0 mole of calcium hydroxide were allowed to react. Calculate the maximum number of moles of calcium phosphate formed.



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**152.** 10 ml of a gaseous hydrocarbon is mixed with excess of oxygen and burnt . The gases are then cooled back . The reduction in volume was 25 ml . When the gases are passed into caustic potash , there is a further reduction in volume of 30 ml . If all volumes are measured under the laboratory conditions , the hydrocarbon is



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**153.** 25 mL of a gaseous hydrocarbon is mixed with 150mL of oxygen in an eudiometer. After sparking and cooling back the mixture is passed through alkaline pyrogallol. The volume loss suffered in pyrogallol is 25mL. Calculate the molecular weight of hydrocarbon.



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**154.**  $S_4N_x$  in vapour state is subjected to decomposition totally to get octaatomic sulphur vapour and nitrogen gas . Under similar conditions the volume of products is 2.5 times to the reactants. Deduce the

molecular formula of the nitride of sulphur. Calculate the weight percentage of nitrogen.



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**155.** A 60mL mixture of nitrous oxide and nitric oxide is totally decomposed. The volume of the mixture after passing through alkaline pyrogallol is 48mL. Calculate the weight percentage of the diatomic oxide in the



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**156.** 60 mL of methane and 180mL of oxygen are mixed and fixed. The resulting gases are passed through caustic soda solution. Determine the composition of gases before and after passing through base solution.



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**157.** Two grams of a mixture of propane and acetylene is burnt in excess oxygen. The unreacted oxygen is removed by adsorption into basic pyrogallol. The ratio of volumes of gaseous  $CO_2$  and  $H_2O$  is 3:2. Determine the mass of unsaturated hydrocarbon in the given mixture.



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**158.** 60mL of pure ozone is heated and then cooled. The increase in the volume is 10mL. Determine the percentage volume of ozone decomposed into oxygen.



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**159.** 100mL of each hydrogen and oxygen was mixed and fired. What will be the final volume of the mixture when measured at the original conditions?



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**160.** Calculate the equivalent weight of ferrous sulphate (a) as salt and (b) as reductant.



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**161.** What is the equivalent weight of potassium dichromate in acidic medium ?



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**162.** The equivalent volume of hydrogen at STP from one gram of a divalent metal when treated with a dilute mineral acid is 560 mL. Calculate the atomic mass of metal.



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**163.** Equivalent weight of element X is 3. If vapour density of volatile chloride of X is 77, Find out the molecular formula of chloride.



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**164.** Calculate the equivalent weight of hypo based on its reaction with iodine.



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**165.** Oxidation of base at anode is given by the chemical equation :  
 $4OH^- \rightarrow O_2 + 2H_2O + 4e^-$  What is the equivalent weight of water?



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**166.** Specific heat of a metal is  $0.115 \text{ cal K}^{-1}$  . If the weight percentage of metal in metal oxide is 77.28, determine the valency of metal.

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**167.** Equivalent weight of ferrous ion when it acts as salt is X and as reductant is Y. What is the ratio of X and Y?

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**168.** 2.1 g of metal carbonate on thermal decomposition gave 1 g of metal oxide as residue. Determine the equivalent weight of metal.

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**169.**  $Cu_2S$  and  $M_2S$  are isomorphous. Percent weight of sulphur in  $Cu_2S$  is 20.14 and in  $M_2S$  is 12.9. if the atomic mass of Cu is 63.5, Calculate that of the other metal, M.

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**170.** Calculate the mole fraction of glucose in 10% aqueous solution.



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**171.** Aqueous ethanol is labelled as 2 molal. Find the mole fraction of alcohol.



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**172.** The molarity and molality of a solution of sulphuric acid are 11.07 and 21.91 respectively. The density of the solution in g/ml is



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**173.** Laboratory grade concentrated sulphuric acid has a density  $1.82 \text{ g cm}^{-3}$ . Weight percentage of acid is 98. Calculate the normality of solution.



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**174.** How many moles are present in 1500mL of semi molar sucrose solutions? What is the weight of solute in the solution?



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**175.** Two grams of pure caustic soda is present dissolved in 1.5 Lit solution. If 10mL of this is diluted to 150mL. What is the normality of diluted base?



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**176.** X. and .Y. are two different solutions of hydrochloric acid with concentrations 5M and 2M respectively. If one litre of 3M hydrochloric acid is to be prepared by mixing only X and Y calculate their volumes.



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**177.** 100mL of each 0.2M solutions of  $H_2SO_4$  and HCl are mixed. Calculate the normality of the mixture.



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**178.** If 100mL of 1M HCl is added to 150mL of 1M NaOH, What is the final nature and concentration of resultant solution.



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**179.** 9.8g of an acid of molecular weight 98 was neutralised by 200ml of one normal caustic soda. What is the basicity of the acid?



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**180.** 25mL of decimolar solution of a stable divalent transition metal cation is oxidised by 50mL of 0.02M acidified permanganate solution. What is the final oxidation state of the metal?



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**181.** How many grams of anhydrous sodium carbonate can be decomposed using 50mL of seminormal hydrochloric acid?



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**182.** 30ml of hydrogen peroxide solution was added with added with excess potassium iodide. The iodide liberated was titrated using starch indicator with 20ml of 0.3N sodium thiosulphate solution. Calculate the normality of hydrogen peroxide solution.



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**183.**  $V_1$  mL of  $xN$  NaOH and  $V_2$  mL of  $yN$   $Ba(OH)_2$  were together sufficient to neutralise 100mL of 0.1N HCl. The ratio of  $V_1 : V_2$  is 1:4 and  $x:y$  is 4:1. What is the fraction of acid neutralised by barium hydroxide solution?



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**184.**  $x$ g of tartaric acid is dissolved in 30mL of 0.2M potash solution. The resultant mixture requires 20ml of 0.1M HCl for titration. Report the numerical value of  $x$ .

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**185.** A mixture of caustic soda and soda ash requires 25ml 1M HCl for phenolphthalein indicator and 35ml of 1M HCl for methyl orange indicator. Calculate ratio of (a) number of equivalent and (b) number of moles of the component in the mixture.

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### EXERCISE -1.1.1

1. Distinguish between atom and molecule.



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2. Explain with suitable examples, the term atomicity .



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3. What are the atomicity values of

(a) monoclinic sulphur,

(b) phosgene,

(c ) phenol and (d) fructose.



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## EXERCISE -1.1.2

1. State and explain the law of conservation of mass.



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2. State and explain Gay-Lussac's law of combining volumes.



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3. Calculate the mass of sodium chloride that is to be treated with 19.6g of sulphuric acid in order to produce 7.3g of hydrogen chloride and 24g of sodium bisulphate.

Hint:  $\text{NaCl} + \text{H}_2\text{SO}_4 \rightarrow \text{NaHSO}_4 + \text{HCl}$



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4. Zinc sulphate crystals contain 43.9% water and 22.6% zinc. What is the weight of water that 13.7g of zinc sulphate crystals contain?



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5. State the following

law of constant proportions.



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6. How much volume of oxygen will be required to burn completely 24mL of methane? How much volume of carbon dioxide is formed under similar conditions?



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### EXERCISE -1.1.3

1. Define atomic mass number.



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2. Write a note on Avogadro constant.



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## EXERCISE -1.1.4

1. Define mole and write its significance.



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2. What is the difference between molecular mass and molar mass?



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3. What is GMV? Write its value with suitable examples.



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4. What is the volume ratio of equal masses of hydrogen, methane and oxygen present under similar conditions?



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5. How many grams of oxygen are present in a decimol of washing soda.



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6. One atom of an element weighs  $6.644 \times 10^{-26}$  kg. How many gram atoms are present in 40 kg of the element?



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7. What is the density of chlorine relative to that of air?



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8. How many moles are present in (a) 5.08g of sodium bicarbonate (b) 16.3g of rhombic sulphur (c) 6.46 g of helium and (d) 23.3g of zinc



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9. How many grams are to be weighed in order to represent 0.1 mole of each (a) sodium carbonate (b) copper sulphate penta hydrate (c) sodium oxalate and (d) sodium hydroxide?



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10. Report the volume at STP occupied by (a)  $6.022 \times 10^{22} \text{H}_2\text{S}$  molecules and (b) 0.25 mol of nitrogen



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11. How many molecules are present in 2.34 moles of methane?



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12. How many molecules are present in  $5.6 \times 10^{-8}$  cc of  $Cl_2$  at stP?



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13. The approximate production of sodium carbonate per month is  $424 \times 10^6$  g. While that of methyl alcohol is  $320 \times 10^6$  gm. Which is produced more in terms of moles ?



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14. The price incurred in producing one kg of magnesium is Rs. 25. What is the price of one mole of metal?



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15. How many grams of aluminium will have the same number of atoms as one gram of magnesium?



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16. Calculate the number of electrons present in 1.8 mg of water.



**Watch Video Solution**

17. How many molecules are present in one L oxygen?



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18. How many liters of helium gas at NTP has weight same as  $3.0115 \times 10^{23}$  molecules of methane?



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19. Calculate the real mass of one methane molecule



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## EXERCISE -1.1.5

1. Distinguish between empirical and molecular formula



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2. How is empirical formula of a compound determined ?



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3. One gram of an organic compound on oxidation gave 2.2g  $\text{CO}_2$  and 0.9g of  $\text{H}_2\text{O}$ . Calculate the weight percentage of carbon and hydrogen.



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4. 0.25g of an organic compound on analysis by Duma's method gave 32cc nitrogen at STP. What is the weight percentage of nitrogen in the given compound?



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5. What is the mass percentage of carbon in ethane.



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6. A hydrocarbon contains 90% carbon by weight. What is its empirical formula?



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7. A chlorinated alkane has 10.1% C and 0.84% hydrogen by weight. Calculate its empirical formula.



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8. 0.156g of an organic compound in carius tube method gave 0.235g of silver iodide. Calculate the percent weight of halogen in the compound .



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9. Weight percentage of C , H and Cl in an organic compound are 16.27% , 0.67% and 72.2% respectively. If the vapour density is 73.75, What is its molecular formula?



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10. Combustion of 0.6gm of an organic compound gave 1.17gm of carbondioxide. 0.84 gm of water. Vapour density of the compound is equal to 22.4. The compound contains carbon, hydrogen and nitrogen. Calculate the molecular formula.



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11. Calculate the mass percentage of the element oxygen in hydrogen peroxide.



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12. Analysis of an organic compound gave 40%C, 6.6%H by weight and the remaining is oxygen. If the molecular weight of the compound is 90 what is molecular formula?



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13. Combustion of 0.277g of an organic compound gave 0.66g carbondioxide and 0.337g water. Vapour density of the compound is equal to 37. Calculate its molecular formula.



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## EXERCISE -1.1.6

1. What are physical properties and chemical properties? Write examples.



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2. Comment on SI system of units.



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3. How are mass and volume measured in laboratory.



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4. What is dimensional analysis?



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1. What information is provided by a balanced equation?



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2. Write the use of stoichiometric coefficients in chemical calculations.



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3. Mention various relationships useful in stoichiometric calculations.



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4. 2.5 grams of a sample of chalk is strongly heated. If 0.88 grams of carbon dioxide is produced, What is the percentage purity of  $\text{CaCO}_3$  in the sample?



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5. How many grams of ethene may be burnt completely by the oxygen gas produced by complete decomposition of 9.6 grams of potassium chlorate?



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6. 5.84 grams of hydrogen chloride and 5.22 grams of manganese dioxide are reacted. Calculate the volume of chlorine gas liberated at STP?



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7. 10 grams of a mixture of  $\text{CaCO}_3$  and  $\text{MgCO}_3$  require equal weight of sulphuric acid for complete reaction. Calculate the percentage weight of  $\text{MgCO}_3$  in the mixture.



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8. 2 grams of a mixture of sodium carbonate and sodium bicarbonate on strong heating liberated carbon dioxide, which occupied 0.224 L at STP. What is the weight of  $\text{Na}_2\text{CO}_3$  in the original mixture?



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9. 10 grams of 90% pure limestone is thermally decomposed. If the gas liberated is utilised for the conversion of aqueous sodium carbonate, how many moles of bicarbonate is formed?



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10. One Litre each of sulphur dioxide and ozone are allowed to react. Find the limiting reagent. What volume of sulphur trioxide is formed under similar conditions?



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11. An astronaut receives the energy required in his body by the combustion of 34g of sucrose per hour. How much oxygen he has to carry along with him for his energy requirement in a day?



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### EXERCISE -1.1.8

1. How is the molecular formula of a hydrocarbon determined based on analysis of combustion data?



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2. 12 ml of a gaseous mixture of hydrocarbons  $C_nH_{2n}$  and  $C_nH_{2n+2}$  (n is same for both ) required exactly 57mL of oxygen for combustion . If the volume of carbondioxide obtained under similar conditions is 36mL, What is the volume ratio of hydrocarbons in the given mixture.



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3. Calculate the volume of oxygen required for the complete combustion of 60mL acetylene. What volume of carbon dioxide is obtained in the combustion?



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4. 100mL of a gaseous mixture has 20mL ethylene and the remaining oxygen. The mixture is fired and cooled to room temperature. Determine the final composition of gaseous mixture.



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5. One litre of a mixture of carbon monoxide and carbon dioxide is repeatedly passed over red hot coke. The mixture is cooled and collected to occupy 1.25L. What is the percentage volume of carbon monoxide in the given mixture?



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## EXERCISE -1.1.9

1. How are equivalent weights of elements and ions calculated?



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2. Mention with example, the equivalent weights of acids, bases and salts.



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3. Calculate the equivalent weights of zinc and zinc sulphate (At.wt. of Zn = 65.4).



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4. How many gram equivalents are present in (a) 24.5g of  $H_2SO_4$  used in neutralisation and (b) 16.8 lit of  $SO_2$  at STP used as reductant.



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5. A metal oxide contains 53% of metal by weight. What is the equivalent weight of metal?



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6. What are the equivalent volumes of oxygen and chlorine at STP?



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7. Weight percentage of metal is 0.033  $\text{calK}^{-1}$ , Calculate the valency of metal.



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8. When copper oxide is strongly heated with hydrogen it reduced to give metal. If the weight loss suffered by the oxide is 14.9g and weight of water formed is 16.78g, calculate the equivalent weight of oxygen.



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9. 5.4 grams of an element of group IIIA on oxidation gave 10.2 grams of its oxide. Calculate the atomic weight of element.



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10. 2.5 grams of a divalent metal carbonate on treating with excess dilute mineral acid liberated a gas, which was measured at 1 atm and 273K as 5.6L. Calculate the atomic weight of the metal present in the given salt.



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11. Molecular weights of ammonia and nitrogen are respectively  $X_1$  and  $X_2$ . In the reaction of producing ammonia,  $N_2 + 3H_2 \rightarrow 2NH_3$ , the equivalent weights of ammonia and nitrogen are given as respectively  $y_1$  and  $y_2$ . Then how is  $(y_1 - y_2)$  related to molecular weights?



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12. When oxalic acid ( $H_2C_2O_4$ ) is used as reducing agent, the acid is oxidised to carbondioxide. Calculate the equivalent weight of the acid.



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### EXERCISE -1.1.10

1. What is mole fraction? How is it calculated?



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2. Define molality. How is it dependent on temperature?



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3. What are (a) molarity and (b) normality? Write their units.



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4. Calculate the weight of anhydrous sodium carbonate required to prepare 250ml of decimolar solution.



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5. How much water must be added to 100ml of 0.5M NaOH to get 0.2M NaOH solution.



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6. Density of 84% pure sulphuric acid in aqueous solution is  $1.75 \text{ g cm}^{-3}$ .

Find the molarity of the acid solution.



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7. What is the normality of 5.3%(w/v) aqueous solution of  $\text{Na}_2\text{CO}_3$ ?



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8. Calculate the weight of sodium chloride present in 250mL of 0.1N solution.



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9. Find the number of moles of the solute present in 600ml of 0.05M solution.



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10. How many grams of  $Al_2(SO_4)_3$ , will be required to prepare 4 litres of 0.025M solution ?



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11. 250mL of 0.2M NaOH and 100mL of 0.5M NaOH solutions were added. What is the molarity of the mixture?



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12. How many grams of  $H_2SO_4$  required to be dissolved in 250g of water to prepare decimolal solution?



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13. Calculate the molality, if density of 8.653% (w/v)  $Na_2CO_3$  solution is 1.018g  $cm^{-3}$ .



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14. 100 mL of ethano  $(d = 0.78 \text{ g cc}^{-1})$  I made upto a litre with pure water. Caculate the molality.



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15. 12% (w/v) aqueous caustic soda has a density of  $1.2 \text{ g cc}^{-1}$ . Calculate the mole fraction of the components.



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16. A homogeneous mixture contains 90g of water, 18.4g of glycerol and 6.4g of methanol. What is the mole fraction of methanol in the given mixture?



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17. What volumes of 10N NaOH and 2N NaOH should be mixed to obtain 4L of 5N



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18. 250 mL of 0.2M  $H_2SO_4$  is diluted with one L of water. What is the normality of the dilute acid?



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19. To convert 1 litre of 1.123N solution of an acid into 1N solution, how much volume of water should be added ?



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20. Molecular weight of a dibasic acid is 132. If 33 grams of acid is present in 400ml solution, calculate molarity and normality



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21. 10 L of water has 33 mg of oxygen dissolved. What is the ppm of dissolved oxygen?



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### EXERCISE -1.1.11

1. Explain the term titration , titrant and titrate.



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2. Write the principle and equation used for direct titrations.



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3. 40mL of 0.2M oxalic acid can completely decolourise what volume of 0.1M acidified permanganate solution?



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4. What volume of 1N NaOH solution can completely convert a solution containing 12g of  $\text{NaH}_2\text{PO}_4$  to  $\text{Na}_3\text{PO}_4$ ?



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5. How many milligrams of calcium should be added to decrease the concentration of 200ml of 1.02N HCl to 1.0N HCl?



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6. 0.63 grams of a dioic acid required 50mL of 0.2M NaOH for neutralisation. Calculate the molar mass of acid .

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7. 10mL of 0.2N  $KMnO_4$  solution in dilute sulphuric acid was decolorised by 40mL of dilute hydrogen peroxide. Calculate the normality of hydrogen peroxide.

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## QUESTIONS FOR DESCRIPTIVE ANSWERS

1. Distinguish between element and compound?

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2. Copper forms two oxide  $Cu_2O_x$  and  $Cu_2O_y$ . For the same amount of metal, twice as much oxygen was used to form first oxide than to second oxide. What is the ratio of X and Y?

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3. What are the molecular mass and molar mass, if each molecule of a substance contains 9 carbon and 13 hydrogen atom?



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4. Density of metal is  $7.42 \text{ g}^{-1}$ . If the radius of metal atom is  $1.43 \times 10^{-10}$  m. Calculate the atomic weight of metal.



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5. Calculate the mass of  $10^{22}$  formula units of blue vitriol.



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6. The atomic weight of two isotopes of boron are 10.01 and 11.01 . If the atomic weight of natural boron is 10.81, what is the percentage of heavier

isotope of boron in nature?



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7. Ratio of atoms in an oxide of sulphur is 3:1 .What is the ratio of weight of elements in the oxide?



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8. There are more number of atoms in one gram atom of an element than in one gram of the same element. Explain.



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9. The formula weight of metal chloride is 136 and specific gravity of metal is  $0.06 \text{ g}^{-1}$ . How many grams of oxygen can combine with one gram of metal?



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10. How many fundamental particles are present in 10u of helium?



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11. 0.22g of a metal chloride required 0.51g of  $AgNO_3$  to precipitate chloride completely. If the specific heat of metal is  $0.057 \text{ cal g}^{-1}$ , find the molecular formula of metal chloride?



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12. Density of a gas relative to air is 1.17. What is the molar mass of gas?



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13. KCl contains 52% of potassium and KI contains 23.6% potassium by weight. What is the weight percentage of iodine in iodine monochloride?

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14. What weight of fluorine is present in one gram of a fluoride tooth paste, for instance  $(Na_3PO_4F)$ ?

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15. One gram of copper is dissolved in nitric acid and crystal hydrate  $Cu(NO_3)_2 \cdot 3H_2O$  is obtained by evaporation. What is the weight of residue?

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16. The weight ratio of elements carbon, nitrogen and hydrogen in a compound of molecular mass 108 is 18:2:7. What is its molecular formula?

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17. 100grams of a hydrocarbon has 93.71 g of carbon. What is its empirical formula of the hydrocarbon?



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18. 0.234g of an organic compound on heating with conc nitric acid and silver nitrate in carius furnace gave 0.84g of silver chloride. Calculate the weight percentage of chlorine in the compound.



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19. An organic compound contains 52.2%C, 13%H and remaining oxygen. What is its empirical formula?



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20. Two oxides of a non-metal X contain 50% and 40% of non-metal respectively. If the formula of the first oxide is  $XO_2$ , then the formula of second oxide is



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21. Two elements 'A' and 'B' (atomic weights 75 and 16 respectively) combine to give a compound having 75.8 % of 'A'. The compound has the formula (St. John's)



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22. Write the square root of  $6.4 \times 10^7$  in significant figures.



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23. Subtract 24.5492 from 62.831 and report the answer in significant figures.



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24. A piece of metal is 3 inch long. What is its length in cm?



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25. Density of Hg is  $13.6\text{gcc}^{-1}$ . Report the mass of 21cc in significant figures.



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26. Report the prouduct of 4.5 and 1.25 in significant figures.



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27. Divide 0.9 with 4.26 and report the answer in significant figures.



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28. What volume of carbondioxide is obtained at STP by heating 8g of 50% pure limestone?



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29. 8 grams of NaOH are totally consumed to react with carbondioxide produced by the calcination of sodium bicarbonate. What weight of sodium bicarbonate is to be calcinated?



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30. One gram of calcium is treated with excess dilute hydrochloric acid. Calculate the volume of hyrogen liberated at 700 torr  $27^{\circ}\text{C}$



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**31.** What Is the maximum weight of ammonia obtained by the reaction of 3kg of hydrogen and 7kg of nitrogen?



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**32.** Calculate the volume of air measured at NTP used for the roasting of 3kg of iron pyrites  $FeS_2$ . Assume that air contains 21%  $O_2$  by volume.



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**33.** 3.5 grams aluminium bronze was heated in aqueous hydroxhloric solution. The hydrogen liberated measured 4.15L at STP. What is the percentage of copper in the given alloy?



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**34.** Calculate the amount of 80% pure sodium hydroxide required to react completely with 21.3 grams of chlorine in hot conditions.



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**35.** What is the volume of ammonia obtained starting from 2 L of nitrogen, if the conversion is only 6 % efficient in the given conditions?



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**36.** Write the Gay-Lussac's volume coefficients needed for the combustion of gaseous hydrocarbons .



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**37.** Sulphur follows law of multiple proportions to combine with halogens. Calculate the equivalent weight of sulphur when it forms  $SCl_2$  and  $S_2Cl_2$

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**38.** Calculate the equivalent weight of ferrous oxalate when it acts as reductant in acidic solutions.

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**39.** The weight percentage of chloride in a binary halide is 77:45. What is the equivalent weight of the element forming chloride?

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**40.** Calculate the equivalent weights of : carbonium ion and metaborate ion.

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**41.** One gram of an alloy of Mg and Al, when treated with excess dilute hydrochloric acid gave 1.2L hydrogen at  $0^{\circ}\text{C}$  and 0.92atm. Calculate the weight percentage of Mg in the alloy



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**42.** Molar mass of solute of 60g. If 120mL solution contains 0.2mol of solute. Express the %w/v



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**43.** Write the differences as well as the relationship between molality and molarity of a given solution.



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**44.** Find the number of moles of solute present in 500mL of 0.4M  $KMnO_4$  solution.



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**45.** What is the mole fraction of solute in 10% aqueous caustic soda solution?



**Watch Video Solution**

**46.** Molality and molarity of 500mL aqueous solution are 2.2 and 1.8 respectively. What is the weight of solvent present in the given aqueous solution?



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47. How many chloride ions are present in 250mL of 0.1F calcium choride solution?



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48. Equal volume of 0.1M HCl and 0.2M  $H_2SO_4$  are mixed. What is the molarity of proton in the mixture?



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49. 12ml of  $H_2SO_4$  is completely neutralised with 15ml of 0.1N NaOH.What is the strength of acid in  $gL^{-1}$ ?



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50. Calculate the mole fraction of lower alcohol in a mixture of 92g  $C_2H_5OH$  and 32g of  $CH_3OH$ ?



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51. The density of 3M  $\text{Na}_2\text{S}_2\text{O}_3$  is 1.25 g/cc. Calculate the mole fraction of  $\text{Na}_2\text{S}_2\text{O}_3$  and molality of thiosulphate.

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52. The common name of calcium sulphate hemihydrate is-

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53. One mole of a mixture of CO and  $\text{CO}_2$  requires exactly 20g of NaOH is solution for complete conversion of all the  $\text{CO}_2$  into  $\text{Na}_2\text{CO}_3$ . How many more grams of caustic soda would be required for the conversion of one mole of the totally oxidised form of given mixture.

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54. 4 grams of each pure hydrochloric acid and pure caustic soda are together dissolved in water. What weight of sodium chloride is obtained?



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55. Mole fraction of water in aqueous sulphuric acid solution is 0.85. Calculate the molality.



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56. One gram of a mixture of  $KMnO_4$  and  $K_2Cr_2O_7$  was treated with excess KI in acid solution. The liberated iodine required 200mL of 0.15N hypo for titration. Calculate the percentage weight of potassium permanganate in the mixture.



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57. A mixture of NaOH and  $Na_2CO_3$  is titrated with 50mL of 0.5N  $H_2SO_4$  for phenolphthalein indicator. Then it requires another 20mL of the same acid for methyl orange indicator. Determine the weight of mixture.



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58. A 25mL of  $NO_3^-$  Solution was treated with excess Al. The ammonia gas is passed into 50mL of 0.15N HCl. Excess unreacted acid HCl is back titrated with 32.1mL 0.1N NaOH solution. Calculate the molarity of  $NO_3^-$  in the original solution.



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59. 15 grams of a mixture of calcium carbonate and sodium carbonate on ignition liberated a gas which has occupied 2.24L at STP. What is the weight ratio of components in the given mixture?



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1. The law of conservation of mass holds good for all of the following except

- A. Chemical reactions
- B. Nuclear reactions
- C. Endothermic reaction
- D. Exothermic reactions

**Answer: B**



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2. Percentage of copper and oxygen in samples of  $CuO$  obtained by different methods were found to be the same. This proves the law of

- A. Constant proportions

B. Reciprocal proportions

C. Multiple proportions

D. Conservation of mass

**Answer: A**



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3. In compound A, 1.00 g nitrogen unites with 0.57 g oxygen. In compound B, 2.00g nitrogen combines with 2.28 g oxygen. In compound C, 3.00 g nitrogen combines with 5.13 g oxygen. These results obey the following law.

A. Law of constant proportion

B. Law of multiple proportion

C. Law of reciprocal proportion

D. Dalton.s law of partial pressure

**Answer: B**



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4. In the reaction between hydrogen and oxygen gives water vapour, the ratio of volumes is 2 : 1 : 2. This illustrates the law of

- A. conservation of mass
- B. combining weights
- C. combining volumes
- D. all the above

**Answer: C**



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**LIST-I**

- A) Law of conservation of mass  
 B) Avogadro's Law  
 C) Gay-Lussac's Law of combining volumes  
 D) Law of conservation of energy

**LIST-II**

- 1)  $V_1/V_2 = n_1/n_2$   
 2)  $2\text{H}_{2(\text{s})} + \text{O}_{2(\text{g})} \rightarrow 2\text{H}_2\text{O}_{(\text{s})}$   
 3) 12g of C + 32g of  $\text{O}_2 = 44\text{g CO}_2$   
 4)  $\text{H}_{2(\text{g})} + \text{Cl}_{2(\text{g})} \rightarrow 2\text{HCl}_{(\text{g})}$   
 5)  $\text{H}_{2(\text{g})} + \text{Cl}_{2(\text{g})} \rightarrow 2\text{HCl}_{(\text{g})}$ ,  $\Delta H = -184.6\text{kJ}$

5.

The correct match is

A    B    C    D

A. 3    1    4    5

A    B    C    D

B. 3    1    5    4

A    B    C    D

C. 3    1    2    5

A    B    C    D

D. 1    2    4    5

**Answer: A**



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6. One gram molecule of oxygen is

A. 16 gms of oxygen

B. 32 gms of oxygen

C. 8gms of oxygen

D. 1gm of oxygen

**Answer: B**



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7. One gram - atom of oxygen is

A. 1 g of oxygen

B. 16g of oxygen

C. 22.4 g of oxygen

D. 8g of oxygen

**Answer: B**



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8. Which of the following represents the absolute mass of .Na. atom?

A. 23 gms

B. 23 amu

C.  $23 \times 1.66 \times 10^{-24} \text{gms}$

D.  $23 \times 1.66 \times 10^{-24} \text{amu}$

**Answer: B**



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9. 1 gram of hydrogen contains  $6 \times 10^{23}$  atoms. Then 4 grams of He contains

A.  $6 \times 10^{23}$  atoms

B.  $12 \times 10^{23}$  atoms

C.  $24 \times 10^{23}$  atoms

D.  $1.5 \times 10^{23}$  atoms

**Answer: A**



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**10.** The molar mass of a substance is 20g. The molecular mass of the substance is

A. 20g

B. 20 a.m.u.

C. 10g

D. 10 a.m.u

**Answer: B**



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**11.** The number of molecules in one litre of water is (density of water = 1g/mL)

A.  $6 \times 10^{23} / 22.4$

B.  $3.33 \times 10^{25}$

C.  $3.33 \times 10^{23}$

D.  $3.33 \times 10^{24}$

**Answer: B**



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**12. Which of the following contains the maximum number of atoms?**

A. 10g of  $\text{CaCO}_3$

B. 4g of hydrogen

C. 9g of  $\text{NH}_4\text{NO}_3$

D. 1.8g of  $\text{C}_6\text{H}_{12}\text{O}_6$

**Answer: B**



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13. The mixture containing the same number of molecules as that of 14 g of CO is

- A. 14g of nitrogen + 16g of oxygen
- B. 7g of nitrogen + 16g of oxygen
- C. 14g of nitrogen + 8g of oxygen
- D. 7g of nitrogen + 8g of oxygen

**Answer: D**



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14. Which of the following is heaviest?

- A. 50g of iron
- B. 5 moles of nitrogen
- C. 0.1 gram atom of silver

D.  $10^{23}$  atoms of carbon

**Answer: B**



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15. If we consider that  $1/6$  in place of  $1/2$  men of caron is taken is taken to be the relation atomic mass orbit, the mass of the mole of substance will

A. increase two fold

B. decrease twice

C. be a function of molecular mass of the substance

D. remain unchanged

**Answer: D**



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16. If the relative atomic mass of oxygen is 64 units, the molecular mass of CO becomes

- A. 112
- B. 128
- C. 28
- D. 7

**Answer: A**



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17. 1 mole of water vapour is condensed to liquid at  $25^{\circ}\text{C}$ . Now this water contains

- i) 3 moles of atoms
  - ii) 1 mole of hydrogen molecules
  - iii) 10 moles of electrons
  - iv) 16 g of oxygen
- The correct combination is

A. (i) & (ii) are correct

B. (i) & (iii) are correct

C. (i) & (iv) are correct

D. All are correct

**Answer: D**



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**18.** The ratio between the number of molecules in equal masses of  $CH_4$  and  $SO_2$  is

A. 1 : 1

B. 4 : 1

C. 1 : 4

D. 2 : 1

**Answer: B**

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19. 7g of nitrogen occupies a volume of 5 litres under certain conditions. Under the same conditions one mole of a gas, having molecular weight 56, occupies a volume of

- A. 40L
- B. 20L
- C. 10L
- D. 80L

**Answer: B**

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20. A mixture of 7g of nitrogen and 8g of oxygen at STP occupies a volume of



- A. 11,200 mL
- B. 22, 400 mL
- C. 2240 mL
- D. 5600 mL

**Answer: A**



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**21. Which of the following has highest mass?**

- A. 1 gram atom of iron
- B. 5 moles of  $N_2$
- C.  $10^{24}$  carbon atoms
- D. 44.8 lit of He at STP

**Answer: B**



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**22.** Which contains more number of molecules?

- A. 1 mole of carbon dioxide
- B. 4g of hydrogen
- C. 33.6 litres of oxygen at STP
- D. 6g of helium

**Answer: B**



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**23.** Assertion (A) : 1 c.c. of Nitrogen at STP contains  $2.69 \times 10^{19}$  molecules.

Reason (R ) : Molar volume of an ideal gas at STP contains Avogadro number of molecules.



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24. There are as many notes as number of oxygen atoms in 24.8 gm  $\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$  (Mw = 248). A note counting machine counts 48 milion notes per day. Number of days taken to count these notes is

A.  $10^{17}$

B.  $10^{16}$

C.  $10^{10}$

D.  $10^{12}$

**Answer: B**



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25. How many moles of magnesium phosphate,  $\text{Mg}_3(\text{PO}_4)_2$  will contain 0.25 mole of oxygen atoms ?

A. 0.02

B.  $3.125 \times 10^{-2}$

C.  $1.25 \times 10^{-2}$

D.  $2.5 \times 10^{-2}$

**Answer: B**



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**26.** The number of oxygen atoms present in 50 g of calcium carbonate is

A.  $6.023 \times 10^{23}$

B.  $30.1 \times 10^{23}$

C.  $9.035 \times 10^{23}$

D.  $1.206 \times 10^{24}$

**Answer: C**



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27. Total number of sulphate ions present in 3.92 g of chromic sulphate is  
(Cr=52, S=32, O=16)

A.  $1.8 \times 10^{23}$

B.  $1.8 \times 10^{23}$

C.  $1.2 \times 10^{21}$

D.  $6 \times 10^{23}$

**Answer: A**



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28. The element 'A' and 'B' combine together to give two compounds  $A_2B_3$  and  $AB_2$ . The weight of 0.2 mole of  $A_2B_3$  is 26 gm. The weight of 0.3 mole of  $AB_2$  is 24 gm. Then the atomic weight of A and B respectively

A. 15,20

B. 20,25

C. 20,30

D. 25,30

**Answer: C**



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### LECTURE SHEET EXERCISE-1 (LEVEL-II (ADVANCED))

1. The mass of  $1.5 \times 10^{20}$  atoms of an element is 15mg. The atomic mass of the element is

A. 60g

B. 60mg

C. 60

D. 6

**Answer: C**

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2. Bell metal contains 80% copper . The mass of Bell metal which contain  $1.5 \times 10^{20}$  atoms of copper is (Cu = 64)

A. 2mg

B. 20mg

C. 40mg

D. 12.8mg

**Answer: B**

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3. Assuming that air at STP contained 80% by volume of nitrogen, the volume of air at STP that contains  $4.8 \times 10^{23}$  molecules of nitrogen is

A. 18 L

B. 44.8 L

C. 22.4 L

D. 11.2 L

**Answer: C**



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4. Ordinary water contain one part of heavy water per 6000 parts of water by weight. The number of heavy water molecules present in a drop of water of volume 0.01 mL is (density of water 1 g/mL)

A.  $2.5 \times 10^{16}$

B.  $5 \times 10^{17}$

C.  $5 \times 10^{16}$

D.  $7.5 \times 10^{16}$

**Answer: C**



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5. The weight of 600 ml of a mixture of ozone and oxygen is 1 gm at STP.

The volume of oxygen in the mixture is

A. 200 ml

B. 500 ml

C. 400 ml

D. 300 ml

**Answer: C**

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LECTURE SHEET EXERCISE-I (LEVEL-II (ADVANCED)) (MORE THAN ONE CORRECT ANSWER TYPE QUESTIONS)

1. Which of the following can explain law of reciprocal proportions?

A.  $H_2O$ ,  $CH_4$ ,  $CO_2$

B.  $CO$ ,  $CO_2$ ,  $C_3O_2$

C.  $HF$ ,  $CF_4$ ,  $CH_4$

D.  $N_2O$ ,  $NO_2$ ,  $N_2O_4$

**Answer: A::C**



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2. 0.5 mole of  $P_4IO_{10}$  contains

A. 80 gm oxygen

B. 2 gram atoms phosphorous

C. 5 gram atoms oxygen

D. 10 gram atoms oxygen

**Answer: A::B::C**



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3. 3200gm sulphur is present in

A. 9800 gm  $H_2SO_4$

B. 20 mole  $H_2SO_4$

C. 100 moles  $H_2SO_4$

D. 6400 g  $SO_2$

**Answer: A::C::D**



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4.  $6.023 \times 10^{22}$  atoms of Hydrogen can make

A. 0.05 moles of  $H_2$  molecules

B. 0.1 gms of Hydrogens atoms

C. 0.1 gram-molecules of Hydrogen

D. 0.1 gram atoms of Hydrogen

**Answer: A::B::D**



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5. Equal volume of oxygen and ozone at a given temperature and pressure contain equal

A. number of moles

B. masses

C. number of gramatoms

D. number of respective molecules

**Answer: A::D**



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6. Calculate the number of protons, neutrons and electrons respectively in  ${}^{14}_7\text{N}^{3-}$

A.  $7 \times 6.023 \times 10^{23}$  electrons

B.  $7 \times 6.023 \times 10^{23}$  protons

C.  $7 \times 6.023 \times 10^{23}$  neutrons

D.  $14 \times 6.023 \times 10^{23}$  protons

**Answer: B::C**



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**LECTURE SHEET EXERCISE-I (LEVEL-II (ADVANCED)) (LINKED COMPREHENSION TYPE QUESTIONS)**

1. Isotopes are the atoms of same element, they have same atomic number but different mass number. Isotopes have different number of neutrons in their nucleus. If an element exists in two isotopes having

atomic masses .a. and .b. in the ratio  $m : n$ , then average atomic mass will be  $\frac{mxa + nxb}{m + n}$  Different isotopes of same element have same position in the periodic table. The elements which have single isotope are called monoistropic elements. Greater is the percentage composition of an isotope, more will be its abundance in nature.

The isotopes of chlorine with mass number 35 and 37 exist in the ratio (if its average atomic mass is 35.5)

A. 1 : 1

B. 2 : 1

C. 3 : 1

D. 3 : 2

**Answer: C**



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2. Isotopes are the atoms of same element, they have same atomic number but different mass number. Isotopes have different number of

neutrons in their nucleus. If an element exists in two isotopes having atomic masses .a. and .b. in the ratio  $m : n$ , then average atomic mass will be  $\frac{m \times a + n \times b}{m + n}$  Different isotopes of same element have same position in the periodic table. The elements which have single isotope are called monoisotopic elements. Greater is the percentage composition of an isotope, more will be its abundance in nature.

Atomic mass of boron is 10.81. It has two isotopes namely  ${}_5B^{11}$  and  ${}_5B^x$  with their relative abundance of 80% and 20% respectively. The value of x is

A. 10.05

B. 10

C. 10.01

D. 10.02

**Answer: A**



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3. When we concept that one mole of a substance contains the same numbers of elementary entities or one mole of any other substance, we don't actually need to know what that number is. Sometimes however we will need to work with the actual number of elementary entities in a mole of substance. This number is called Avogadro's number.

$$N_A = 6.022137 \times 10^{23} \text{ molecules}$$

The unit  $\text{mol}^{-1}$  which we read as per mole signifies that a collection of  $N_A$  molecular level entities is equivalent to one mole at the macroscopic level. For example a mole of carbon contains  $6.02 \times 10^{23}$  atoms of C. A mole of oxygen gas contains  $6.02 \times 10^{23}$  molecules of  $\text{O}_2$ .

The number of atoms present in 8 g of ozone is

A.  $N_A$

B.  $3N_A$

C.  $\frac{N_A}{6}$

D.  $\frac{N_A}{2}$

**Answer: D**





4. When we concept that one mole of a substance contains the same numbers of elementary entities or one mole of any other substance, we don't actually need to know what that number is. Sometimes however we will need to work with the actual number of elementary entities in a mole of substance. This number is called Avogadro's number.

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Which of the following is a reasonable value for the numbers of atoms in 1.00 g of helium?

A. 0.25

B. 4.0

C.  $4.1 \times 10^{-23}$

D.  $1.5 \times 10^{23}$

**Answer: D**



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The dot at the end of a sentence has a mass of about one micrograms. Assuming that the black stuff is carbon. No. of carbon atoms present in it is

A.  $5 \times 10^{16}$

B.  $5 \times 10^{17}$

C.  $8 \times 10^{23}$

D.  $12 \times 10^{23}$

**Answer: A**



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### LECTURE SHEET EXERCISE-I (LEVEL-II (ADVANCED)) (MATRIX MATCHING TYPE QUESTIONS)

Column-I

Column-II

- |                                     |                      |
|-------------------------------------|----------------------|
| A) One gram molecules of oxygen gas | P) one mole of $H_2$ |
| 1. B) Gram molar volume of $H_2$    | Q) one mole of $O_2$ |
| C) 44 gm of $CO_2$                  | R) 22.4lit at STP    |
| D) 18 gm water                      | S) $3N_A$ atoms      |



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1. Number of years it would take to spend Avogadro's number of rupee at the rate of 10 lakhs rupee per second is  $x \times 10^{10}$ . Find the value of  $x$ .

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2. Rahul Dravid wants to wear  $6.023 \times 10^{21}$  Ag atoms in the form of a ring. His Silver Gold Copper alloy ring consists of 20% of Silver. The mass of the ring is  $0.9x$ . What is  $x$ ?

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3. A copper plate of 20 cm x 10 cm is to be plated with silver of 1 mm thickness on both the sides. Number of moles of silver required for plating is (density of silver =  $10.8 \text{ g cm}^3/\text{cc}$ ) \_\_\_\_\_

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4. To a sample of an element A (at.wt.=70) another element B (atomic wt = 120) is to be added as an impurity. For the ratio of the atoms in the mixture to be  $1:10^{-9}$ ,  $x \times 10^{-8}g$  of B will be required for 35g of A. Find the value of x.



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## LECTURE SHEET EXERCISES-II (LEVEL-I (MAIN))

1. A certain metal sulphide  $MS_2$  is used extensively as a high temperature lubricant. If  $MS_2$  is 40.00 % by mass sulphur, atomic mass of M is

- A. 60
- B. 96
- C. 100
- D. 80

**Answer: B**



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2. Haemoglobin contains 0.33 % iron ( $\text{Fe}=56$ ). The molecular weight of haemoglobin is 68000. The number of iron atoms in one molecule of haemoglobin is .

A. 2

B. 3

C. 4

D. 5

**Answer: C**



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3. A compound contains 20% sulphur. The molecular weight of the compound could be

- A. 80
- B. 240
- C. 400
- D. 640

**Answer: D**



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**4. The percentage of nitrogen in Magnesium nitride is**

- A. 14
- B. 28
- C. 42
- D. 56

**Answer: B**



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5. The percentage of silica in sodium silicate is approximately (Si=28)

A. 25

B. 40

C. 50

D. 60

**Answer: C**



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6. The empirical formula of acetic acid is the same as that of

A. Sucrose

B. Glucose

C. Oxalic acid



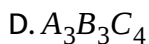
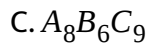
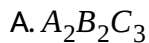
D. Formic acid

**Answer: B**



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7. The relative number of atoms of different elements in a compound are as follows , A = 1.33 , R = 1 and C = 1.5 . The empirical formula of the compound is

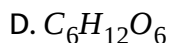
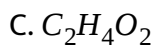
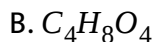
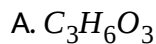


**Answer: C**



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8. The empirical formula of a compound is  $CH_2O$ . Its molecular weight is 120. The molecular formula of the compound is



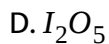
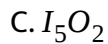
**Answer: B**



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9. On analysis, a certain compound was found to contain iodine and oxygen in the ratio of 254:80. The formula of the compound is (At mass I = 127, O = 16)



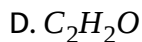
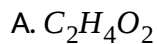


**Answer: D**



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10. 60g of a compound on analysis gave  $C = 24g$ ,  $H = 4g$  and  $O = 32g$ . Its empirical formula is

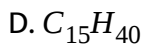
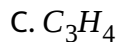
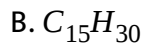
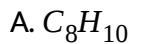


**Answer: B**



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11. A compound contains 90 %  $C$  and 10 %  $H$ . The empirical formula of the compound is



Answer: C



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LIST - 1

(Molecules)

A) Glucose

B) Oxalic acid

12. C) Inorganic Benzene

C) Inorganic Benzene

D) Oxygenated water

LIST - 2

(Empirical formula)

1)  $BNH_2$

2)  $CH_2O$

3)  $CH$

4)  $CHO_2$

4)  $CHO_2$

5)  $HO$

The correct match is

- |    |   |   |   |   |
|----|---|---|---|---|
|    | A | B | C | D |
| A. | 3 | 5 | 2 | 4 |
|    | A | B | C | D |
| B. | 2 | 4 | 1 | 5 |
|    | A | B | C | D |
| C. | 1 | 3 | 2 | 4 |
|    | A | B | C | D |
| D. | 4 | 2 | 1 | 3 |

**Answer: B**



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**13. Assertion(A):** Acetylene on additional polymerization gives benzene.

**Reason(R):** The empirical formulae of acetylene and benzene are same

The correct answer is

A. Both (A) and (R ) are true and (R ) is the correct explanation of (A)

B. Both (A) and (R ) are true and (R ) is not the correct explanation of (A)

C. (A) is true but (R ) is false

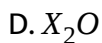
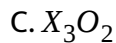
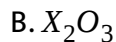
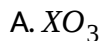
D. (A) is false but (R ) is true

**Answer: B**



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14. An element X forms two oxides. Formula of the first oxide is  $XO_2$ . The first contains 50% of oxygen. If the second oxide contains 60% oxygen, the formula of the second oxide is



**Answer: A**



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15. Elements 'A' and 'B' combine in the ratio of their

- A. Atomic weights
- B. Molecular weights
- C. Equivalent weights
- D. Mass numbers

**Answer: C**



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16. The equivalent weight of a metal in different compounds are 18.6 and

28. Atomic mass of the metal would be

- A. 18.6
- B. 28
- C. 46.6
- D. 56

**Answer: D**



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**17.** The equivalent weight of Calcium Carbonate as salt

A. 100

B. 50

C. 33.3

D. 25

**Answer: B**



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**18.** Molecular weight of  $KMnO_4$  is "M". In a reaction  $KMnO_4$  is reduced to  $KMnO_2$ . The equivalent weight of  $KMnO_4$  is



A.  $M$

B.  $M/2$

C.  $M/3$

D.  $M/5$

**Answer: A**



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**19.** Which of the following acid has the same molecular weight and equivalent weight

A.  $H_3PO_2$

B.  $H_3PO_3$

C.  $H_3PO_4$

D.  $H_2SO_4$

**Answer: A**

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20. Equivalent weights of  $K_2Cr_2O_7$  in acidic medium is

A. 24.5

B. 49

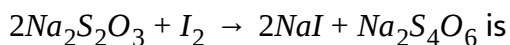
C. 147

D. 296

Answer: B

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21. The equivalent of iodine in the reaction



[M is molecular weight]

A. M

B.  $M/2$

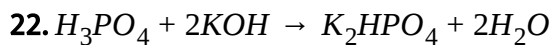
C.  $M/3$

D.  $2M$

**Answer: B**



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Based on the above reaction equivalent weight of  $H_2PO_4$  is

A. 196

B. 98

C. 49

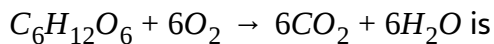
D. 32.67

**Answer: C**



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23. The equivalent weight of glucose in the reaction



[M is molecular weight]

A. M

B.  $M/2$

C.  $M/24$

D. 2M

**Answer: C**



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24. In acidic medium dichromate ion oxidises ferrous ion to ferric ion. If the grammolecular weight of potassium dichromate is 294 gm, its equivalent weight is

A. 294

B. 147

C. 49

D. 24.5

**Answer: C**



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**25. Assertion (A) :** The equivalent weights of nitric acid and crystalline oxalic acid are same.

**Reason (R) :** The basicity is same for both the acids.

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. (A) is false but (R) is true

**Answer: C**



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**26.** The oxide of an element contains 67.67% of oxygen. Equivalent weight of the element is

A. 2.46

B. 3.82

C. 4.36

D. 4.96

**Answer: B**



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**27.** Equivalent weights 36. A bivalent metal has 12 equivalent weight. The molecular weight of its oxide is

A. 16

B. 32

C. 40

D. 52

**Answer: C**



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## LECTURE SHEET EXERCISES-II (LEVEL-II (ADVANCED))

1. 0.36g of an organic compound on combustion gave 1.1g of  $CO_2$  and 0.54g of  $H_2O$ . The percentages of carbon and Hydrogen in the compound are

A. 75, 25

B. 60, 40

C. 83.33, 16.67

D. 77.8, 22.2

**Answer: C**



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2. 0.66 g of a compound gave 112 ml of nitrogen at STP in the Dumas method. The percentage of Nitrogen in the compound is

A. 25

B. 41.5

C. 42.4

D. 21.2

**Answer: D**



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3. 2 moles of  $N_2H_4$  loses 16 moles of electrons is being converted to a new compound x. Assuming that all of the N appears in the new compound, what is the oxidation state of N in x?

A. -1

B. -2

C. +2

D. +4

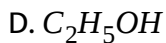
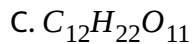
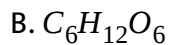
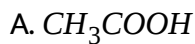
**Answer: C**



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**LECTURE SHEET EXERCISES-II (LEVEL-II (ADVANCED)) (MORE THAN ONE CORRECT ANSWER TYPE QUESTIONS)**

1. Which pair of species have same percentage of carbon?



**Answer: A::B**



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**2. Acetic acid and glucose have same**

A. empirical formula

B. weight composition of elements

C. ratio of masses of individual elements

D. number of gramatoms of each element per mole

**Answer: A::B::C**



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3. A certain compound has the molecular formula  $X_4O_6$  having 57.2 % X.

Thus,

- A. atomic mass of X is 32
- B. X may contain six valence electrons
- C. X is an electropositive metal
- D. X can be a non-metal

**Answer: A::B::D**



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4. 80% carbons is present in an alkane by weight. The possible conclusions are

- A. The empirical formula of the compound is  $CH_3$
- B. The minimum number of carbons in the molecule is 2

C. The compound has gram atoms of C & H in 4:1 ratio

D. This composition suits to all alkanes

**Answer: A::B**



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5. Equivalent weight and formula weight of reactants are same in the conversions

A.  $AgNO_3 \rightarrow Ag$  metal

B.  $CuO \rightarrow Cu_2O$

C.  $H_2O_2 \rightarrow H_2O$

D.  $Na_2S_2O_3 \rightarrow Na_2S_4O_6$

**Answer: A::B::D**



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6. Which relations between equivalent weight (E) and Molecular weight (M) of reactant are correct for the given change?

A.  $FeCl_2$  into  $Fe(OH)_2$ ,  $E = \frac{M}{2}$

B.  $Fe_2(SO_4)_3$  into  $Fe^{+2}$ ,  $E = \frac{M}{2}$

C.  $FeSO_4$  into  $Fe_2(SO_4)_3$ ,  $E = \frac{M}{2}$

D.  $K_2MnO_4$  into  $KMnO_4$ ,  $E = \frac{M}{2}$

Answer: A::B



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7.  $K_4[Fe(CN)_6]$  is converted into  $CO_3^{-2}$ ,  $Fe^{+3}$  ions and  $NO_3^-$  ions.

Here\_\_\_\_\_

A. N. is reduced

B. C. is oxidised

C. Iron is oxidised

Answer: B::C::D



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8. Select the correct statement(s)

A. Equivalent weight of  $\text{Ca}(\text{HC}_2\text{O}_4)_2$  is  $M/4$  when it is a reducing agent

B. Equivalent weight of  $\text{Ca}(\text{HC}_2\text{O}_4)_2$  is  $M/2$  when it behaves as an acid

C.  $\text{Ca}(\text{HC}_2\text{O}_4)_2$  can be estimated by  $\text{MnO}_4^- / \text{H}^+$

D.  $\text{Ca}(\text{HC}_2\text{O}_4)_2$  can be estimated by an acid

Answer: A::B::C



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9. Consider the following reactions.



select the correct statement

- A. Equivalent weight of  $\text{Br}_2$  when it is reduced to  $\text{Br}^-$  is 80
- B. Equivalent weight of  $\text{Br}_2$  when it is oxidised to  $\text{BrO}_3^-$  is 96
- C. Net equivalent weight of  $\text{Br}_2$  is 96
- D. It is a disproportionation reaction

**Answer: A::C::D**



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10. Which statement are correct for the reaction,  $\text{NH}_4\text{NO}_2 \xrightarrow{\Delta} \text{N}_2 + 2\text{H}_2\text{O}$

- A. The reaction is disproportionation in nitrogen
- B. Equivalent weight of reactant is  $\frac{1}{3}$ rd of its formula weight
- C.  $\text{NH}_4^+$  reduced  $\text{NO}_2^-$

D.  $\text{NO}_2^-$  reduced  $\text{NH}_4^+$

Answer: B::C



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11.  $4\text{Mg} + 10\text{HNO}_3 \rightarrow 4\text{Mg}(\text{NO}_3)_2 + \text{NH}_4\text{NO}_3 + 3\text{H}_2\text{O}$ . In this reaction

A. 96 gms magnesium can reduce one mole of  $\text{HNO}_3$

B. Equivalent weight of reduced  $\text{HNO}_3$  is  $\frac{1}{8}$ th of its molecular weight

C. Entire  $\text{HNO}_3$  involved in the reaction is reduced

D.  $\text{HNO}_3$  is reduced to the best possible extent

Answer: A::B::D

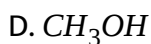
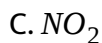
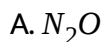


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1. Empirical formula is the simplest formula of the compound which gives the atomic ratio of various elements present in one molecule of the compound. However the molecular formula of the compound gives the number of atoms of various elements present in one molecule of the compound.  $\text{Molecular formula} = (\text{Empirical formula}) \times n$

Which pair of species have same percentage composition of carbon?



**Answer: D**

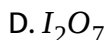
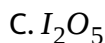
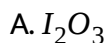


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2. Empirical formula is the simplest formula of the compound which gives the atomic ratio of various elements present in one molecule of the

compound. However the molecular formula of the compound gives the number of atoms of various elements present in one molecule of the compound.  $\text{Molecular formula} = (\text{Empirical formula}) \times n$

Which pair of species have same percentage composition of carbon?



**Answer: C**



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3. Empirical formula is the simplest formula of the compound which gives the atomic ratio of various elements present in one molecule of the compound. However the molecular formula of the compound gives the number of atoms of various elements present in one molecule of the

compound. Molecular formula = (Empirical formula)  $\times n$

Which pair of species have same percentage composition of carbon?

A. HF

B.  $H_2F_2$

C.  $H_3F_3$

D.  $H_4F_4$

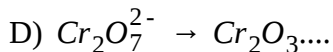
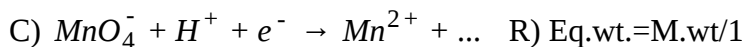
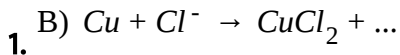
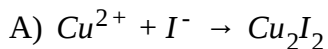
Answer: B



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## LECTURE SHEET EXERCISES-II (LEVEL-II (ADVANCED)) (MATRIX MATCHING TYPE QUESTIONS)

Column-I



Column-II

P) Eq.wt.=M.wt/6

Q) Eq.wt.=M.wt/5

R) Eq.wt.=M.wt/1

S) Eq.wt.=M.wt/2



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Column-I

Column-II

- A)  $N_2$                       P) 40% carbon by mass
2. B)  $CO$                       Q) Empirical formula  $CH_2O$
- C)  $C_6H_{12}O_6$                 R) Vapour density : 14
- D)  $CH_3COOH$               S)  $14N_A$  electrons in a mole



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## LECTURE SHEET EXERCISES-II (LEVEL-II (ADVANCED)) (INTEGER TYPE QUESTIONS)

1. 4.4 gms of a hydrocarbon on combustion produced 6.72 L of  $CO_2$  at STP and sufficient water vapour that can generate 0.4 gms of  $H_2$  with excess Na. The hydrocarbon is  $x$  times heavier than  $CO_2$ . What is  $x$ ?



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2. What is the  $\frac{\text{Mol wt}}{\text{Eq. wt}}$  ratio of  $\text{Fe}_2(\text{SO}_4)_3$  being converted into  $\text{Fe}(\text{OH})_3$



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3. What is  $\frac{\text{mol. Wt}}{\text{Eq. wt}}$  of  $\text{FeC}_2\text{O}_4$  getting converted into  $\text{Fe}^{+3}$  and  $\text{CO}_2$ ?



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4. Eq. wt  $\frac{\text{Mol wt}}{x}$  What is x for acetaldehyde converted into acetic acid.



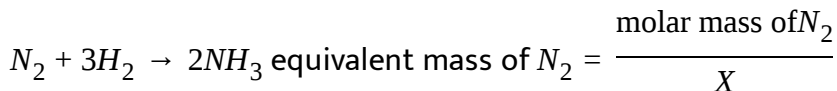
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5. What is the equivalent weight of methane during its Combustion?



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6. For the following reaction



What is the value of x.



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7. The equivalent mass of an element is 4. Its chloride has vapour density 59.25. Then the valency of the element is \_\_\_\_\_.



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### LECTURE SHEET EXERCISE-III (LEVEL-I (MAIN))

1. The number of moles of  $CO_2$  produced when 3 moles of  $HCl$  react with excess of  $CaCO_3$  is

A. 1

B. 1.5

C. 2

D. 2.5

**Answer: B**



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2. The mass of  $\text{CO}_2$  obtained when 2g of pure limestone is calcined is

A. 44g

B. 0.22g

C. 0.88g

D. 8.8g

**Answer: C**



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3. The weight of oxygen required to completely react with 27g of Al is

- A. 8g
- B. 16g
- C. 32g
- D. 24g

**Answer: D**



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4. Air contains 20% by volume of oxygen. The volume of air required for the complete combustion of 1L of methane under the same conditions is

- A. 2L
- B. 4L
- C. 10L
- D. 0.4L



**Answer: C**



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5. What volume of  $H_2$  at NTP is required to convert 2.8 g of  $N_2$  into  $NH_3$ ?

A. 2240 ml

B. 22400 ml

C. 6.72 lit

D. 224 lit

**Answer: C**



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6. X litre of carbon monoxide is present at mSTP. It is completely oxidised to  $CO_2$ . Formed is 11.207 l. What is the value of X in litres?

A. 22.414

B. 11.207

C. 5.6035

D. 44.828

**Answer: B**



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7. When a sample of baking is strongly ignited in a crucible, it suffered a loss in weight of 3.1 g. The mass of baking soda is

A. 16.8g

B. 8.4g

C. 11.6g

D. 4.2g

**Answer: B**

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8. A metal oxide has the formula  $X_2O_3$ . It can be reduced by hydrogen to give free metal and water. 0.159g of metal oxide requires 6 mg of hydrogen for complete reduction. The atomic mass of metal is amu is

A. 15.58

B. 155.8

C. 5.58

D. 55.8

**Answer: D**

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9. In the reaction  $4A + 2B + 3C \rightarrow A_4B_2C_3$ , what will be the number of moles of product formed, starting from one mole of A, 0.6 moles of B and 0.72 moles of C

A. 0.25

B. 0.3

C. 0.24

D. 2.32

**Answer: C**



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**10.** The number of moles of  $Fe_2O_3$  formed when 5.6 lit of  $O_2$  reacts with 5.6g of Fe?

A. 0.125

B. 0.01

C. 0.05

D. 0.10

**Answer: C**

11. 1 mole of each of  $\text{Ca}(\text{OH})_2$  and  $\text{H}_3\text{PO}_4$  are allowed to react under dilute conditions . The maximum number of moles of  $\text{Ca}_3(\text{PO}_4)_2$  formed is

- A. 1
- B.  $1/2$
- C.  $1/3$
- D. 3

**Answer: C**

12. 10 grams of  $\text{CaCO}_3$  is completely decomposed to x and  $\text{CaO}$ . 'x' is passed into an aqueous solution containing 0.1mole of sodium carbonate.

What is the number of moles of sodium bicarbonate formed? (mol. wts:

$CaCO_3 = 100$ ,  $NaCO_3 = 106$ ,  $NaHCO_3 = 84$ )

A. 0.2

B. 0.1

C. 0.01

D. 10

**Answer: A**



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**13.** The volume of  $CO_2$  formed when 1 litre of  $O_2$  reacted with 2 lit of CO under the same condition is

A. 1L

B. 2L

C. 3L

D. 1.5L

**Answer: B**



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**14.** 20 ml of nitric oxide combines with 10 ml of oxygen at STP to give  $\text{NO}_2$ .

The final volume will be

A. 30 ml

B. 20 ml

C. 10 ml

D. 40 ml

**Answer: B**



**Watch Video Solution**

15. 4g of mixture of  $\text{Na}_2\text{CO}_3$  and  $\text{NaHCO}_3$  on heating liberates 448 ml of  $\text{CO}_2$  at STP. The percentage of  $\text{Na}_2\text{CO}_3$  in the mixture is

- A. 84
- B. 16
- C. 54
- D. 80

**Answer: B**



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### LECTURE SHEET EXERCISE-III (LEVEL-II (ADVANCED))

1. 1 lit of oxygen and 3 lit of  $\text{SO}_2$  at STP are reacted to produce sulphur trioxide . Then the ratio of between volume of sulphur trioxide and that of sulphur dioxide after reaction and weight of  $\text{SO}_3$  formed (in grams) respectively are



A. 1:2, 7:14gms

B. 2:1, 14.28gms

C. 2:1, 7.14gms

D. 1:1, 14.28gms

**Answer: C**



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2. The mass of 80 % pure  $H_2SO_4$  required to completely neutralise 60g of  $NaOH$  is

A. 92g

B. 58.8g

C. 73.5g

D. 98g

**Answer: A**

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3. 70 g of a sample of magnesite on treatment with excess of HCl gave 11.2 L of  $CO_2$  at STP. The percentage purify of the sample

A. 80

B. 70

C. 60

D. 50

**Answer: C**

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4. The volume in litres of  $CO_2$  librated at STP when 10 g of 90% pure limestone is heated completely,is

A. 2.016

B. 20.16

C. 2.24

D. 22.4

**Answer: A**



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5.  $NH_3$  is formed in the following steps

I.  $Ca + 2C \rightarrow CaC_2$  50% yield

II.  $CaC_2 + N_2 \rightarrow CaCN_2 + C$  100% yield

III.  $CaCN_2 + 3H_2O \rightarrow 2NH_3 + CaCO_3$  50% yield

To obtain 2 moles  $NH_3$ , calcium required is

A. 1 mol

B. 2 mol

C. 3 mol

D. 4 mol

**Answer: D**



**Watch Video Solution**

6. 18.4g of a mixture of  $\text{CaCO}_3$  and  $\text{MgCO}_3$  on heating gives 4.0g of magnesium oxide. The volume of  $\text{CO}_2$  produced at STP in this process is

A. 1.12 L

B. 4.48 lit

C. 2.24 L

D. 3.36 L

**Answer: B**



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7. A mixture of  $\text{Na}_2\text{CO}_3$  and  $\text{NaHCO}_3$  having a total weight of 100 gm on heating produced 11.2L of  $\text{CO}_2$  under STP conditions. The percentage of

$\text{Na}_2\text{CO}_3$  in the mixture is

A. 55.8 %

B. 44.2 %

C. 84 %

D. 16 %

**Answer: D**



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8. 10ml of mixture containing CO and  $\text{N}_2$  required 7 ml of oxygen to form  $\text{CO}_2$  and NO respectively on combustion. Find the volume of  $\text{N}_2$  in the mixture.

A.  $7/2$

B.  $17/2$

C. 4 ml

D. 7 ml

**Answer: C**



**Watch Video Solution**

9. 40 ml gaseous mixture of  $\text{CO}$ ,  $\text{CH}_4$  and  $\text{Ne}$  was exploded with 10 ml of oxygen. On cooling, the gases occupied 36.5 ml. After treatment with  $\text{KOH}$  the volume reduced by 9 ml and again on treatment with alkaline pyrogallol, the volume further reduced, percentage of  $\text{CH}_4$  in the original mixture is

A. a. 22.4

B. b. 77.5

C. c. 7.5

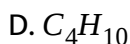
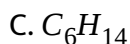
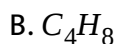
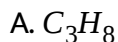
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**Answer: D**



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10. 40 ml of a hydrocarbon undergoes combustion in 260 ml oxygen and gives 160 ml of  $CO_2$ . If all volumes are measured under similar conditions of temperature and pressure, the formula of the hydrocarbon is



**Answer: D**



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11. Phosphine on decomposition produces phosphorus and hydrogen. When 100 ml of phosphine are decomposed the change in volume under laboratory conditions is

- A. 50 ml increase
- B. 50 ml decrease
- C. 900 ml decrease
- D. 75 ml increase

**Answer: A**



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**LECTURE SHEET EXERCISE-III (LEVEL-II (ADVANCED)) (MORE THAN ONE CORRECT ANSWER TYPE QUESTIONS)**

1. Two moles of  $H_2SO_4$  will be neutralised by

- A. 1 mole KOH
- B. 2 mol  $Ca(OH)_2$
- C. 4 mole KOH
- D. 2 mole KOH



**Answer: B::C**



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2. In which of the following reactions, no change in gaseous volume occurs when measured at similar T and P?

- A. Combination of  $N_2$  and  $O_2$  to give NO
- B. Combination of  $N_2$  and  $H_2$  to form  $NH_3$
- C. Combustion of carbon to give  $CO_2$
- D. Combustion of carbon monoxide

**Answer: A::C::D**



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3. Which of the following requires six times their volume of oxygen for complete combustion?

A. n-Butane

B. 1-Butene

C. 2-Butene

D. Cyclobutane

**Answer: B::C::D**



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4. One mole Barium chloride and one mole Sodium phosphate are mixed in aqueous medium.

A.  $BaCl_2$  acts as limiting reagent

B.  $Na_3PO_4$  acts as limiting reagent

C. Half mole of  $Ba_3(PO_4)_2$  is formed

D. 0.33 mole of  $Ba_3(PO_4)_2$  is formed

**Answer: A::D**



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5. One litre of  $\text{CO}_2$  is passed over hot coke. The volume becomes 1.4 lit.

The resultant mixture contains.

A. 0.6 lit  $\text{CO}_2$

B. 0.6 lit CO

C. 0.8 lit CO

D. 0.8 lit  $\text{CO}_2$

**Answer: A::C**



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6.  $\text{MnO}_2 + 4\text{HCl} \rightarrow \text{MnCl}_2 + \text{Cl}_2 + 2\text{H}_2\text{O}$ , In the reaction  $\text{MnO}_2$  acts as

A. 0.80 mole of  $\text{Cl}_2$  is formed

B. 0.80 mole of HCl remains unreacted

C.  $MnO_2$  is completely reacts

D.  $MnO_2$  is the limiting reactant

**Answer: A::B::C::D**

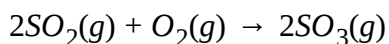


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### LECTURE SHEET EXERCISE-III (LEVEL-II (ADVANCED)) (LINKED COMPREHENSION TYPE QUESTIONS)

1. 10 moles of  $SO_2$  and 4 moles of  $O_2$  are mixed in a closed vessel of volume 2 litres. The mixture is heated in the presence of Pt catalyst.

Following reaction takes place:



Assuming the reaction proceeds to completion.

Select the correct statement.

A.  $SO_2$  is the limiting reagent

B.  $O_2$  is the limiting reagent

C. Both  $\text{SO}_2$  and  $\text{O}_2$  are limiting

D. Cannot be predicted

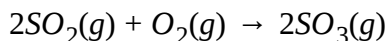
**Answer: B**



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2. 10 moles of  $\text{SO}_2$  and 4 moles of  $\text{O}_2$  are mixed in a closed vessel of volume 2 litres. The mixture is heated in the presence of Pt catalyst.

Following reaction takes place:



Assuming the reaction proceeds to completion.

Select the correct statement.

A. 10

B. 4

C. 8

D. 14

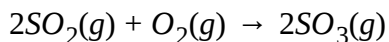
**Answer: C**



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3. 10 moles of  $SO_2$  and 4 moles of  $O_2$  are mixed in a closed vessel of volume 2 litres. The mixture is heated in the presence of Pt catalyst.

Following reaction takes place:



Assuming the reaction proceeds to completion.

Select the correct statement.

A. 4

B. 2

C. 6

D. 8

**Answer: B**



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4. In a reaction vessel,  $100\text{gH}_2$  and  $100\text{ g Cl}_2$  are mixed and suitable conditions are provided for the reaction:  $\text{H}_{2(g)} + \text{Cl}_{2(g)} \rightarrow 2\text{HCl}_{(g)}$

The amount of HCl formed in this reaction (at 100% yield) will be

A.  $102.8\text{g}$

B.  $73\text{g}$

C.  $36.5\text{g}$

D.  $142\text{g}$

**Answer: A**



**Watch Video Solution**

5. In a reaction vessel,  $100\text{gH}_2$  and  $100\text{ g Cl}_2$  are mixed and suitable conditions are provided for the reaction:  $\text{H}_{2(g)} + \text{Cl}_{2(g)} \rightarrow 2\text{HCl}_{(g)}$

The amount of HCl formed in this reaction (at 100% yield) will be

A.  $50\text{g}$

B. 97.2g

C. 46g

D. 64g

**Answer: B**



**Watch Video Solution**

6. In a reaction vessel, 100g  $H_2$  and 100 g  $Cl_2$  are mixed and suitable conditions are provided for the reaction:  $H_{2(g)} + Cl_{2(g)} \rightarrow 2HCl_{(g)}$

The amount of HCl formed (at 90% yield) will be

A. 36.8g

B. 62.5g

C. 80g

D. 92.53g

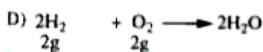
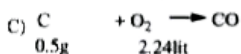
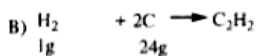
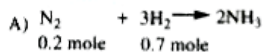
**Answer: D**



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## LECTURE SHEET EXERCISE-III (LEVEL-II (ADVANCED)) (MATRIX MATCHING TYPE QUESTIONS)

### Column-I



### Column-II (Limiting reagent)

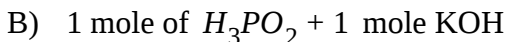
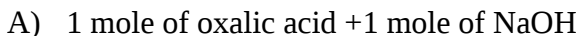


1.

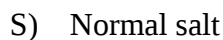
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2. Match type of the salt formed with the appropriate reaction.

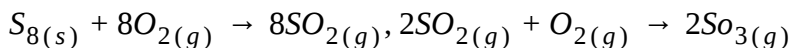
### Column-I (Reaction)



### Column-II (Type of Salt)

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1. Sulphur trioxide is prepared by the following two reactions:



How many grams of  $SO_3$  are produced from  $1.6g S_8$  ?



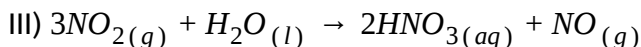
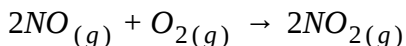
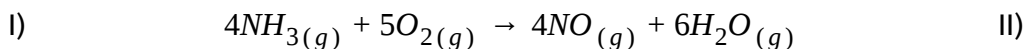
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2. 2 moles of pure  $KClO_3$  is decomposed to an extent of 66.6%. How many does of  $O_2$  is released?



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3. Nitric acid can be produced from  $NH_3$  in three step process



% yield of I, II, III reaction are respectively 50%, 60% and 80%. Then how much volume of  $NH_{3(g)}$  at STP is required to produce 2.25 gm of  $HNO_3$ .



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4. A gaseous hydrocarbon on combustion produces four times its volume of  $CO_2$  by consuming six times its volume of oxygen. What is the ratio of atoms of Hydrogen and carbon in that hydrocarbon?



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5. The percentage by volume of  $C_3H_8$  in a gaseous mixture of  $C_3H_8$ ,  $CH_4$  and  $CO$  is 20. When 10 ml of the mixture is burnt in excess of  $O_2$ , the volume of  $CO_2$  produced is  $2x\text{ml}$ . Find the value of  $x$ .



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6. 12 grams of a mixture of sand and calcium carbonate on strong heating produced 7.6 grams of residue. How many grams of sand is present in the mixture?



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#### LECTURE SHEET EXERCISE-IV (LEVEL-I (MAIN))

1. What is the mole percentage of  $O_2$  in a mixture of 7g of  $N_2$  and 8g of  $O_2$ ?

A. 25 %

B. 75 %

C. 50 %

D. 40 %

**Answer: C**



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2. The aqueous solution of glucose is 10% w/w of solution, the percentage of w/w of solvent is

A. 11.11 %

B. 15 %

C. 20.22 %

D. 22.22 %

**Answer: A**



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3. The average concentration of  $Na^+$  ion in human body serum is 3 to 4 gm per litre. The molarity of  $Na^+$  ion is about

A. 0.15M

B. 3.4M

C.  $2.3M$

D.  $0.68M$

**Answer: A**



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4. Hydrogen Peroxide in aqueous solution decomposes on warming to give oxygen according to the equation,  $2H_2O_{2(aq)} \rightarrow 2H_2O_{(l)} + O_{2(g)}$ , under conditions where one mole of gas occupies  $24dm^3$ .  $100cm^3$  of  $.X.M$  solution  $H_2O_2$  produces  $3dm^3$  of  $O_2$ . Thus X is :

A. 2.5

B. 5.0

C. 10.0

D. 30.0

**Answer: A**



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5. 20 volume. of  $H_2O_2$  is equal to

A. 20 %  $H_2O_2$  by mass

B. 6 %  $H_2O_2$  by mass

C. 1.764N

D. 3.571N

Answer: D



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6. How much  $Ca(NO_3)_2$  in mg must be present in 50 ml of a solution with 2.35 ppm of Ca?

A. 0.1175

B. 770.8

C. 4.7

D. 0.48

**Answer: D**



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### LECTURE SHEET EXERCISE-IV (LEVEL-II (ADVANCED))

1. Mole fraction of ethanol in an aqueous solution of ethanol and water is

0.1. The mass percent of ethanol is

A. 10

B. 90

C. 22

D. 78

**Answer: C**



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2. 0.45 N & 0.6 N NaOH solution are mixed in 2:1 by volume. The amount of solute present in 1 lit of this solution is

A. 0.5 gm

B. 25 gm

C. 20 gm

D. 5 g

**Answer: C**

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3. The specific gravity of 98%  $H_2SO_4$  is 1.8 g/cc. 50 ml of this solution is mixed with 1750 ml of pure water. Molarity of resulting solution is

A. 0.2 M

B. 0.5 M

C. 0.1 M

D. 1M

**Answer: B**



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**LECTURE SHEET EXERCISE-IV (LEVEL-II (ADVANCED)) (MORE THAN ONE CORRECT ANSWER TYPE QUESTIONS)**

1. Which of the following is independent on slight variation of temperature?

A. Molarity

B. Normality

C. Molality

D. Molefraction

**Answer: C::D**



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2. 0.1 mole of  $KMnO_4$  present in 500 ml solution got converted into  $K_2MnO_4$ . The concentration of  $KMnO_4$  is

A. 0.2 M

B. 0.2 N

C. 1 N

D. 0.04 N

**Answer: A::B**



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3. 1 ml of 1 M solution is mixed with 999 ml of pure water.

A.  $10^{-3}$  M solution is formed

B. The mass of solute per ml decreases by 1000 times

C. The quantity of solute decrease in the solution

D. 10 ml of resultant solution contains  $10^{-5}$  moles of solute

**Answer: A::B::D**



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4. 100 ml, 0.1 M  $K_2SO_4$  is mixed with 100 ml, 0.1M  $Al_2(SO_4)_3$  solution. The resultant solution is

A.  $0.1N K^+$  ions

B.  $0.4N K^+$  ions

C.  $0.2M SO_4^{-2}$  ions

D.  $0.1M Al^{+3}$  ions

**Answer: A::B::C::D**



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5. 3.65% W/V HCl solution has density 1.0365 gm/cc, then its concentration is

A. 1 M

B. 1 m

C. 1 N

D. 0.5 M

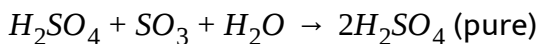
**Answer: A::B::C**



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LECTURE SHEET EXERCISE-IV (LEVEL-II (ADVANCED)) (LINKED  
COMPREHENSION TYPE QUESTIONS)

1. Oleum is mixture of  $H_2SO_4$  and  $SO_3$  i.e.  $H_2S_2O_7$  which is obtained by passing  $SO_3$  in solution of  $H_2SO_4$ . In order to dissolve  $SO_3$  in oleum, dilution of oleum is done by water in which oleum is converted into pure  $H_2SO_4$  as shown below:



When 100 gm oleum is diluted with water then total mass of diluted oleum is known as percentage labelling in oleum.

For example: 109 %  $H_2SO_4$  labelling of oleum sample means that 109 gm pure  $H_2SO_4$  is obtained on diluting 100 gm oleum with 9 gm  $H_2O$  which dissolves all free  $SO_3$  in oleum.

If the number of moles of free  $SO_3$ ,  $H_2SO_4$ , and  $H_2O$  be  $x$ ,  $y$  and  $z$  respectively in 118%  $H_2SO_4$  labelled oleum, the value of  $(x + y + z)$  is

A. 2.2

B. 3.2

C. 3.4

D. 4.2

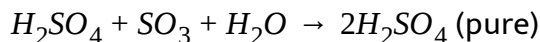
Answer: A



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LECTURE SHEET EXERCISE-IV (LEVEL-II (ADVANCED)) (LINKED COMPREHENSION TYPE QUESTIONS)

1. Oleum is mixture of  $H_2SO_4$  and  $SO_3$  i.e.  $H_2S_2O_7$  which is obtained by passing  $SO_3$  is solution of  $H_2SO_4$ . In order to dissolve  $SO_3$  in oleum, dilution of oleum is done by water in which oleum is converted into pure  $H_2SO$  as shown below:



When 100 gm oleum is diluted with water then total mass of diluted oleum is known as percentage labelling in oleum.

For example: 109 %  $H_2SO_4$  labelling of oleum sample means that 109 gm pure  $H_2SO_4$  is obtained on diluting 100 gm oleum with 9 gm  $H_2O$  which dissolves al free  $SO_3$  in oleum.

If 109%  $H_2SO_4$  labelled oleum, the percent of free  $SO_3$  and  $H_2SO_4$  are

A. 30 % , 70 %

B. 40 % , 60 %

C. 60 % , 40 %

D. 15 % , 85 %

**Answer: B**



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### LECTURE SHEET EXERCISE-IV (LEVEL-II (ADVANCED)) (MATRIX MATCHING TYPE QUESTIONS)

1. When 200 ml 0.2M NaCl and 200 ml 0.4M  $BaCl_2$  and 100 ml 0.2 M KCl are mixed.

Column-I

Column-II

A) molarity of  $Na^+$  ion    P) 0.04 M

B) molarity of  $Ba^{+2}$  ion    Q) 0.08 M

C) molarity of  $Cl^-$  ion    R) 0.16 M

D) molarity of  $K^+$  ion    S) 0.44 M



**View Text Solution**



LECTURE SHEET EXERCISE-IV (LEVEL-II (ADVANCED)) (INTEGER TYPE QUESTIONS)

1. An aqueous glucose solution contains 180 ppm glucose. If one .ml. of the solution is mixed with 99ml water, the molarity of the resultant solution is  $x \times 10^{-y}$ . What is y? (d=1 gm/cc)



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2. The mole fraction of solute in an aqueous solution is  $\frac{1}{112}$ . The molality (m) of the solution is 0.1x. What is x?



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3. 2 moles of  $KMnO_4$  present in 500 ml solution get converted into  $MnO_2$ . The normality of  $KMnO_4$  solution is 3x, x = ?



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## LECTURE SHEET EXERCISE-V (LEVEL-I (MAIN))

1. Number of moles of  $KMnO_4$  required to oxidize one mole of  $Fe(C_2O_4)$  in acidic medium is

- A. 0.6
- B. 0.167
- C. 0.2
- D. 0.4

**Answer: A**



**Watch Video Solution**

2. 20 ml of  $0.1MFeC_2O_4$  solution is titrated with  $0.1MKMnO_4$  in acidic medium. Volume of  $KMnO_4$  solution required to oxidise  $FeC_4O_4$

completely is

A. 20 ml

B. 12 ml

C. 8 ml

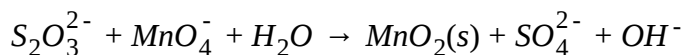
D. 4 ml

**Answer: B**



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3.  $0.1M$  -  $KMnO_4$  is used for the following titration. How much volume of the solution in ml will be required to react with 0.158 gm of  $Na_2S_2O_3$ ?



A. 80 ml

B. 26.67 ml

C. 13.33 ml

D. 16 ml

**Answer: B**



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4. The volume of 0.1 M  $AgNO_3$  should be added to 10.0 ml of 0.09M  $K_2CrO_4$  to precipitate all the chromate as  $Ag_2CrO_4$  is

A. 18 ml

B. 9 ml

C. 27 ml

D. 36 ml

**Answer: A**



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5. 0.66 g of  $H_3PO_2$  will require x ml of 0.1M NaOH for complete neutralization. X is

- A. 100 ml
- B. 200 ml
- C. 300 ml
- D. none of these

**Answer: A**



**Watch Video Solution**

6. 100 ml of 0.01 M  $KMnO_4$  oxidizes 10 ml of  $H_2O_2$  sample in acidic medium. The volume strength of  $H_2O_2$  sample is

- A. 11.2 Vol
- B. 5.6 Vol
- C. 2.80 Vol

D. none of these

**Answer: C**



**View Text Solution**

7. How many litres of  $CO_2$  at STP will be formed when 100 of  $0.1M H_2SO_4$  reacts with excess of  $Na_2CO_3$ ?

A. 22.4

B. 2.24

C. 0.224

D. 5.6

**Answer: C**



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8. Moles of  $KHC_2O_4$  (potassium acid oxalate) required to reduce 100 mL of 0.02M  $KMnO_4$  in acidic medium (to  $Mn^{2+}$ ) is

- A. 0.002
- B. 0.005
- C. 0.001
- D. 0.007

**Answer: B**



**Watch Video Solution**

9. In the reactant of  $KMnO_4$  with an oxalate in acidic medium.  $MnO_4^-$  is reduced to  $Mn^{2+}$  and  $C_2O_4^{2-}$  is oxidised to  $CO_2$ . Hence, 50 ml of 0.02 M  $KMnO_4$  is equivalent to

- A. 100 ml of 0.05 M  $H_2C_2O_4$
- B. 50 ml of 0.05 M  $H_2C_2O_4$

C. 25 ml of 0.2 M  $H_2C_2O_4$

D. 50 ml of 0.10 M  $H_2C_2O_4$

**Answer: B**



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### LECTURE SHEET EXERCISE-V (LEVEL-II (ADVANCED))

1. 100 mL of  $H_2O_2$  is oxidized by 100 mL of  $1MKMnO_4$  in acidic medium (  $MnO_4^-$  reduced to  $Mn^{+2}$  ) 100 mL of same  $H_2O_2$  is oxidized by v mL of  $1MKMnO_4$  in basic medium ( $MnO_4^-$  reduced to  $MnO_2$ ). Find the value of v:

A. 500

B. 100

C. 100/3

D. 500/3



**Answer: D**



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2. 1 mol of equimolar mixture of ferric oxalate and ferrous oxalate will require x mol of  $KMnO_4$  in acidic medium for complete oxidation. X is

A. 0.8 mol

B. 0.9 mol

C. 1.6 mol

D. 1.8 mol

**Answer: B**



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3. How much volume of 0.40 M  $Na_2S_2O_3$  would be required to react with the  $I_2$  liberated by adding excess of KI of 50 mL of 0.20 M  $CuSO_4$

A. 12.5 mL

B. 25 mL

C. 50 mL

D. 2.5 mL

**Answer: B**



**Watch Video Solution**

4. To neutralize completely 20 ml of 0.1 M phosphorus acid, 40 mol of KOH was required. What volume of this KOH solution will be required to neutralize 0.66 g of  $H_3PO_2$ ?

A. 100 ml

B. 200 ml

C. 300 ml

D. 66.7 ml

**Answer: A**



**Watch Video Solution**

5. If  $x$  g is the mass of  $\text{NaHC}_2\text{O}_4$  required to neutralize 100 ml of 0.2 M NaOH and  $y$  g that required to reduce 100 ml of 0.02 M  $\text{KMnO}_4$  in acidic medium then

A.  $x = y$

B.  $2x = y$

C.  $x = 4y$

D.  $4x = y$

**Answer: C**



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6. An equimolar mixture of  $Na_2C_2O_4$  and  $H_2C_2O_4$  required  $V_1L$  of  $0.1MKMnO_4$  in acidic medium for complete oxidation. The same amount of the mixture required  $V_2L$  of  $0.1\text{ M NaOH}$  for neutralization. The ratio of  $V_1$  to  $V_2$  is

A. 1:2

B. 2:1

C. 2:5

D. 5:2

**Answer: C**



**Watch Video Solution**

7. 3 moles of a mixture of  $FeSO_4$  and  $Fe_2(SO_4)_3$  required 100 mL of 2 M  $KMnO_4$  solution in acidic medium. Hence, mole fraction of  $FeSO_4$  in the mixture is

A.  $\frac{1}{3}$

B.  $\frac{2}{3}$

C.  $\frac{2}{5}$

D.  $\frac{3}{5}$

**Answer: A**



**Watch Video Solution**

8. One litre of a solution contains 18.9 gm of  $HNO_3$  and one litre of another solution contains 3.2 gm of NaOH. In what volume ratio must these solutions be mixed to obtain a neutral solution?

A. 3:8

B. 8:3

C. 15:4

D. 4:15

**Answer: D**



**Watch Video Solution**

**9.** During the titration of a mixture of  $\text{Na}_2\text{CO}_3$  and  $\text{NaHCO}_3$  against HCl

- A. phenolphthalein is used to detect the first end point
- B. phenolphthalein is used to detect the second end point
- C. methyl orange is used to detect the first end point
- D. methyl red is used to detect the first end point

**Answer: A**



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**10.** In the mixture of  $\text{NaHCO}_3$  and  $\text{NaCO}_3$ , volume of a given HCl required is x ml with phenolphthalein indicator and further y mL is required with

methyl orange indicator. Hence volume of HCl for complete reaction of  $\text{NaHCO}_3$  present in the original mixture is

- A.  $2x$
- B.  $y$
- C.  $x/2$
- D.  $(y - x)$

**Answer: D**



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11. 40 mL of 0.05 M solution of sodium sesquicarbonate ( $\text{Na}_2\text{CO}_3 \cdot \text{NaHCO}_3 \cdot 2\text{H}_2\text{O}$ ) is titrated against 0.05 M HCl solution. X ml of HCl solution is used when phenolphthalein is the indicator and y ml of HCl is used when methyl orange is the indicator in two separate titrations. Hence (y-x) is

- A. 80 mL

B. 30 mL

C. 120 mL

D. none of these

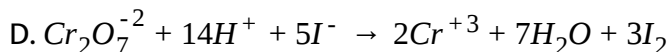
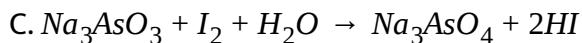
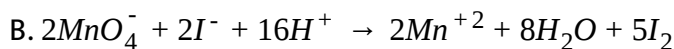
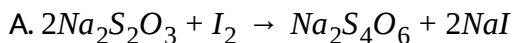
**Answer: A**



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**LECTURE SHEET EXERCISE-V (LEVEL-II (ADVANCED)) (MORE THAN ONE CORRECT ANSWER TYPE QUESTIONS)**

**1. Which relation involve iodimetric titration?**



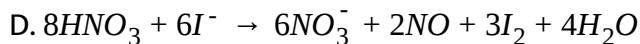
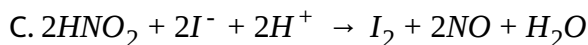
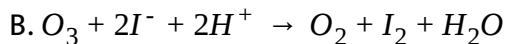
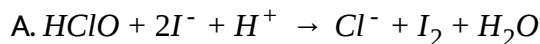


Answer: A::C



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2. Which of the following are valid iodometric titrations?



Answer: A::B::C



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3. 50 ml  $\text{H}_2\text{O}_2$  is completely oxidised by 10 ml, 0.2 N  $\text{KMnO}_4$  solution in acidic medium. The strength of hydrogen peroxide is

A. 0.68 gm/lit

B.  $\frac{M}{50}$

C.  $\frac{N}{25}$

D. 3.4 % (w/v)

**Answer: A::B::C**



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4. One mole of  $KMnO_4$  is used for complete oxidation of  $FeSO_4$ ,  $FeC_2O_4$  and  $H_2C_2O_4$  respectively and separately. Pick up the correct statement.

A. 5 mole of  $FeSO_4$  can be oxidized

B.  $3/5$  mole of  $FeC_2O_4$  can be oxidized

C.  $5/3$  mole of  $FeC_2O_4$  can be oxidized

D. 2.5 mole of  $H_2C_2O_5$  can be oxidized

**Answer: A::C::D**

5. 40 gm NaOH, 106gm $Na_2CO_3$  and 84gm $NaHCO_3$  is dissolved in water and the solution is made 1 lit, 20 ml of this stock solution is titrated with 1 N HCl, hence which of the followign statements are correct?

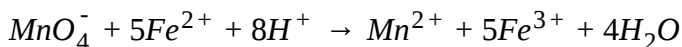
- A. The burette reading of HCl will be 40 ml, if phenolphthalein is used as indiator from the beginning
- B. The burette reading of HCl will be 60 ml, if phenolphthalein is used as indicator form the beginning.
- C. The burette readin of HCl will be 40ml, if methyl orange is used as indicator after the first end point
- D. The burette reading of HCl will be 80 ml, if methyl organe is used as indicator from the very beginning.

Answer: A::C::D

## LECTURE SHEET EXERCISE-V (LEVEL-II (ADVANCED)) (LINKED COMPREHENSION TYPE QUESTIONS)

1. A quantity of 25.0 mL of solution containing both  $Fe^{2+}$  and  $Fe^{3+}$  ions is titrated with 25.0 mL of 0.0200  $KMnO_4$  (in dilute  $H_2SO_4$ ). As a result, all of the  $Fe^{2+}$  ions are oxidised to  $Fe^{3+}$  ions.

Next 25 mL of the original solution is treated with Zn metal finally, the solution requires 40.0 mL of the same  $KMnO_4$  solution for oxidation to  $Fe^{3+}$ .



Zinc added in the second titration will

A. 0.01 M

B. 0.02 M

C. 0.10 M

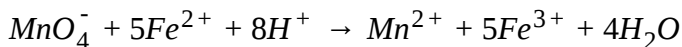
D. 0.20 M

**Answer: C**

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2. A quantity of 25.0 mL of solution containing both  $Fe^{2+}$  and  $Fe^{3+}$  ions is titrated with 25.0 mL of 0.0200  $M KMnO_4$  (in dilute  $H_2SO_4$ ). As a result, all of the  $Fe^{2+}$  ions are oxidised to  $Fe^{3+}$  ions.

Next 25 mL of the original solution is treated with Zn metal finally, the solution requires 40.0 mL of the same  $KMnO_4$  solution for oxidation to  $Fe^{3+}$ .



Zinc added in the second titration will

A. oxidize  $Fe^{2+}$  to  $Fe^{3+}$

B. reduce  $Fe^{3+}$  to  $Fe^{2+}$

C. reduce  $Fe^{3+}$  to Fe

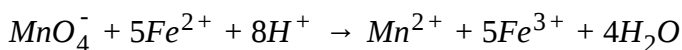
D. reduce  $Fe^{2+}$  to Fe

**Answer: A**

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3. A quantity of 25.0 mL of solution containing both  $Fe^{2+}$  and  $Fe^{3+}$  ions is titrated with 25.0 mL of 0.0200  $MKMnO_4$  (in dilute  $H_2SO_4$ ). As a result, all of the  $Fe^{2+}$  ions are oxidised to  $Fe^{3+}$  ions.

Next 25 mL of the original solution is treated with Zn metal finally, the solution requires 40.0 mL of the same  $KMnO_4$  solution for oxidation to  $Fe^{3+}$ .



IF 0.02  $MK_2Cr_2O_7$  is used instead of 0.02 M  $KMnO_4$  its volume required in these titrations are respectively

- A. 25 mL, 40 mL
- B. 25 mL, 15 mL
- C. 20.8 mL, 33.3 mL
- D. 10.4 mL, 16.7 mL

**Answer: C**



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4.  $H_2O_2$  acts both as oxidant and reductant.  $H_2O$  and  $O_2$  are products when  $H_2O_2$  acts as oxidant and reductant respectively. The strength of  $H_2O_2$  is expressed in terms of molarity, normality, % strength and volume strength.  $H_2O_2$  decomposes as  $H_2O_2 \rightarrow H_2 + 1/2O_2(g)$  i.e., one mole  $O_2$  is released from 2 mole  $H_2O_2$ .  $x$ . volume strength of  $H_2O_2$  means 1 volume (mL or litre) of  $H_2O_2$  sample released  $x$  volume (mL or litre)  $O_2$  gas at NTP on its decomposition.

Hence molarity =  $x/11.2$  moles per litre, i.e., normality of  $H_2O_2 = x/5.6$

Thus volume strength, i.e.,  $x = 5.6 \times \text{Normality}$ .

Weight of  $H_2O_2$  (in gm) present in 100 mL  $H_2O_2$  solution is called percentage strength of  $H_2O_2$

How much volume of  $H_2O_2$  solution of 22.4 vol. strength is required to oxidise 6.3 gm oxalic acid

A. 10mL

B. 11.2mL

C. 25 mL

D. 30 mL

Answer: C



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5.  $H_2O_2$  acts both as oxidant and reductant.  $H_2O$  and  $O_2$  are products when  $H_2O_2$  acts as oxidant and reductant respectively. The strength of  $H_2O_2$  is expressed in terms of molarity, normality, % strength and volume strength.  $H_2O_2$  decomposes as  $H_2O_2 \rightarrow H_2 + 1/2O_2(g)$  i.e., one mole  $O_2$  is released from 2 mole  $H_2O_2$ .  $x$ . volume. strength of  $H_2O_2$  means 1 volume (mL or litre) of  $H_2O_2$  sample released  $x$  volume (mL or litre)  $O_2$  gas at NTP on its decomposition.

Hence molarity =  $x/11.2$  moles per litre, i.e., normality of  $H_2O_2 = x/5.6$

Thus volume strength, i.e.,  $x = 5.6 \times \text{Normality}$ .

Weight of  $H_2O_2$  (in gm) present in 100 mL  $H_2O_2$  solution is called percentage strength of  $H_2O_2$

50 mL of  $H_2O_2$  solution was diluted to 200 mL and 10 mL of this diluted



$H_2O_2$  solution reduced 10 mL of 0.1 M  $KMnO_4$  acidic solution. The volume strength of  $H_2O_2$  is

- A. 2.8 Vol
- B. 5.6 Vol
- C. 11.2 Vol
- D. 22.4 Vol

**Answer: C**



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**6.** Molarity is number of moles of solute dissolved per litre of the solution while normality is number of gm-equivalent of solute dissolved per litre of solution. Molality is number of moles of solute dissolved per Kg of solvent. Normality and molarity change with change of temperature of solution but molality is independent of temperature. In case of monobasic acid normality and molarity are equal but dibasic acid or base molarity is two times of normality. In redox and neutralisation processes

number of milliequivalents of reactants as well as products are always equal.

The volume of 0.1 M  $\text{Ca}(\text{OH})_2$  required to neutralise 0.2 M  $\text{H}_3\text{PO}_3$  solution of volume  $0.25\text{dm}^3$  will be

- A. 100mL
- B. 250 mL
- C. 500 mL
- D. 750 mL

**Answer: C**



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7. Molarity is number of moles of solute dissolved per litre of the solution while normality is number of gm-equivalent of solute dissolved per litre of solution. Molality is number of moles of solute dissolved per Kg of solvent. Normality and molarity change with change of temperature of solution but molality is independent of temperature. In case of

monobasic acid normality and molarity are equal but dibasic acid or base molarity is two times of normality. In redox and neutralisation processes number of milliequivalents of reactants as well as products are always equal.

100 mL solution of  $x$  M  $KMnO_4$  oxidised 1.52 gm  $FeSO_4$  in acidic medium.

The value of  $x$  is

A. 0.01

B. 0.02

C. 0.04

D. 0.05

**Answer: B**



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LECTURE SHEET EXERCISE-V (LEVEL-II (ADVANCED)) (MATRIX MATCHING TYPE QUESTIONS)

1. Given two mixtures: (I) NaOH and  $\text{Na}_2\text{CO}_3$  and (II)  $\text{NaHCO}_3$  and  $\text{Na}_2\text{CO}_3$

100 ml of mixture I required w and x ml of 1 M HCl in separate titrations using phenolphthalein and methyl orange indicators while 100 ml of mixture II required y and z ml of same HCl solution in separate titrations using the same indicators.

**Column-I (Substance)**

- A)  $\text{Na}_2\text{CO}_3$  in mixture I
- B)  $\text{Na}_2\text{CO}_3$  in mixture II
- C) NaOH in mixture I
- D)  $\text{NaHCO}_3$  in mixture II

**Column-II (Molarity in solution)**

- P)  $(2w - x) \times 10^{-2}$
- Q)  $(z - 2y) \times 10^{-2}$
- R)  $y \times 10^{-2}$
- S)  $(x - w) \times 10^{-2}$



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**LECTURE SHEET EXERCISE-V (LEVEL-II (ADVANCED)) (INTEGER TYPE QUESTIONS)**

1. How many moles of Mg can reduce one mole of dil.  $\text{HNO}_3$  into  $\text{NH}_4^+$  ions ?



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2. One litre 2M  $\text{Na}_3\text{PO}_4$  and 1 litre of 1M  $\text{BaCl}_2$  solutions are mixed. What is the normality of phosphate ions in the filtrate?



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3. 25 mL of 0.1 M solution of metallic salt (A) oxidised 25 mL of 0.1 M sodium sulphite to sodium sulphate. If oxidation number of the metal in the salt (A) is 3, then new oxidation number of the metal is \_\_\_\_\_



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4. Equivalent weight of a metal chloride is 75.5. How many moles of NaOH is required to completely precipitate one mole of metal hydroxide. Atomic weight of the metal is 120.



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5. 70 gms of a metal oxide on reduction produced 54 gms of metal. The atomic weight of the metal is 81. What is its valency?



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6. The purity of  $H_2O_2$  in a given sample is 85%. The weight of impure sample of  $H_2O_2$  which required 10 ml of  $M/5KMnO_4$  solution in a titration in acidic medium is 0.1 x. Find x?



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## PRACTICE SHEET EXERCISE-I (LEVEL-I (MAIN))

1. Chemical equation is balanced according to the law of

A. Multiple proportions

B. Reciprocal proportions

C. Conservation of mas

D. Definite proportions

**Answer: C**



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2. Two gaseous samples were analysed. One contained 1.2 g of carbon and 3.2 g of oxygen. The other contained 27.3% carbon and 72.7% oxygen. The experiemental data is an accordance with

A. Law of conservation of mass

B. Law of definite proportions

C. Law of reciprocal proportion

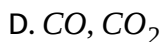
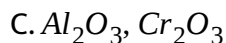
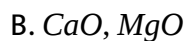
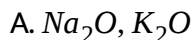
D. Law of multiple proportions

**Answer: B**



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3. Which of the following pairs can be cited as an example to illustrate the law of multiple proportion?



**Answer: A**



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4. (A): In Haber's process,  $N_2$  and  $H_2$  combine in 1 : 3 volume ratio

(R): Gases combine in simple volume ratio

A. Both (A) and (R ) are true and (R ) is the correct explanation of (A)



B. Both (A) and (R ) are true and (R ) is not the correct explanation of

(A)

C. (A) is true but (R ) is false

D. (A) is false but (R ) is true

**Answer: A**



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5. Given that the abundance of isotopes  $^{54}\text{Fe}$ ,  $^{56}\text{Fe}$  and  $^{57}\text{Fe}$  are 5%, 90% and 5% respectively, the atomic mass of Fe is

A. 55.85

B. 55.95

C. 55.75

D. 56.05

**Answer: B**

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6. Avogadro number is

- A. of atoms in one gram-atomic-weight
- B. of molecules in one gram-molecular-weight
- C. of atoms in 0.012 kg of C-12
- D. of atoms in 3.2 grams of oxygen

**Answer: D**

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7. Avogadro number of helium atoms have a mass of

- A. 2g
- B. 4g
- C. 8g

D.  $4 \times 6.02 \times 10^{23}g$

**Answer: B**



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**8.** The weight of 0.1 mole of  $Na_2CO_3$  is

A. 106 g

B. 10.6 g

C. 5.3 g

D.  $6.02 \times 10^{22}g$

**Answer: B**



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9. The mass of  $1.5 \times 10^{26}$  molecules of a substance is 16 kg . The molecular mass of the substance is

- A. 64kg
- B. 64 a.m.u
- C. 16 a.m.u
- D. 32 a.m.u

**Answer: B**



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10. The number of sulphur atoms present in 0.2 mole of sodium thiosulphate is

(N=Avogadro number)

- A. 4N
- B. 0.2N

C. 0.4N

D. 0.1N

**Answer: C**



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**11.** 48 g of Mg contains the same number of atoms as 160 g of another element . The atomic mass of the element is

A. 24

B. 320

C. 80

D. 40

**Answer: C**



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12. Number of atoms in 558.5 gm Fe (At.wt of Fe = 55.85 g  $\text{mol}^{-1}$ ) is

A. Twice that in 60 g carbon

B.  $6.023 \times 10^{22}$

C. Half that in 8g He

D.  $558.6 \times 6.023 \times 10^{23}$

**Answer: A**



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13. Which of the following contain more number of molecules

A. 1 gm  $H_2$

B. 1 gm  $CO_2$

C. 1 gm  $SO_3$

D. 1 gm  $N_2$

**Answer: A**



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**14.** One mole of  $CH_4$  contains

A.  $6.02 \times 10^{23}$  atoms of hydrogen

B. 4gm atoms of hydrogen

C. 3g of carbon

D.  $1.81 \times 10^{23}$  molecules of  $CH_4$

**Answer: B**



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**15.** The atomic masses of two elements A and B are 20 and 40 respectively.

If x gm of A contains Y atoms, how many atoms are present in 2x gm of B

A.  $2y$

B.  $y/2$

C.  $y$

D.  $4y$

**Answer: C**



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**16.** A gaseous mixture contains oxygen and nitrogen in the ratio 1:4 by weight. The ratio of their number of molecules is

A. 1 : 4

B. 4 : 1

C. 7 : 32

D. 3 : 16

**Answer: C**





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17. The volume of two moles of oxygen at STP

A. 22.4 L

B. 11.2 L

C. 40 L

D. 44.8 L

**Answer: D**



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18. Four ten litre flasks are separately filled with the gases hydrogen, helium, oxygen and ozone at the same temperature and pressure. The ratio of the total number of atoms of these gases present in different flasks would be

A. 1:2:3:2

B. 2:1:2:3

C. 1:3:2:2

D. 1:1:1:1

**Answer: B**



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**19.** 7.5 g of a gas occupies 5.6 litres at STP. The gas is

A. NO

B.  $\text{NO}_2$

C. CO

D.  $\text{CO}_2$

**Answer: A**



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20. The density of a gas is 2, relative to nitrogen, under the same conditions. The molecular weight of the gas is

A. 5.6

B. 28

C. 56

D. 14

**Answer: C**



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21. Henry thinks that a mole contains  $6.023 \times 10^{24}$  molecules. Hence the mass of Henry's mole of Nitrogen is

A. 2.8g

B. 28g

C. 280g

D. 0.28g

**Answer: C**



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22. A copper plate of 20 cm x 10 cm is to be plated with silver of 1 mm thickness on both the sides. Number of moles of silver required for plating is (density of silver =10.8 g m /cc)\_\_\_\_\_

A.  $1.2 \times 10^{24}$

B.  $2.4 \times 10^{24}$

C.  $1.2 \times 10^{13}$

D.  $2.4 \times 10^{23}$

**Answer: A**



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23. The element 'A' and 'B' combine together to give two compounds  $A_2B_3$  and  $AB_2$ . The weight of 0.2 mole of  $A_2B_3$  is 26 gm. The weight of 0.3 mole of  $AB_2$  is 24 g m. Then the atomic weight of A and B respectively

A. 30, 40

B. 50, 50

C. 80, 20

D. 40, 30

**Answer: D**



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### **PRACTICE SHEET EXERCISE-I (LEVEL-II (ADVANCED))**

1. Analysis of chlorophyll shows that it contains 2.68% Mg. Number of magnesium atoms present in 2.4 g of chlorophyll is

A.  $2.68 \times 6 \times 10^{21}$

B.  $2.68 \times 6 \times 10^{23}$

C.  $2.68 \times 6 \times 10^{20}$

D.  $2.68 \times 6 \times 10^{20}/24$

**Answer: C**



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2. The density of water is  $1\text{g/mL}$ . Assuming that there are no intermolecular spaces between water molecules in liquid water, the volume of a water molecule is

A.  $1.5 \times 10^{-23}\text{ml}$

B.  $6 \times 10^{-23}\text{ml}$

C.  $3 \times 10^{-23}\text{ml}$

D.  $3 \times 10^{-22}\text{ml}$

**Answer: C**



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3. An  $\alpha$  - particle changes into a Helium atom. In the course of one year the volume of Helium collected from a sample of Radium was found to be  $1.12 \times 10^{-2} \text{ mL}$  at STP. The number of  $\alpha$  particles emitted by the sample of Radium in the same time is

A.  $6 \times 10^{17}$

B.  $3 \times 10^{17}$

C.  $1.5 \times 10^{17}$

D.  $1.2 \times 10^{18}$

**Answer: B**



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PRACTICE SHEET EXERCISE-I (LEVEL-II (ADVANCED)) (MORE THAN ONE CORRECT ANSWER TYPE QUESTIONS)

1.  $\frac{1}{12}$  the mass of  $^{12}\text{C}$  atom is equal to

A. amu

B.  $\frac{1}{16}$ th mass of  $^{16}\text{O}$  atom

C.  $\frac{1}{16}$ th mass of  $\text{CH}_4$  molecule

D. 1 gm

Answer: A::B::C



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2. 18 gms of glucose contains

A. 0.6 gram-atoms of carbon

B. 0.6 grammolecules of Hydrogen



C. 0.6 grammoles of  $\text{CO}_2$

D. 1.2 gramatoms of Hydrogen

**Answer: A::B::D**



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**3. Which of the following contains Avagadro number of atoms?**

A. one mole of Helium gas

B. 22.4 lts of  $\text{CO}_2$  at STP

C. 11.2 lts of Hydrogen gas at STP

D. 3.2 gms of methane

**Answer: A::C::D**



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4. 8 gm  $O_2$  has the same number of molecules as in

A. 11 g  $CO_2$

B. 22g  $CO_2$

C. 7g CO

D. 14g CO

**Answer: A::C**



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5. Equal masses of oxygen and ozone have equal

A. number of grammoles

B. number of gramatoms

C. volumes at STP

D. number of electrons

**Answer: B::D**



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6. We have 1.6 g  $CH_4$ , 1.7g $NH_3$  and 1.8g $H_2O$  select correct the alternate(s).

A. There are equal number of moles of each reactant

B. Total number of atoms in  $CH_4 > NH_3 > H_2O$

C. Total number of H-atoms are in the ratio of 4:3:2

D. Total number of C-atoms in  $CH_4 <$  that of N-atoms in  $NH_3 <$  that of O-atoms in  $H_2O$

**Answer: A::B::C**



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7.  $10^{21}$  molecules are removed from 440mg of  $CO_2$ . It becomes

A. 366mg

B. 8.3 milli mole

C. 200 mg

D. 4.1 milli mole

**Answer: A::B**



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## **PRACTICE SHEET EXERCISE-I (LEVEL-II (ADVANCED)) (LINKED COMPREHENSION TYPE QUESTIONS)**

1. In chemistry, .mole. is an essential tool for the chemical calculations. It is a basic S.I. unit adopted by the 14<sup>th</sup> general conference on weights and measurements in 1971. A mole contains as many elementary particles as the number of atoms present in 12 g of C. 1 mole of a gas at STP occupies 22.4 litre volume. Molar volume of solids and liquids is not definite. Molar mass of a substance is also called gram atomic mass or gram molar mass.

The virtual meaning of mole is plenty, heap or the collection of large numbers. 1 mole of a substance contains  $6.023 \times 10^{23}$  elementary particles like atom or molecule. Atomic mass unit (amu) is the unit of atomic mass, e.g., atomic mass of single carbon is 12 amu.

The mass of one molecule of water is approximately

A. 1 g

B. 0.5 g

C.  $1.66 \times 10^{-24}g$

D.  $3 \times 10^{-23}g$

**Answer: D**



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**2.** In chemistry, .mole. is an essential tool for the chemical calculations. It is a basic S.I. unit adopted by the 14<sup>th</sup> general conference on weights and measurements in 1971. A mole contains as many elementary particles as the number of atoms present in 12 g of C. 1 mole of a gas at STP occupies

22.4 litre volume. Molar volume of solids and liquids is not definite. Molar mass of a substance is also called gram atomic mass or gram molar mass. The virtual meaning of mole is plenty, heap or the collection of large numbers. 1 mole of a substance contains  $6.023 \times 10^{23}$  elementary particles like atom or molecule. Atomic mass unit (amu) is the unit of atomic mass, e.g., atomic mass of single carbon is 12 amu.

How many atoms are present in 49 g of  $H_2SO_4$ ?

A.  $7 \times 6.023 \times 10^{23}$

B.  $5 \times 6.023 \times 10^{23}$

C.  $6 \times 6.012 \times 10^{23}$

D.  $7 \times 3.02 \times 10^{23}$

**Answer: D**



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**3.** In chemistry, .mole. is an essential tool for the chemical calculations. It is a basic S.I. unit adopted by the 14<sup>th</sup> general conference on weights and

measurements in 1971. A mole contains as many elementary particles as the number of atoms present in 12 g of C. 1 mole of a gas at STP occupies 22.4 litre volume. Molar volume of solids and liquids is not definite. Molar mass of a substance is also called gram atomic mass or gram molar mass. The virtual meaning of mole is plenty, heap or the collection of large numbers. 1 mole of a substance contains  $6.023 \times 10^{23}$  elementary particles like atom or molecule. Atomic mass unit (amu) is the unit of atomic mass, e.g., atomic mass of single carbon is 12 amu.

$x \text{ L N}_2$  gas at STP contains  $3 \times 10^{22}$  molecules. The number of molecules in  $x \text{ L}$  ozone at STP will be

A.  $3 \times 10^{22}$

B.  $4 \times 10^{23}$

C.  $6.02 \times 10^{23}$

D.  $3 \times 10^2$

**Answer: A**



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4. Avogadro's law states that under conditions of constant temp. and pressure equal volume of gases contain equal no. of particles. Experimental investigation shows that at one atmosphere pressure and a temperature of 273 K, one mole of any gas occupies a volume which is very close to 22.4 L. Therefore, the number of moles in any gas sample can be found by comparing its volume at STP with 22.4 L.

If Avogadro's number is  $6 \times 10^{23}$  molecules then the mass of one atom of oxygen would be

A.  $\frac{16}{6.02}$  amu

B.  $6 \times 10^{-23}$  amu

C. 16 amu

D.  $16 \times 6.02$  amu

**Answer: C**



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5. Avogadro's law states that under conditions of constant temp. and pressure equal volume of gases contain equal no. of particles. Experimental investigation shows that at one atmosphere pressure and a temperature of 273 K, one mole of any gas occupies a volume of which is very close to 22.4 L. Therefore, the number of moles in any gas sample can be found by comparing its volume at STP with 22.4 L.

At STP 40 L of  $\text{CO}_2$  contains

- A. 5.6 moles
- B. 1.786 mole
- C. 7.635 mole
- D. 1.934 mole

**Answer: B**



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6. Avogadro's law states that under conditions of constant temp. and pressure equal volume of gases contain equal no. of particles. Experimental investigation shows that at one atmosphere pressure and a temperature of 273 K, one mole of any gas occupies a volume of which is very close to 22.4 L. Therefore, the number of moles in any gas sample can be found by comparing its volume at STP with 22.4 L.

Number of gram atoms of oxygen present in 0.3 gram mole of  $H_2C_2O_4 \cdot 2H_2O$  is

A. 0.3

B. 0.6

C. 1.2

D. 1.8

**Answer: D**



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PRACTICE SHEET EXERCISE-I (LEVEL-II (ADVANCED)) (MATRIX MATCHING TYPE QUESTIONS)

Column-I

Column-II

- |                                   |                                    |
|-----------------------------------|------------------------------------|
| A) 1.2g of carbon                 | P) $4.8 \times 10^{23}$ atoms      |
| 1. B) 3g of $\text{CO}_2$         | Q) $9.034 \times 10^{23}$ atoms    |
| C) 11.2 L $\text{CO}_2$ at S.T.P. | Q) 0.1 moles                       |
| D) 0.2 moles $\text{NH}_3$        | S) $9.64 \times 10^{24}$ electrons |



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Column-I

Column-II

- |  |                    |
|--|--------------------|
| A) 16g of $\text{O}_2$                                 | P) 1gm atom of O   |
| 2. B) Gram molar volume of $\text{H}_2\text{O}$        | Q) 22.4 lit at STP |
| C) 18 g of $\text{H}_2\text{O}$                        | R) 18 ml           |
| D) $1/2$ mole $\text{O}_2 + 1$ gm atom of $\text{H}_2$ | S) 11.2 lit at STP |



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PRACTICE SHEET EXERCISE-I (LEVEL-II (ADVANCED)) (INTEGER TYPE QUESTIONS)

1. The weight of a gaseous mixture containing  $12.044 \times 10^{23}$  atoms of He and  $3.011 \times 10^{23}$  molecules of hydrogen is \_\_\_\_\_g.



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2. Number of moles of valency electrons present in  $6.022 \times 10^{23} \text{NH}_4^+$  ions is \_\_\_\_\_.



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3. The weight of methane which occupies the same volume at STP as 7.5 gm of ethane is \_\_\_\_\_g.



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## PRACTICE SHEET EXERCISE-II (LEVEL-I (MAIN))

1. The percentage of oxygen in  $\text{NaOH}$  is

A. 40

B. 6

C. 8

D. 20

**Answer: A**



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2. A peroxidase enzyme contains 2 % selenium (Se=80). The minimum molecular weight of the enzyme is

A. 1000

B. 2000

C. 4000

D. 800

**Answer: C**

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3. An alkaloid contains 17.28% of nitrogen and its molecular mass is 162.

The number of nitrogen atoms present in one molecule of the alkaloid is

- A. five
- B. four
- C. three
- D. two

**Answer: D**

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4. Manganese forms non-stoichiometric oxides having the general formula  $MnO_x$ . The value of x for the compound that analyzed 64% Mn.

(At wt Mn=55)

A. 1.16

B. 1.83

C. 2

D. 1.93

**Answer: D**



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5. In diammonium phosphate  $(\text{NH}_4)_2\text{HPO}_4$ , the percentage of  $\text{P}_2\text{O}_5$  is

A. 35.87

B. 46.44

C. 51.99

D. 53.78

**Answer: D**



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6. Assertion A: Empirical formula of glucose or that of acetic acid is  $CH_2O$

.

Reason(R): If percentage composition of elements is same, then empirical formula is same.

The correct answer is

- A. Both (A) and (R ) are true and (R ) is the correct explanation of (A)
- B. Both (A) and (R ) are true and (R ) is not the correct explanation of (A)
- C. (A) is true but (R ) is false
- D. (A) is false but (R ) is true

**Answer: A**



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7. Assertion: (A): Empirical formula of ethane is  $CH_3$

Reason (R): Empirical formula of all alkenes is  $CH_2$

The correct answer is

- A. Both (A) and (R ) are true and (R ) is the correct explanation of (A)
- B. Both (A) and (R ) are true and (R ) is not the correct explanation of (A)
- C. (A) is true but (R ) is false
- D. (A) is false but (R ) is true

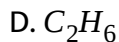
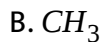
**Answer: B**



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8. A compound contains carbon and hydrogen in the mass ratio 3:1. The formula of the compound is

A.  $CH_2$



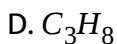
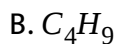
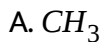
**Answer: C**



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9. four grams of hydrocarbon  $(C_xH_y)$  on complete combustion gave 12grams of  $CO_2$ . What is the empirical formula of the hydrocarbon ?

( $C = 12, H = 1$ )



**Answer: D**



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10. The following is not a fixed quantity

- A. atomic weight of an element
- B. equivalent weight of an element (or) compound
- C. molecular weight of a compound
- D. formula weight of a substance

**Answer: B**



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11. The equivalent weights of S in  $SCl_2$  and  $S_2Cl_2$  are in the ratio

- A. 1:2
- B. 2:1
- C. 1:1

D. 1:4

**Answer: A**



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12. Molecular weight of orthophosphoric acid is  $M$ . Its equivalent weight is

A.  $3M$

B.  $M$

C.  $\frac{M}{2}$

D.  $\frac{M}{3}$

**Answer: D**



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13. Molecular weight of Mohr's salt is 392. Its equivalent weight when it is oxidised by  $KMnO_4$  in acidic medium is

- A. 392
- B. 196
- C. 130.6
- D. 78.5

**Answer: A**



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14. The equivalent weight of Bayer's reagent is

- A. 31.6
- B. 52.6
- C. 79
- D. 158

**Answer: B**



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**15.** When Ferrous sulphate acts as reductant, its equivalent weight is

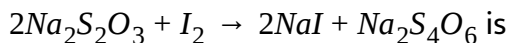
- A. twice that of its molecular weight
- B. equal to its molecular weight
- C. one-half of its molecular weight
- D. one-third of its molecular weight

**Answer: B**



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**16.** The equivalent weight of Hypo in the reaction [M = molecular weight]



A.  $M$

B.  $M/2$

C.  $M/3$

D.  $M/4$

**Answer: A**



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17.  $2H_2O \rightarrow 4e^- + O_2 + 4H^+$ . The equivalent weight of molecules oxygen is

A. 32

B. 16

C. 8

D. 4

**Answer: C**



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18. Assertion (A) : The basicity of orthophosphorus acid,  $H_3PO_3$  is 2.

Reason (R) : Three hydrogen atoms are attached to phosphorus through oxygen atoms in  $H_3PO_3$ .

- A. Both (A) and (R) are true and (R) is the correct explanation of (A)
- B. Both (A) and (R) are true and (R) is not the correct explanation of (A)
- C. (A) is true but (R) is false
- D. (A) is false but (R) is true

Answer: C



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Medium	Equivalent weight of $KMnO_4$
A) Acidic	a) 158
19. B) Neutral	b) 79
C) Strongly basic	c) 52.6
D) Weakly basic	d) 31.6

The correct match is

A. A - d, B - c, C - a, D - c

B. A - d, B - c, C - a, D - b

C. A - d, B - b, C - a, D - c

D. A - d, B - c, C - a, D - a

**Answer: A**



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## PRACTICE SHEET EXERCISE-II (LEVEL-II (ADVANCED))

1. 0.4g of a compound on complete combustion gave 56ml of  $CO_2$  at 760mm and  $0^\circ C$ . The percentage of carbon in the compound is

A. 50

B. 60

C. 27.5

D. 7.5

**Answer: D**



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2. 0.262 g of a substance gave, on combustion 0.361 g of  $CO_2$  and 0.147 g of  $H_2O$ . What is the empirical formula of the substance

A.  $CH_2O$

B.  $C_3H_6O$

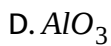
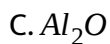
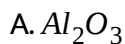
C.  $C_3H_6O_2$

D.  $C_2H_6O_2$

**Answer: A**

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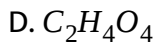
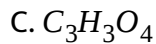
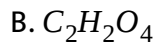
3. If 5.0 g of Al react with 4.45 g of  $O_2$ , empirical formula of aluminium oxide is



**Answer: A**

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4. A dibasic acid containing C,H and O was found to contain C=26.7% and H=2.2%. The vapour density of its dimethyl ester was found to be 73. The molecular formula of the acid is



**Answer: B**



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5. A bivalent metal has 37.2 equivalent weight. The molecular weight of its chloride is

A. 216.6

B. 148.8

C. 145.4

D. 172.8

**Answer: C**

PRACTICE SHEET EXERCISE-II (LEVEL-II (ADVANCED)) (MORE THAN ONE CORRECT ANSWER TYPE QUESTIONS)

1. One mole of  $N_2H_4$  loses 10 moles of electrons to form a new compound X . Assuming that all the nitrogen appears in the new compound , the oxidation state of nitrogen in X is (there is no change in the oxidation number of hydrogen)

A. -1

B. -3

C. +3

D. +5

Answer: C

2. The molar mass of a solute X in  $\text{g mol}^{-1}$ , if its 1% solution is isotonic with a 5% solution of cane sugar (molar mass =  $342\text{g mol}^{-1}$ ), is

- A. iron content in haemoglobin is 0.35% by mass
- B. 1 mole of haemoglobin contains 56 g iron
- C. 1 mole of haemoglobin contains 224 g iron
- D. if iron content is increased to 0.56%, molar mass of haemoglobin would be higher than  $65000\text{ g mol}^{-1}$

**Answer: A::C::D**



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3. Which of the following may show fixed equivalent weights?

- A. Mg
- B. Al
- C. Zn

D. Cu

Answer: A::B::C



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4. Equivalent weight of the reaction is same as its formula weight or molecular weight in case of the conversion \_\_\_\_\_

A.  $Na_2S_2O_3$  into  $Na_2S_4O_6$

B.  $FeSO_4$  into  $Fe_2(SO_4)_3$

C.  $KBr$  into  $Br_2$

D.  $Br_2$  into  $KBr$

Answer: A::B::C



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5.  $3\text{Cl}_2 + 6\text{NaOH} \rightarrow 5\text{NaCl} + \text{NaClO}_3 + 3\text{H}_2\text{O}$ , chlorine gets

A.  $\frac{5}{6}$ th  $\text{Cl}_2$  content undergoes reduction

B.  $\frac{1}{6}$ th  $\text{Cl}_2$  content undergoes reduction

C. The equivalent weight of chlorine molecule is 42.6

D. Equivalent weight of oxidised part of chlorine atom is 7.1

**Answer: A::C::D**



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6. Chloro acetic acid (molecular weight  $M$ ) is converted into  $\text{Cl}_2$  and  $\text{CO}_2$ .

Which statement is correct?

A. chlorine is reduced

B. carbon is oxidised

C. equivalent weight of chloroacetic acid is  $M/13$

D. chlorine is oxidised



Answer: B::C::D



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PRACTICE SHEET EXERCISE-II (LEVEL-II (ADVANCED)) (LINKED COMPREHENSION TYPE QUESTIONS)

1. Empirical formula is the simplest formula of the compound which gives the atomic ratio of various elements present in one molecule of the compound. However the molecular formula of the compound gives the number of atoms of various elements present in one molecule of the compound.  $\text{Molecular formula} = (\text{Empirical formula}) \times n$

Which pair of species have same percentage composition of carbon?

A. MO

B.  $MO_2$

C.  $M_2O_5$

D.  $M_2O_3$

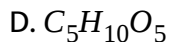
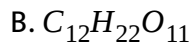
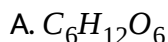
**Answer: D**



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2. Empirical formula is the simplest formula of the compound which gives the atomic ratio of various elements present in one molecule of the compound. However the molecular formula of the compound gives the number of atoms of various elements present in one molecule of the compound.  $\text{Molecular formula} = (\text{Empirical formula}) \times n$

Which pair of species have same percentage composition of carbon?



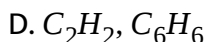
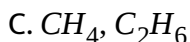
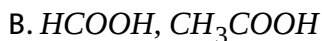
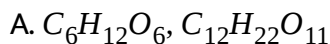
**Answer: B**



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3. Empirical formula is the simplest formula of the compound which gives the atomic ratio of various elements present in one molecule of the compound. However the molecular formula of the compound gives the number of atoms of various elements present in one molecule of the compound.  $\text{Molecular formula} = (\text{Empirical formula}) \times n$

Which pair of species have same percentage composition of carbon?



**Answer: D**



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Column-I    Column-II

A)  $NH_3$     P)  $EF = MF$

1. B)  $N_2H_4$     Q)  $MF = (EF)_2$

C)  $N_3H$     R) Maximum percentage of nitrogen by mass

D)  $C_2N_2$     S) Least percentage of nitrogen by mass



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2. Match the underlined substance in the reactions listed in column-I with their equivalent masses listed in column-II (M = molecular mass of the substance in question)

Column-I

A)  $\underline{FeC_2O_4} + Cr_2O_7^{2-} + H^+ \longrightarrow \text{Products}$

B)  $\underline{Fe_3O_4} + MnO_4^- + H^+ \longrightarrow \text{Products}$

C)  $KHC_2O_4 + MnO_4^- + H^+ \longrightarrow \text{Products}$

D)  $H_2O_2 + \underline{Cr_2O_7^{2-}} + H^+ \longrightarrow \text{Products}$

Column-II

P)  $\frac{M}{6}$

Q)  $\frac{M}{2}$

R) M

S)  $\frac{M}{3}$



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1. An enzyme contains 2% of sulphur. The molecular weight of the Enzyme is 6400. How many sulphur atoms are present in that enzyme molecule?



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2. 0.1 moles of Hydrocarbon on complete combustion produced 17.6 gms of  $\text{CO}_2$ . How many Carbon atoms are present in each molecule of the hydrocarbon.



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3. Euivalent weights of two oxides of an element are 14 and 11 respectively. What is the ratio of atomicity of oxygen in the second oxide to first oxide?



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4. Ionisable H atom in  $H_3PO_3$  is x and in  $H_3PO_2$  is y. Then ratio of x,y is



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5. In the reaction

$NaOH + Al(OH)_3 \rightarrow NaAlO_2 + H_2O$ , the  $\frac{M.wt}{Eq.wt}$  of  $Al(OH)_3$  is \_\_\_\_\_

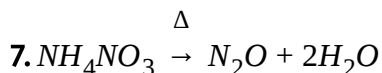


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6. Methane is converted into formaldehyde. What is the ratio of molecular weight to equivalent weight of Methane?



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How many gram equivalents are present in one mole of Ammonium

nitrate?



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### PRACTICE SHEET EXERCISE-III (LEVEL-I (MAIN))

1. In the formation of  $Al_2O_3$  from  $Al$  and  $O_2$ , if 1.5 mole of oxygen is used up, the mass of aluminium that reacted is

A. 27g

B. 54g

C. 108g

D. 81g

**Answer: B**



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2. 2.76 g of silver carbonate on strong ignition leaves a residue weighing

A. 2.48g

B. 2.16g

C. 2.32g

D. 2.84g

**Answer: B**



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3. x grams of calcium carbonate was completely burnt in air. The weight of the solid residue formed is 28 g. What is the value of x (in grams)?

A. 44

B. 200

C. 150

D. 50



**Answer: D**



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4. The weight of a pure sample of  $KClO_3$  to be decomposed in order to get 0.96g of  $O_2$  is

A. 2.45g

B. 1.225g

C. 9.90g

D. none

**Answer: A**



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5. The amount of Mg in gms. to be dissolved in dilute  $H_2SO_4$  to liberate  $H_2$  which is just sufficient to reduce 160g of ferric oxide is

A. 24

B. 48

C. 72

D. 96

**Answer: C**



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6. 0.2 mole of an alkane on complete combustion gave 26.4g of  $\text{CO}_2$ . The molecular weight of alkane is

A. 16

B. 30

C. 44

D. 58

**Answer: C**

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7. Benzene burns in oxygen according to the equation  $2C_6H_{6(l)} + 15O_{2(g)} \rightarrow 12CO_{2(g)} + 6H_2O_{(l)}$ . How many litres of oxygen are required at STP for the complete combustion of 39g of liquid benzene?

A. 11.2

B. 22.4

C. 42

D. 84

**Answer: D**

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8. The volume of  $CO_2$  obtained by the complete decomposition of one mole of  $NaHCO_3$  at STP is

A. 22.4L

B. 11.2L

C. 44.8L

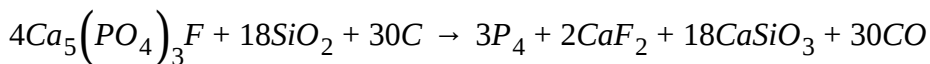
D. 4.48L

**Answer: B**



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9. How many moles of  $P_4$  can be produced by reaction of 0.1 mole  $Ca_5(PO_4)_3F$ , 0.36 mole  $SiO_2$  and 0.90 mole C according to the following reaction?



A. 0.060

B. 0.030

C. 0.045

D. 0.075

**Answer: A**



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**10.** 1g of Mg is burnt in a vessel containing 0.5 g of oxygen. The remaining unreacted is

A. 0.25g of Mg

B. 0.1g of Mg

C. 0.1g of  $O_2$

D. 0.75g of Mg

**Answer: A**



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**11.** If 0.5 mol of  $BaCl_2$  is mixed with 0.2 mol of  $Na_3PO_4$  the maximum number of moles of  $Ba_3(PO_4)_2$  that can be formed is

A. 0.7

B. 0.5

C. 0.30

D. 0.10

**Answer: D**



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**12.** 10ml of a gaseous hydrocarbon on combustion gives 40ml of  $CO_2$  and 50ml of  $H_2O$  vapour under the same conditions. The hydrocarbon is

A.  $C_4H_6$

B.  $C_6H_{10}$

C.  $C_4H_8$

D.  $C_4H_{10}$

**Answer: D**

### PRACTICE SHEET EXERCISE-III (LEVEL-II (ADVANCED))

1. An electric discharge is passed through a mixture containing 50cc of  $O_2$  and 50cc of  $H_2$ . The volume of the gases formed at  $110^\circ C$  will be

- A. 50cc
- B. 75cc
- C. 25cc
- D. 100cc

**Answer: B**

2. When 20 ml of methane and 20 ml of oxygen are exploded together and the reaction mixture is cooled to laboratory temperature. The

resulting volume of the mixture is

A. 40 ml

B. 20 ml

C. 30 ml

D. 10 ml

**Answer: B**



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3. The volume of  $CO_2$  that can be obtained at STP from 60 g. of 70% pure  $MgCO_3$  is

A. 16L

B. 11.2L

C. 1.12L

D. 5.6L



**Answer: B**



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4. Sodium carbonate of 92% purity is used in the reaction  $Na_2CO_3 + CaCl_2 \rightarrow CaCO_3 + 2NaCl$ . The number of grams of  $Na_2CO_3$  required to yield 1 gm of  $CaCO_3$

A. 8.5g

B. 10.5g

C. 11.52g

D. 1.152g

**Answer: D**



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5. 7 g of a sample of sodium chloride on treatment with excess of silver nitrate gave 14.35 g of AgCl. The percentage of NaCl in the sample is

- A. 80
- B. 50
- C. 65.8
- D. 83.5

**Answer: D**



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6. A gaseous mixture of propane and butane of volume 3 litre on complete combustion produces 11 lit  $CO_2$  under standard condition of temp. and pressure. Find the ratio of volume of butane to propane.

- A. 1:2
- B. 2:1

C. 3:2

D. 3:1

**Answer: B**



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7. 0.8 mole of a mixture of CO and  $CO_2$  requires exactly 40 g of NaOH in solution for complete conversion of all the  $CO_2$  into  $Na_2CO_3$ . How many more moles of NaOH would it require for conversion into  $Na_2CO_3$ . If the mixture is completely oxidised to  $CO_2$ ?

A. 0.2

B. 0.6

C. 1

D. 1.5

**Answer: B**



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8. A gas mixture contains acetylene and carbondioxide. 20 lit of this mixture requires 20 lit of oxygen under the same conditions for complete combustion. The percentage by volume of acetylene in the mixture is

A. 50 %

B. 40 %

C. 60 %

D. 75 %

**Answer: B**

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9. 200ml of pure oxygen is subjected to electric discharge, 15% of oxygen is converted into ozone. The volume of ozonized oxygen is

A. 20ml

B. 30ml

C. 190ml

D. 80ml

**Answer: C**



**Watch Video Solution**

**PRACTICE SHEET EXERCISE-III (LEVEL-II (ADVANCED)) (MORE THAN ONE CORRECT ANSWER TYPE QUESTIONS)**

**1. One mole of calcium phosphide on reaction with excess of water gives**

A. one mole of  $PH_3$

B. moles of  $Ca(OH)_2$

C. 2 moles of  $PH_3$

D. 3 moles of CaO

**Answer: B::C**



**Watch Video Solution**

**2.** 1 mole  $Ba(OH)_2$  will exactly neutralize

A. 0.5 mole HCl

B. 1 mole  $H_2SO_4$

C. 1 mole of  $H_3PO_3$

D. 2 mole of  $H_3PO_2$

**Answer: B::C::D**



**Watch Video Solution**

**3.** Combustion of 2.24 lts ethane at STP requires

A. 7.84 lts of  $O_2$

B. 0.35 moles of  $O_2$

C. 11.2 gms of  $O_2$

D. 5.6 lts of  $O_2$  at STP

**Answer: A::B::C**



**Watch Video Solution**

4.  $10\text{ml } N_2$  is reacted with  $20\text{ ml } H_2$  to form  $NH_3$ . The correct statements is /are

A.  $13.3\text{ ml } NH_3$  is formed

B.  $20\text{ ml } NH_3$  is formed

C.  $3.4\text{ ml } N_2$  is left after the completion of the reaction

D.  $16.7\text{ ml } NH_3$  of mixture is left after the completion of the reaction

**Answer: A::C::D**



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PRACTICE SHEET EXERCISE-III (LEVEL-II (ADVANCED)) (LINKED COMPREHENSION TYPE QUESTIONS)

1. A gaseous hydrocarbon consumed 5 times its volume of oxygen as for combustion. The volume of  $CO_2$  produced in the reaction is thrice the volume of hydrocarbon under the same conditions

How many grams of water is produced by combustion of 0.1 mol of the given hydrocarbon?

- A. 7.2 gm
- B. 3.6 gm
- C. 14.4 gm
- D. 1.8 gm

**Answer: A**



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2. A gaseous hydrocarbon consumed 5 times its volume of oxygen as for combustion. The volume of  $\text{CO}_2$  produced in the reaction is thrice the volume of hydrocarbon under the same conditions

What is the ratio of molecular weight to empirical formula weight of the hydrocarbon?

A. 1

B. 2

C. 3

D. 4

**Answer: A**



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**PRACTICE SHEET EXERCISE-III (LEVEL-II (ADVANCED)) (MATRIX MATCHING TYPE QUESTIONS)**

Column-I

Column-II

A) 1 mole NaOH

P) 0.5 mole  $H_2SO_4$

1. B) 0.5 mole  $Ca(OH)_2$  Q) 1 mole HCl

C) 2 moles  $KMnO_2$

R) 16 moles Mohr.s salt solution

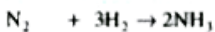
D) 1 mole  $K_2Cr_2O_7$

S) 5 moles oxalic acid solution

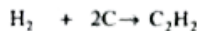


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Column-I (Reaction)



A) 0.1 mol 0.1 mol



B) 1g 1g



C) 1g (22.4L at NTP)



D) 1g 1g

Column-II (Product formed)

P)  $4.16 \times 10^{-2}$  mol

Q)  $8.33 \times 10^{-2}$  mol

R)  $6.25 \times 10^{-2}$  mol

S)  $6.67 \times 10^{-2}$  mol

2.



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PRACTICE SHEET EXERCISE-III (LEVEL-II (ADVANCED)) (INTEGER TYPE QUESTIONS)

1. One mole of an alkane on Combustion produced four moles of  $H_2O$ .

How many moles of  $CO_2$  is produced in this reaction?



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2. A gaseous paraffin requires five times its volume of oxygen for complete combustion. How many carbon atoms are present in a molecule of that paraffin?



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3. In the preparation of Iron from haematite ( $Fe_2O_3$ ) by the reaction with carbon  $Fe_2O_3 + C \rightarrow Fe + CO_2$  94.5 kg of 10x% pure Iron could be produced from 120 kg of 90% pure  $Fe_2O_3$ ? Find the value of x.



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1. The aqueous solution of glucose is 10% w/w of solution, the percentage of w/w of solvent is

A. 18 litres

B. 9 litres

C. 0.9 litres

D. 1.8 litres

**Answer: D**



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2. 0.115 gm of sodium metal was dissolved in 500 ml of the solution in distilled water. The normality of the solution would be

A. 0.010N

B. 0.0115N

C.  $0.023N$

D.  $0.046N$

**Answer: A**



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3. 1 kg of 2m urea solution is mixed with 2 kg of 4m urea solution. The molality of the resulting solution is

A.  $3.33m$

B.  $10m$

C.  $1.67m$

D.  $5m$

**Answer: A**



**Watch Video Solution**

4. 25.5 g of  $H_2O_2$  solution on decomposition gave 1.68 L of  $O_2$  at STP. The percentage strength by weight of the solution is

A. 30

B. 10

C. 20

D. 25

**Answer: C**



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#### **PRACTICE SHEET EXERCISE-IV (LEVEL-II (ADVANCED))**

1. How many grams of 40% pure sodium hydroxide is dissolved in 0.5 M, 250 ml NaOH solution?

A. 5 gm

B. 2 gm

C. 12.5 gm

D. 4 gm

**Answer: C**



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2. Mole fraction of solute in an aqueous solution of NaOH is 0.1. If the specific gravity of the solution is 1.4, the normality of the solution is

A. 6.9

B. 0.1

C. 71.4

D. 0.14

**Answer: A**



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3. Molefraction of  $I_2$  in  $C_6H_6$  is 0.2. The molality of  $I_2$  in  $C_6H_6$  is

A. 3.205m

B. 9.615m

C. 6.41m

D. 1.062m

**Answer: A**



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4. 5.3 g of  $Na_2CO_3$  taken in a 250 ml flask and water added upto the mark.

10ml of that solution was taken in a 50 ml flask water added upto the mark. Find molarity of that dilute solution.

A. 0.1 M

B. 0.02 M



C. 0.04 M

D. none

**Answer: C**



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**PRACTICE SHEET EXERCISE-IV (LEVEL-II (ADVANCED)) (MORE THAN ONE CORRECT ANSWER TYPE QUESTIONS)**

1. 10% W/V NaOH is same as

A. 2.5 M

B. 2.5 N

C. 1.5 m

D. 10% W/W NaOH

**Answer: A::B::C**



**Watch Video Solution**

2. 17.1 gms of  $Al_2(SO_4)_3$  is present in 500 ml of aqueous solution. Its concentration can be

A. 0.1 M

B. 0.6 N

C. 1 N

D. 0.5 M

Answer: A::B::C



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3. 100 ml solution contains 12 mg  $MgSO_4$ . The concentration of solution is

A.  $10^{-3}M$

B.  $2 \times 10^{-3}N$

C. 120 ppm

D.  $10^{-3}m$

**Answer: A::B::C::D**



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**PRACTICE SHEET EXERCISE-IV (LEVEL-II (ADVANCED)) (LINKED COMPREHENSION TYPE QUESTIONS)**

1. 1.00 gm of a mixture having equal number of moles of carbonates of two alkali metals required 44.4 ml of 0.5 N HCl for complete reaction.

Atomic weight of one of the metals is 7.00

The number of moles of each metal carbonate in

A. 0.222

B. 2.22

C. 22.2

D. 0.0222

**Answer: d**



**Watch Video Solution**

2. 1.00 gm of a mixture having equal number of moles of carbonates of two alkali metals required 44.4 ml of 0.5 N HCl for complete reaction.

Atomic weight of one of the metals is 7.00

The number of moles of each metal carbonate in

A. 0.1

B. 0.0111

C. 0.0055

D. 0.00275

**Answer: c**



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3. 1.00 gm of a mixture having equal number of moles of carbonates of two alkali metals required 44.4 ml of 0.5 N HCl for complete reaction.

Atomic weight of one of the metals is 7.00

The number of moles of each metal carbonate in

- A. 74 and 60
- B. 134 and 160
- C. 160 and 60
- D. 74 and 106

**Answer: d**



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**PRACTICE SHEET EXERCISE-IV (LEVEL-II (ADVANCED)) (INTEGER TYPE QUESTIONS)**

1. What is the normality of sulphate ions in 1M  $Al_2(SO_4)_3$  solution?



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2. 100 ml, 1.5M  $Fe(NO_3)_3$ , 100 ml, 2M  $FeCl_3$ , 100 ml 2M  $Mg(NO_3)_2$  are mixed and 700 ml water is added. The molar concentration of total ions in the solution in \_\_\_\_M



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3. How many moles of  $H_2O_2$  must be present in 2L of its solution, such that 100 ml of the solution can liberate 3.2 grams of oxygen at  $273^\circ C$  and 0.5 atm pressure?



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4. An aqueous sodium hydroxide solution contains, 80ppm NaOH. If one ml of the solution is mixed with 99 ml water, the molarity of the resultant solution is  $x \times 10^{-5}$  what is x? (assume  $d=gm/cc$ )



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## PRACTICE SHEET EXERCISE-V (LEVEL-I (MAIN))

1. The weight of oxalic acid required to reduce 80 ml of 0.4 M  $KMnO_4$  in acidic medium is

A. 10.08g

B. 7.21g

C. 16.28g

D. 12.4g

**Answer: A**

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2. What volume of 0.01M  $K_2Cr_2O_7$  would be required to oxidize Fe(II) in 50 ml of 0.03 M solution of ferrous ammonium sulphate in acidic medium?

A. 150 ml

B. 75 ml

C. 50 ml

D. 25 ml

**Answer: D**



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3. How much volume of 0.185 N -  $KMnO_4$  solution would be needed for complete reaction with 25 ml of 0.212 N -  $KNO_2$  in acidic medium?

A. 57.29ml

B. 11.46ml

C. 28.65ml

D. 22.92ml

**Answer: C**



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4. The maximum amount of  $BaSO_4$  precipitated on mixing equal volumes of  $BaCl_2$  (0.5 M) with  $H_2SO_4$  (1 M) will correspond to

A. 0.5N

B. 1.0N

C. 1.5N

D. 2.0M

**Answer: A**

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5. 500 ml of a 0.1 N solution of  $AgNO_3$  added to 500 ml of 0.1 N solution of KCl. The concentration of nitrate ion in the resulting mixture is

A. 0.05N

B.  $0.1N$

C.  $0.2N$

D. reduced to zero

**Answer: A**



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**6. Phenolphthalein is not a good indicator for titrating**

A. NaOH against oxalic acid

B. NaOH against HCl

C. Ferrous sulphate against  $KMnO_4$

D. NaOH against  $H_2SO_4$

**Answer: C**



**Watch Video Solution**

1. What volume at STP of gaseous ammonia will be required to be passed into 100 ml of  $0.5M H_2SO_4$  to bring down its strength to 0.25 M?

A. 1.560L

B. 1.120L

C. 1.680L

D. 2.240L

**Answer: B**



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2. 0.70 g of a sample of  $Na_2CO_3 \cdot xH_2O$  were dissolved in water and the volume was made to 100 ml. 20 ml of this solution required 19.8 ml of (N/10) HCl for complete neutralisation. The value of x is

A. 2

B. 1

C. 4

D. 10

**Answer: A**



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3. 10 g sample of  $H_2O_2$  just decolorised 100 ml of 0.1 M  $KMnO_4$  in acidic medium % by mass of  $H_2O_2$  in the sample is

A. 3.40

B. 8.5

C. 17.0

D. 1.70

**Answer: B**



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4. To a 25 ml  $H_2O_2$  solution, excess of acidified solution of potassium iodide was added. The iodine liberated required 20 ml of 0.3 N sodium thiosulphate solution. The volume strength of  $H_2O_2$  solution is

A. 1.344

B. 0.672

C. 2.688

D. 0.896

**Answer: A**



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5. X gm of  $KHC_2O_4$  requires 100 ml of 0.02M  $KMnO_4$  in acidic medium. In another experiment, y gm of  $KHC_2O_4$  requires 100 mkl of 0.05 M  $Ca(OH)_2$ . The ratio of x and y is

A. 1:1

B. 1:2

C. 2:1

D. 5:4

**Answer: B**



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6. A mixture of  $K_2C_2O_4$  and  $KHC_2O_4$  required equal volumes of  $0.1M K_2Cr_2O_7$  for oxidation and  $0.1\text{ M NOH}$  for neutralisation is separate titrations. The molar ratio of  $K_2CrO_4$  and  $KHC_2O_4$  in the mixture is

A. 1:1

B. 2:1

C. 1:2

D. 3:1

**Answer: B**



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7. A mixture containing 0.05 mol of  $K_2Cr_2O_7$  and 0.02 mol of  $KMnO_4$  was treated with excess of KI in acidic medium. The liberated iodine required 2.0 L of  $Na_2SO_3$  solution of titration. Concentration of  $Na_2S_2O_3$  solution was

A.  $0.125 \text{ mol L}^{-1}$

B.  $0.20 \text{ mol L}^{-1}$

C.  $0.25 \text{ mol L}^{-1}$

D.  $0.30 \text{ mol L}^{-1}$

**Answer: B**



**Watch Video Solution**

8. 20 mL of  $x$  M HCl neutralises 5 mL of 0.2 M  $\text{Na}_2\text{CO}_3$  solution to phenolphthalein end-point. The value of  $x$  is

A.  $0.167M$

B.  $0.133M$

C.  $0.150M$

D.  $0.05M$

**Answer: D**



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9. A 100 ml mixture of  $\text{Na}_2\text{CO}_3$  and  $\text{NaHCO}_3$  is titrated against 1 M HCl. If  $v_1L$  and  $v_2L$  are consumed when phenolphthalein and methyl orange are used as indicators respectively in two separate titrations, which of the following is true for molarities in the original solution.

A. molarity of  $\text{Na}_2\text{CO}_3 = 20v_1$



B. molarity of  $\text{NaHCO}_3 = 10(v_2 - 2v_1)$

C. molarity of  $\text{Na}_2\text{CO}_3 = 10(v_2 + v_1)$

D. molarity of  $\text{NaHCO}_3 = 10(v_2 - v_1)$

**Answer: B**



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**PRACTICE SHEET EXERCISE-V (LEVEL-II (ADVANCED)) (MORE THAN ONE CORRECT ANSWER TYPE QUESTIONS)**

1.  $\text{H}_2\text{C}_2\text{O}_4 \cdot 2\text{H}_2\text{O}$  (Mol wt =126) can be oxidised into  $\text{CO}_2$  by acidified  $\text{KMnO}_4$ . 6.3 gms of oxalic acid can not be oxidised

A. 3.16 gms of  $\text{KMnO}_4$

B. 200 ml of 0.1M  $\text{KMnO}_4$

C. 0.1 mole of  $\text{KMnO}_4$

D. 0.02 moles of  $\text{KMnO}_4$

**Answer: A::B::D**



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2. A solution of  $Na_2S_2O_3$  is standardized iodometrically against 0.1262 g of  $KBrO_3$ . This process required 45 mL of the  $Na_2S_2O_3$  solution. What is the strength of the  $Na_2S_2O_3$ ? (K = 39, Br = 80)

A. 0.2M

B. 0.1M

C. 0.05M

D. 0.1N

**Answer: B**



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3.  $x$  millimole of  $KIO_3$  react completely with  $y$  millimole of  $KI$  to give  $I_2$  quantitatively. It  $z$  millimole of hypo are required for complete titration against the  $I_2$  product, then

A.  $z = 6x$

B.  $6y = 5z$

C.  $5x = y$

D.  $x + y = 2z$

Answer: A::B::C



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4.  $H_2C_2O_4$  and  $KHC_2O_4$  behave both as acids and reductants. Amongst the following, the true statement(s) is/are

A. Equal volumes of 1 M solution of each is oxidised by equal volumes of 1 M  $KMnO_4$

- B. Their equivalent masses are equal to respective molecular masses when behaving as reducing agents
- C. V ml of 1 M solution of each is neutralized by equal volumes of 1 M NaOH
- D. V ml of 1 N solution of each (as an acid) is neutralized by equal volumes of 1 M  $\text{Ca}(\text{OH})_2$ .

**Answer: A::D**



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**PRACTICE SHEET EXERCISE-V (LEVEL-II (ADVANCED)) (LINKED COMPREHENSION TYPE QUESTIONS)**

1. 50 ml of given  $\text{H}_2\text{O}_2$  solution is added to excess KI solution in acidic medium. The liberated  $\text{I}_2$  requires 20 ml of 0.04 M standard Hypo solution.

Molarity of  $\text{H}_2\text{O}_2$  solution is

A.  $8 \times 10^{-3}M$

B.  $4 \times 10^{-3}M$

C.  $5 \times 10^{-3}M$

D. None of these

**Answer: A**



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2. 50 ml of given  $H_2O_2$  solution is added to excess KI solution in acidic medium. The liberated  $I_2$  requires 20 ml of 0.04 M standard Hypo solution.

Weight of  $H_2O_2$  present in 250 ml of given solution is

A.  $0.034g$

B.  $0.068g$

C.  $0.136g$

D. none

**Answer: B**



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3. There are two types of iodine titrations (a) Iodometric & (b) Iodimetric, Iodometric method is indirect method of  $I_2$  estimation. Any oxidant which liberates  $I_2$  from KI solution, the liberated iodine is estimated by titrating it with  $Na_2S_2O_3$  solution as :  $I_2 + 2Na_2S_2O_3 \rightarrow 2NaI + Na_2S_4O_6$

100 mL of  $x$  M  $K_2Cr_2O_7$  solution is added to excess of KI solution in acidic medium. The liberated iodine required 50 mL of 0.1N  $Na_2S_2O_3$  solution. The value of  $x$  is

- A. 1/10 M
- B. 1/20 M
- C. 1/12 M
- D. 1/120 M

**Answer: D**



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4. There are two types of iodine titrations (a) Iodometric & (b) Iodimetric, Iodometric method is indirect method of  $I_2$  estimation. Any oxidant which liberates  $I_2$  from KI solution, the liberated iodine is estimated by titrating it with  $Na_2S_2O_3$  solution as :  $I_2 + 2Na_2S_2O_3 \rightarrow 2NaI + Na_2S_4O_6$

100 mL of  $x$ . M  $K_2Cr_2O_7$  solution is added to excess of KI solution in acidic medium. The liberated iodine required 50 mL of 0.1N  $Na_2S_2O_3$  solution. The value of  $x$  is

A. 21.58 %

B. 41.58 %

C. 51.58 %

D. 61.58 %

**Answer: B**

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## PRACTICE SHEET EXERCISE-V (LEVEL-II (ADVANCED)) (MATRIX MATCHING TYPE QUESTIONS)

### Column-I

- A) 1.72 g impure  $\text{FeSO}_4$  consumed 20 mL of 0.1M acidic  $\text{KMnO}_4$   
B) 8.4 gm impure  $\text{H}_2\text{C}_2\text{O}_4 \cdot 2\text{H}_2\text{O}$  consumed 0.1mole  $\text{NaOH}$   
C) 9.84g  $\text{FeSO}_4(\text{NH}_4)_2\text{SO}_4 \cdot 6\text{H}_2\text{O}$  impure sample reduced 0.02 equivalent  $\text{K}_2\text{Cr}_2\text{O}_7$  acidic solution  
D) 16.8 volume of 625ml of  $\text{H}_2\text{O}_2$  reduced 75 gm impure  $\text{KMnO}_4$  in acidic medium.

### Column-II

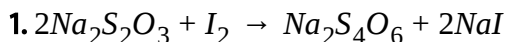
- P) 75% pure sample  
Q) 79.67% pure sample  
R) 79.1% pure sample  
S) 88.37% pure sample

1.



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## PRACTICE SHEET EXERCISE-V (LEVEL-II (ADVANCED)) (INTEGER TYPE QUESTIONS)



How many equivalents of Hypo is oxidised by one mole of Iodine?



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2. How many moles of  $\text{H}_2\text{SO}_4$  can be reduced to  $\text{SO}_2$  by 2 moles of Aluminium?





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3. One litre each of  $1MAl_2(SO_4)_3$  and  $1MBaCl_2$  are mixed. What is the molarity of sulphate ions in the resultant solution?



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4. 100 mL of  $0.01 MXO_4^-$  is reduced to  $X^{n+}$  by 100 mL of  $0.05 M Fe^{2+}$  in acidic medium. Thus oxidation state of X in  $X^{n+}$  is \_\_\_\_\_



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5. 5.4 grams of a metal is able to produce 0.6 grams of  $H_2$  gas with acid action. What is the equivalent weight of that metal?



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6. 0.4 gm of polybasic acid  $H_nA$  (M.wt = 96) requires 0.5 gm NaOH for complete neutralisation. The number of replacable hydrogen atoms are (all the hydrogens are acidic)



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7. The volume of 0.1 M NaOH will be required to neutralise 100 ml of 0.1 ml  $H_3PO_4$  using methyl red indicator to change the colour from pink (acidic medium) to yellow (basic medium) is  $10^x$ . What is x?



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### ADDITIONAL PRACTICE EXERCISE (LEVEL-I (MAIN))

1. A 2 lit solution contains 0.04 mol of each of  $[CO(NH_3)_5SO_4]Br$  and  $[CO(NH_3)_5Br]SO_4$ . To 1 lit of this solution, excess of  $AgNO_3$  is added. To

the remaining solution of excess of  $BaCl_2$  is added. The amounts of precipitated salts, respectively, are

- A. 0.01 mol & 0.01 mol
- B. 0.01 mol & 0.02 mol
- C. 0.02 mol & 0.01 mol
- D. 0.02 mol & 0.02 mol

**Answer: D**



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2. Dissolving 120 gm of urea in 100 gm of water gave a solution of density  $1.15 \text{ g ml}^{-1}$ . The molarity of the solution is

- A.  $1.78M$
- B.  $2.50M$
- C.  $2.05M$

D. 2.22M

**Answer: C**



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3. To neutralize completely 20 ml of 0.1 M aqueous solution of phosphorus acid, the volume of 0.1 molal aqueous KOH solution required is

A. 10 ml

B. 60 ml

C. 40 ml

D. 20 ml

**Answer: C**



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4. If we consider that  $\frac{1}{6}$  in place of  $\frac{1}{2}$  men of caron is taken is taken to be the relation atomic mass orbit, the mass of the mole of substance will

- A. Decrease twice
- B. Increase two fold
- C. remain unchanged
- D. be a function of the molecular mass of the substance

**Answer: C**



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5. Density of a 2.05 M solution of acetic acid in water is  $1.02 \text{ gm ml}^{-1}$ . The molality of the solution is

- A.  $1.14 \text{ mol kg}^{-1}$
- B.  $3.28 \text{ mol kg}^{-1}$
- C.  $2.28 \text{ mol kg}^{-1}$

D.  $0.44 \text{ mol kg}^{-1}$

**Answer: C**



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6.  $\text{HgO}$  is analysed by reaction with iodide and then titrating with an acid.

The equivalent mass of  $\text{HgO}$  is  $\text{H}_2\text{O} + \text{HgO} + 4\text{I}^- \rightarrow \text{HgI}_4^{-2} + 2\text{OH}^-$

A.  $M$

B.  $M/2$

C.  $M/4$

D.  $M/3$

**Answer: B**



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7. Which question represents charge because equation for the solution of  $H_2S$  in water?

A.  $2[H^+] = [S^{-2}] + [HS^-] + [OH^-]$

B.  $[H^+] = [OH^-]$

C.  $[H^+] = [S^{-2}] + [HS^-] + [H^+]$

D.  $[H^+] = [S^{-2}] + [HS^-] + [OH^-]$

**Answer: A**



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8. The ionic strength of solution containing 0.5 M  $MgSO_4$ , 0.1 M  $AlCl_3$  and 0.2  $(NH_4)_2SO_4$  is

A. 0.75

B. 1.85

C. 2

D. 1.50

**Answer: C**



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9. The percentage of  $CH_2O$  in  $CuSO_4 \cdot 5H_2O$  is

A. zero

B. about 28.7

C. about 50

D. about 40

**Answer: B**



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10. 112% labelled oleum is diluted with sufficient water. The solution on mixing with  $5.3 \times 10^2 \text{ gm Na}_2\text{CO}_3$  liberates  $\text{CO}_2$ . The volume of  $\text{CO}_2$  given out at 1 atm at 273 K will be

- A. 1.12 lit
- B. 1.23 lit
- C. 2.2 lit
- D. 25.5 lit

**Answer: D**



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11. The number of significant figures in each of these given numbers respectively are

(i) 506.20 (ii) 0.003402

- A. 4, 5

B. 4,4

C. 5, 4

D. 5, 6

**Answer: C**



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**12.** Number of atoms of iron present in 100 gm  $Fe_2O_3$  having 20% purity is

A.  $0.2N_A$

B.  $0.25N_A$

C.  $0.5N_A$

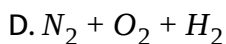
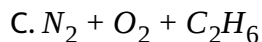
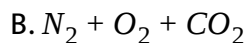
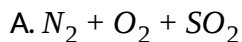
D.  $0.3N_A$

**Answer: B**



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13. Which mixture is lighter than humid air?



**Answer: D**



**View Text Solution**

### ADDITIONAL PRACTICE EXERCISE LEVEL-II (LECTURE SHEET (ADVANCED))

1. A solid element has specific heat  $1 \text{ J g}^{-1} \text{ K}^{-1}$ . If the equivalent weight of the element is 9. Identify the valency and atomic weight of element.

A. 2, 6

B. 3, 27

C. 9, 28

D. 6, 27

**Answer: B**



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2. 12.8 gm of an organic compound containing  $C_1H_1O$  and undergoes combustion to produce 25.56 gm  $CO_2$  and 10.46 gm of  $H_2O$ . What is the empirical formula of compound.

A.  $CH_2O_2$

B.  $CH_2O$

C.  $C_2H_4O$

D.  $CHO$

**Answer: C**

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3. Igniting  $MnO_2$  in air converts it quantitatively to  $Mn_3O_4$ . A sample of pyrolusite is of the following composition.  $MnO_2 = 80\%$  and other inert constituents  $= 15\%$  and rest bearing  $H_2O$ . The sample is ignited to constant weight. What is the % of Mn in the ignited sample.

A. 59.4 %

B. 55 %

C. 56.8 %

D. 58.6 %

**Answer: A**

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4.  $NaOH$  and  $Na_2CO_3$  are dissolved in 200ml aqueous solution. Now methyl orange is added in the same solution titrated and requires 2.5ml

of the same HCl. Calculate the normality of NaOH &  $\text{NaCO}_3$ .

A.  $\frac{0.5}{200}, \frac{1.5}{200}$

B.  $\frac{1.5}{200}, \frac{0.5}{200}$

C.  $\frac{0.5}{200}, \frac{0.5}{200}$

D.  $\frac{1.5}{200}, \frac{1.5}{200}$

**Answer: B**



**Watch Video Solution**

5. 20 gm of sample  $\text{Ba(OH)}_2$  is dissolved in 10 ml of 0.5 N HCl solution, The excess of HCl was titrated with 0.2 NaOH. The volume of NaOH used was 10 ml. Calculate the % of  $\text{Ba(OH)}_2$  in the sample.

A. 1.5 %

B. 2.6 %

C. 3.4 %

D. 1.3 %

**Answer: D**



**Watch Video Solution**

6. A sample of  $H_2O_2$  solution containing  $H_2O_2$  by weight requires x ml of  $KMnO_4$  solution for completed oxidation under acidic condition. The formality of  $KMnO_4$  solution is

A. 0.2 M

B. 0.11 M

C. 0.011 M

D. 0.25 M

**Answer: B**



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7. A sample of pyrolusite ( $MnO_2$ ) weighs 0.5 gm. To this solution 0.594 gm  $As_2O_3$  and a dilute acid are added. After the reaction has stopped  $As^{+3}$  is  $As_2O_3$  is titrated with 45 ml of  $M/50 KMn_4$  solution. Calculate the percentage of  $MnO_2$  in pyrolusite.

A. 65.25 %

B. 68 %

C. 67.3 %

D. 66.6 %

**Answer: A**



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8. A sample of  $H_2O_2$  is x % by mass. If x ml of  $KMnO_4$  are required to oxidize 1 gm of this  $H_2O_2$  sample, calculate the normality of  $KMnO_4$  solution.

A. 0.46N



B.  $0.5N$

C.  $0.6N$

D.  $0.65N$

**Answer: C**



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9. 50 ml solution of  $H_2O_2$  was treated with excess KI (s) and the solution was acidified with acetic acid. The liberated  $I_2$  required 40 ml of  $0.5MNa_2S_2O_3$  solution for the end point using starch is indicator. Find the molairty and volume strength of the  $H_2O_2$  solution.

A. 1.12 gm lit

B. 2.24 gm/lit

C. 5.6 gm/lit

D. None

**Answer: B**



**Watch Video Solution**

10. The density of a 3.6  $MH_2SO_4$  solution that is 29%  $H_2SO_4$  by mass will be

A.  $0.212gmm l^{-1}$

B.  $0.122gmm l^{-1}$

C.  $2.12gmm l^{-1}$

D.  $1.22gmm l^{-1}$

**Answer: D**



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**ADDITIONAL PRACTICE EXERCISE LEVEL-II (LECTURE SHEET (ADVANCED))  
(MORE THAN ONE CORRECT ANSWER TYPE QUESTIONS)**

1. Equal volumes of 0.1 M KCl and 0.1  $MFeCl_3$  are mixed with no change in volume, which is/are correct?

A.  $[Fe^{+3}] = 0.05M$

B.  $[K^+] = 0.05M$

C.  $[Cl^-] = 0.2M$

D.  $[Cl^-] > [K^+]$

Answer: A::B::C::D



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2. When 4 gm of Mg burnt with  $O_2$  form oxide and on dilution of metal oxide form metal hydroxide which statement is/are correct for above series of reaction?

A. Gram equivalent of metal, metal oxide and metal hydroxide are equal

B. Weight of metal oxide is 6.66 gm

C. Weight of metal hydroxide is 9.66 gm

D. Normality of solution in 1 litre volume is  $\frac{14}{42}$

**Answer: A::B::C::D**



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**3. Choose the correct match.**

A. 18ml  $H_2O$  at  $4^\circ C$  contains  $6.023 \times 10^{24}$  electrons

B. 11200 ml of  $CO_2$  at STP contains  $6.023 \times 10^{23}$  oxygen atoms.

C. 5600ml of  $CH_4$  at 273 K and 2 atm contains  $12.04 \times 10^{23}$  hydrogen atom.

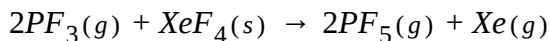
D. 5600 ml of  $CH_4$  at STP contains  $1.505 \times 10^{23}$  methane molecules.

**Answer: A::B::C::D**



**Watch Video Solution**

4.  $PF_3$  reacts with  $XeF_4$  to give  $PF_5$



If 100.0 gm of  $PF_3$  and 50.0 gm  $XeF_4$  react, then which of the following statement is true?

- A.  $XeF_4$  is the limiting reagent
- B.  $PF_3$  is the limiting reagent
- C. 1.127 mol of  $PF_5$  are produced
- D. 0.382 mol of  $PF_5$  are produced

**Answer: A::D**



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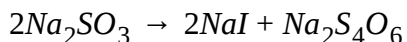
**ADDITIONAL PRACTICE EXERCISE LEVEL-II (LECTURE SHEET (ADVANCED))  
(LINKED COMPREHENSION TYPE QUESTIONS)**

1. Iodine titration can be iodometric or iodimetric depending on using iodine directly or indirectly is an oxidising agent in the redox titration.

a. Iodimetric titration in which a standard iodine solution is used as an oxidant and iodine is directly or indirectly titrated against a reducing agent. For example.



b. Iodimetric procedures are used for the determination of strength of reducing agent such as thiosulphates, sulphites, arsenites and stannous chloride etc. by titrating them against standard solution of iodine in a burette.



Starch is used as indicator near the end point which forms blue colour complex with  $\text{I}_3^-$ . The blue colour disappears when there is not more of free  $\text{I}_2$ .

The volume of KI solution used for  $\text{CuSO}_4$  will be

A.  $M/8$

B.  $M/4$

C.  $M/2$

D. M

**Answer: D**

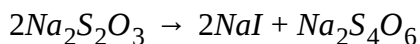


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2. Iodine titration can be iodometric or iodimetric depending on using iodine directly or indirectly as an oxidising agent in the redox titration.

a) Iodimetric titration in which a standard iodine solution is used as an oxidant and iodine is directly or indirectly titrated against a reducing agent. For example  $2\text{CuSO}_4 + 4\text{KI} \rightarrow \text{Cu}_2\text{I}_2 + 2\text{K}_2\text{SO}_4 + \text{I}_2$

b) Iodimetric procedures are used for the determination of strength of reducing agent such as thiosulphates, sulphites, arsenites and stannous chloride etc., by titrating them against standard solution of iodine in a burette.



Starch is used as indicator near the end point which form blue colour complex with  $\text{I}_3^-$ . The blue colour disappears when there is no more of

free  $I_2$ .

When 319.0 gm of  $CuSO_4$  in a solution is related with excess of 0.5 M KI solution, then liberated iodine required 200 ml of 1.0 M  $Na_2S_2O_3$  for complete relation. The percentage purity of  $CuSO_4$  in the sample is

- A. 10 %
- B. 20 %
- C. 5 %
- D. None of these

**Answer: C**



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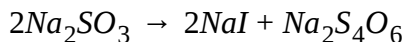
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Starch is used as indicator near the end point which forms blue colour complex with  $\text{I}_3^-$ . The blue colour disappears when there is not more of free  $\text{I}_2$ .

The volume of KI solution used for  $\text{CuSO}_4$  will be

- A. 100 ml
- B. 40 ml
- C. 400 ml
- D. 200 ml

**Answer: D**



**Watch Video Solution**

4. Bleaching powder and bleach solution are produced on a large scale and used in several household products. The effectiveness of bleach solution is often measured by iodometry.

25 ml of household bleach solution is

- A. 0.48 M
- B. 0.96 M
- C. 0.24 M
- D. 0.024 M

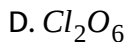
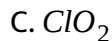
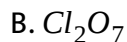
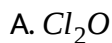
**Answer: C**



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5. Bleaching powder and bleach solution are produced on a large scale and used in several household products. The effectiveness of bleach solution is often measured by iodometry.

25 ml of household bleach solution is



**Answer: A**



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**ADDITIONAL PRACTICE EXERCISE LEVEL-II (LECTURE SHEET (ADVANCED))  
(MATRIX MATCHING TYPE QUESTIONS)**

1. Match the concentration terms with the factors affecting the concentration.

Column-I

A) Molarity (M)

B) Molality (m)

C) Mole fraction (X)

D) Normality

Column-II

P) Temperature

Q) Pressure

R) Dilution

S) Volume



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2. Experimental determination of molar mass of compounds may be made by the following methods. Match them.

Column-I

A) Gases

B) Volatile solids

C) Non-volatile solids

D) Solids of low molar mass

E) solids of high molar mass such as polymers

Column-II

P) Victor meyer.s method

Q) Hofmann.s method

R) Duma.s method

S) Ebullioscopy or cryoscopy

T) Osmotic pressure

U) Raoult.s law



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**ADDITIONAL PRACTICE EXERCISE LEVEL-II (LECTURE SHEET (ADVANCED))  
(INTEGER TYPE QUESTIONS)**

1. The volume (in ml) of 0.10 M  $AgNO_3$  required for complete precipitation of chlorine ions present in 30 ml of 0.01 M solution of  $[Cr(H_2O)_5Cl]Cl_2$  as silver chloride is close to \_\_\_\_\_



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2. A sample of crystalline  $Ba(OH)_2 \cdot xH_2O$  weight 1.578 gm was dissolved in water. The solution required 40 ml of  $0.25N HNO_3$  for complete relation. Determine the number of molecular of water of crystallisat in base.



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3. Compound  $S_4N_4$  decompose completely into  $S_{X(g)}$  and  $N_{2(g)}$ . If all measurements are made at same P & T each volume of  $S_4N_4$  gives 4.0 volume of gaseous product. The value of X is \_\_\_\_\_



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4. 500 ml of aM and 500 ml of bM solution of a solute are mixed and diluted to 2 litre to prepare a solution of 1.5 M. If a and b are in the ratio 2 : 1, then the value of a is.



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5. A student performs a titration with different buretts and finds titre value of 25.2 ml, 2.25 ml, 25.0 ml. The number of significant figures in the average titre value is.



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### ADDITIONAL PRACTICE EXERCISE LEVEL-II (PRACTICE SHEET (ADVANCED) )

1. What weight of slaked lime will be required to decompose completely 4 grams ammonium chloride

A. 2.77g

B. 3.5g

C. 5.5g

D. 5.44g

**Answer: B**



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2. A certain weight of sodium iodine and sodium chloride mixture when treated with sulphuric acid was found to give the same weight (as that of mixture) of sodium sulphate. The percentage composition of NaCl is

A. 18.86

B. 52.23

C. 35.57

D. 71.14

**Answer: D**



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3. How many grams of 83.4% pure sodium sulphate can be produced from 250 g of 95% pure NaCl.

A. 288.2g

B. 237.5g

C. 345.4g

D. 187.2g

**Answer: C**



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4. To a 25 ml  $H_2O_2$  solution, excess of acidified solution of potassium iodide was added. The iodine liberated required 20 ml of 0.3 N sodium thiosulphate solution. The volume strength of  $H_2O_2$  solution is

A. 0.672

B. 1.344

C. 2.688

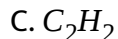
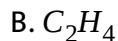
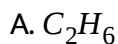
D. 0.896

**Answer: B**



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5. 20CC of hydro carbon were exploded with excess of oxygen. After explosion and cooling a contraction of 20cc was noted on addition of KOH another contraction of 40CC was noted. The molecular formula of hydrocarbon is



**Answer: C**

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6. 10 ml of a mixture of carbon monoxide, marsh gas and hydrogen exploded with excess of oxygen gave a contraction of 6.5cc. There was

further contraction of 7cc when the residual gas was treated with caustic potash. The volume of marsh gas present in original mixture as

A. 5cc

B. 2cc

C. 3cc

D. 4cc

**Answer: B**



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7. On gram of the carbonate of a metal was dissolve din 35 CC 1N HCl. The resulting liquid required 50 CC  $\frac{N}{10}$  caustic soda solution to neutralise it completely. The equivalent weight of metal carbonate is

A. 100

B. 25

C. 53

D. 50

**Answer: D**



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8. A small amount of  $\text{CaCO}_3$  completely neutralises 525 ml of  $\frac{N}{10}$  HCl and no acid is left at the end after converting all calcium chloride to  $\text{CaSO}_4$ .

How much plaster paris  $\left(\text{CaSO}_4 \frac{1}{2} \text{H}_2\text{O}\right)$  can be obtained

A. 1.916g

B. 5.827g

C. 7.53g

D. 3.81g

**Answer: D**



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9. An element A forms a chloride which contains 29.34% by weight of chloride and is isomorphous with KCl. The molecular weight of A is

A. 85.49

B. 40

C. 23

D. 137.5

**Answer: A**



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10. Air contains 21% oxygen by weight. What weight of air is required to burn 200 g of coal which contains only 80% combustible material

A. 2031.79

B. 1023.5g

C.  $426.6g$

D.  $160g$

**Answer: A**



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**ADDITIONAL PRACTICE EXERCISE LEVEL-II (PRACTICE SHEET (ADVANCED)  
(MORE THAN ONE CORRECT ANSWER TYPE QUESTIONS))**

**1. Pick out correct statements**

A. One gram equivalent of oxygen at STP occupies 5.6 litres

B. The molarity of 10 volume  $H_2O_2$  is 0.89 M

C. Phenolphthalein indicates only half neutralisation of  $Na_2CO_3$

D. Empirical formula of benzene is CH

**Answer: A::B::C::D**



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2. Pick out correct statements

- A. Equivalent weight of an element will change with valency
- B. In 109%  $H_2SO_4$  labelled oleum in the percent of free  $SO_3$  is 60%
- C. Metathesis reaction are redox reactions
- D. Product of volume in ml and normality of solution gives number of milliequivalent of solute

Answer: A::D



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3. Pick out incorrect statements

- A. The volume of 0.1M  $FeC_2O_4$  solution required to reduce 200 ml of 0.6 M  $K_2Cr_2O_7$  in acidic medium is 2400 ml

- B. The volume of  $0.1\text{M } \text{Ca}(\text{OH})_2$  required to neutralise  $0.2\text{M } \text{H}_3\text{PO}_3$  solution of volume  $0.25\text{dm}^3$  is 500 ml
- C. Equivalent weight of sulphate ion is 49
- D. Molality is influenced by change in temperature

**Answer: C::D**



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**4. The correct statements are**

- A. The isotopes of chlorine with mass number 35 and 37 exist in ratio 3: 21 if its average atomic mass is 35.5
- B. The mass of one amu is approximately  $1.6 \times 10^{-24}\text{g}$
- C. The number of molecules in 1 ml of a gas at STP is called Loschmidt number

D. If  $6.023 \times 10^{21}$  molecules of a solute are present in 100 ml solution

molarity of solution is 0.1M

**Answer: A::B::C**



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**ADDITIONAL PRACTICE EXERCISE LEVEL-II (PRACTICE SHEET (ADVANCED)  
(LINKED COMPREHENSION TYPEQ QUESTIONS))**

1. Two formulal to calculate number of milli equivalkents (mlQ)

$$\text{Numbr of miliequivalents} = \frac{\text{weight}}{\text{GEW}} \times 1000$$

$$\text{Numbr of milliequivalents} = \text{volume in ml} \times \text{Normality of solution}$$

0.09 grams of dibasic acid neutralise 40 ml of  $\frac{N}{20}$  NaOH solution.

Molecular weight of acid is

A. 90

B. 45



C. 180

D. 60

**Answer: A**



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**2. Two formulal to calculate number of milli equivalents (mlQ)**

$$\text{Numbr of miliequivalents} = \frac{\text{weight}}{\text{GEW}} \times 1000$$

$$\text{Numbr of milliequivalents} = \text{volume in ml} \times \text{Normality of solution}$$

0.25 grams of pure  $\text{CaCO}_3$  neutralised 25 ml dilue HCl normality of HCl solution is

A. 0.1 N

B. 0.5 N

C. 0.25 N

D. 0.2 N

**Answer: D**



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**ADDITIONAL PRACTICE EXERCISE LEVEL-II (PRACTICE SHEET (ADVANCED)  
(MATRIX MATCHING TYPE QUESTIONS))**

Column-I

A) 22.4 volume  $H_2O_2$

1. B) 32 g oxygen

C) 11.2 L  $CO_2$  at STP

D) 1 gram equivalent hydrogen at STP

Column-II

P) 11.2 litres

Q)  $9.034 \times 10^{23}$  atoms

R)  $2 \text{ moleL}^{-1}$

S)  $9.64 \times 10^{24}$  electron



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**ADDITIONAL PRACTICE EXERCISE LEVEL-II (PRACTICE SHEET (ADVANCED)  
(INTEGER TYPE QUESTIONS))**

1. Ammonia is oxidised by oxygen to give nitric oxide and water. The weight of water produced per gram of nitric oxide is  $0.1 \times xg$ . What is value of d.

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2. One gram limestone is heated and quicklime so formed is dissolved in one litre of water. The normality of solution is  $0.01 \times x$ . What is value of  $x$ .

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