CHEMISTRY

BOOKS - FULL MARKS CHEMISTRY (TAMIL ENGLISH)

BASIC CONCEPTS OF CHEMISTRY AND CHEMICAL CALCULATIONS

Text Evaluation Solved Choose The Best Answer

1. 40 ml of methane is completely burnt using 80 ml of oxygen at room temperature. The volume of gas left after cooling to room temperature is

A. 40 ml of CO_2 gas

B. 40 ml CO_2 gas and 80 ml H_2O gas

C. 60 ml of CO_2 and 60 ml H_2O gas

D. 120 ml CO_2 gas

Answer: A

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2. An element X has the following isotopic composition ^{200}X = 90 %, ^{199}X=8 % and ^{202} X=2 %, The weighted average atomic mass of the element X is closest to

A. 201u

B. 202u

C. 199u

D. 200u

Answer: D

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3. Assertion : Two mole of glucose contains 12.044×10^{23} molecules of glucose.

Reason : Total number of entities present in one mole of any substance is equal to 6.022×10^{22}

A. both assertion and reason are true and the reason is the correct explanation of assertion

B. both assertion and reason are true but reason is not the correct explanation of assertion

C. assertion is true but reason is false

D. both assertion and reason are false

Answer: C

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4. Carbon forms two oxides, namely carbon monoxide and carbon dioxide. The equivalent mass of which element remains constant?

A. Carbon

B. Oxygen

C. Both carbon and oxygen

D. Neither carbon nor oxygen

Answer: B

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5. The equivalent mass of a trivalent metal element is 9 g eq^{-1} the molar mass of its anhydrous oxide is

A. 102g

B. 27g

C. 270g

D. 78g

Answer: A

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6. The number of water molecules in a drop of water weighing 0.018 g is

A. 6.022×10^{26}

B. 6.022×10^{23}

C. 6.022×10^{20}

D. 9.9×10^{22}

Answer: C

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7. 1 g of an impure sample of magnesium carbonate (containing no thermally decomposable impurities) on complete thermal decomposition gave 0.44 g of carbon dioxide gas. The percentage of impurity in the sample is

A. 0

B. 0.044

C. 0.16

D. 0.084

Answer: C

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8. When 6.3 g of sodium bicarbonate is added to 30 g of acetic acid solution, the residual solution is round to weigh 33 g. The number of moles of carbon dioxide released in the reaction is

A. 3

B. 0.75

C. 0.075

D. 0.3

Answer: C

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9. When 22.4 litres of H_2 (g) is mixed with 11.2 litres of Cl_2(g), each at 273 K at 1 atm the moles of HCl (g). formed is equal to

A. a) 2 moles of HCl gas

B. b) 0.5 moles of Hcl (g)`

C. c) 1.5 moles of HCl (g)

D. d) 1 moles of HCl (g)

Answer: D

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10. Hot concentrated sulphuric acid is a moderately strong oxidising agent. Which of the following reactions does not show oxidising behaviour?

A. a) $Cu + 2H_2SO_4 \rightarrow CuSO_4 + SO_2 + 2H_2O$

B. b) $C + 2H_2SO_4 \rightarrow CO_2 + 2SO_2 + 2H_2O$

C. c) $BaCl_2 + H_2SO_4 \rightarrow BaSO_4 + 2HCl$

D. d) none of the above

Answer: C

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11. Choose the disproportionation reaction among the following redox reactions.

A. a) $3Mg(s) + N_2 \rightarrow Mg_3N_2(s)$

B. b) $P_4(s) + 3NaOH + 3H_2O \rightarrow PH_3(g) + 3NaH_2PO_2(aq)$

C. c) $Cl_2(g) + 2KI(aq) \rightarrow 2KCl(aq) + I_2$

D. d) $Cr_2O_3(s) + 2Al \rightarrow Al_2O_3(g) + 2Cr$

Answer: B

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12. The equvalent mass of potassium permangnate in alkaline medium is

$MnO_4^- + 2H_2O + 3e^- \rightarrow MnO_2 + 4OH^-$

A. 31.6

B. 52.7

C. 79

D. None of these

Answer: B

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13. Which one of the following represents 180g of water?

A. 5 moles of water

B. 90 moles of water

C. $\frac{6.022 \times 10^{23}}{180}$ Molecules of water

D. 6.022×10^{24} Molecules of water

Answer: D

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14. 7.5 g of a gas occupies a volume of 5.6 litres at $0^{\circ}C$ and 1 atm pressure. The gas is

A. NO

B. N_2O

C. CO

D. CO_2

Answer: A

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15. Total number of electrons present in 1.7 g of ammonia is

A. 6.022×10^{23}

B. $\frac{6.022 \times 10^{22}}{1.7}$

C. $\frac{6.022 \times 10^{24}}{1.7}$

D. $\frac{6.022 \times 10^{23}}{1.7}$

Answer: A

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16. The correct increasing order of the oxidation state of sulphur in the anions

$SO_4^{2-}, SO_3^{2-}, S_2O_4^{2-}, S_2O_6^{2-}$ is

A. a) $SO_3^{2-} < SO_4^{2-} < S_2O_4^{2-} < S_2O_6^{2-}$

B. b) $SO_4^{2-} < S_2O_4^{2-} < S_2O_6^{2-} < SO_3^{2-}$

C. c) $S_2O_4^{2-} < SO_3^{2-} < S_2O_6^{2-} < SO_4^{2-}$

D. d) $S_2O_6^{2-} < S_2O_4^{2-} < SO_4 < (2-) < SO_3^{2-}$

Answer: C

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17. The equivalent mass of ferrous oxalate is

A. $\frac{\text{molar mass of ferrous oxalate}}{1}$

B. $\frac{\text{molar mass of ferrous oxalate}}{2}$

C. $\frac{\text{molar mass of ferrous oxalate}}{3}$

D. None of these

Answer: C

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18. If Avagadro number were changed from 6.022×10^{23} to 6.022×10^{20}, this would change

A. the ratio of chemical species to each other in a balanced equation

B. the ratio of elements to each other in a compound

C. the definition of mass in units of grams

D. the mass of one mole of carbon

Answer: D

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19. Two 22.4 litre containers A and B contains 8 g of O_2 and 8 g of SO_2 respectively, at 273 K. and 1 atm pressure, then

A. number of molecules in A and B are same

B. number of molecules in B is more than that in A

C. the ratio between the number of molecules in A to number of molecules in B is 2:1

D. number of molecules in B is three times greater than the number of molecules in A

Answer: C

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20. What is the mass of precipitate formed when 50 ml of 8.5% solution of $AgNO_3$ is mixed with 100 ml of 1.865% potassium chloride solution?

A. 3.59g

B. 77g

C. 14g

D. 28g

Answer: A

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21. The mass of a gas that occupies a volume of 612.5 ml at room temperature and pressure (25°C and 1 atm pressure) is 1.1 g. The molar mass of the gas is

A. 66.25 g mol^{-1}

B. 44 g mol^{-1}

C. 24.5 g mol^{-1}

D. 662.5 g mol^{-1}

Answer: B

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22. Which of the following contain same number of carbon atoms as in 6 g of carbon-12?

A. 7.5 g ethane

B. 8 g methane

C. both (a) and (b)

D. none of these

Answer: C

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23. Which of the following compound(s) has/have percentage of carbon same as that in ethylene (C_2H_4)?

A. propene

B. ethyne

C. benzene

D. ethane

Answer: A

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24. Which of the following is/are true with respect to carbon -12?

A. relative atomic mass is 12 u

B. oxidation number of carbon is +4 in all its compounds.

C. 1 mole of carbon-12 contain 6.022×10^{22} carbon atoms.

D. all of these

Answer: A

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25. Which one of the following is used as a standard for atomic mass?

A. ${}_6C^{12}$

B. ${}_7C^{12}$

C. ${}_6C^{13}$

D. ${}_6C^{14}$

Answer: A

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Textual Evaluation Solved Write Brief Answer To The Following Questions

1. Define relative atomic mass.

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2. What do you understand by the term mole?

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3. Define equivalent mass.

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4. What do you understand by the term oxidation number?

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5. Distinguish between oxidation and reduction

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6. Calculate the molar mass of the following compounds.

(i)Urea $|CO(NH_2)_2|$

(ii) Acetone $|CH_3COCH_3|$

(iii) Boric acid $|H_3BO_3|$

(iv) Sulphuric acid $|H_2SO_4|$

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7. The density of carbon dioxide is equal to 1.965 kg m^{-3} at 273 K and 1 atm pressure. Calculate the molar mass of CO_2.

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8. Which contains the greatest number of moles of oxygen atoms?

(i) 1 mol of ethanol

(ii) 1 mol of formic acid

(iii) 1 mol of H_2O

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9. Calculate the average atomic mass of naturally occurring magnesium using the following data

Isotope	Isotopic atomic mass	Abundance (%)
Mg^{24}	23.99	78.99
Mg^{25}	24.99	10.00
Mg^{26}	25.98	11.01

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10. In a traction $x + y + z_2 \rightarrow xyz_2$, Identity the limiting reagent If tiny, in the following traction mixtures.

(a) (A) 200 atoms of x+ 200 atoms of y+ 50 molecules of z_2

(b) 1 mol of x+1 mol of y +3 3 mol ofz_2

(c) 50 atoms of x + 25 atoms of y + 50 molecules of z_2

(d) 2.5 mol of x + 5 mol of y + 5 mol of z_2

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11. Mass of one atom of an element is 6.645×10^{-23} g. How many mole's of element are there in 0.320 kg?

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12. What is the difference between molecular mass and molar mass? Calculate the molecular mass and molar mass for carbon monoxide.

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13. What is the empirical formula of the following?

(i) Fructose ($C_6H_{12}O_6$) found in honey

(ii) Caffeine ($C_8H_{10}N_4O_2$) a substance found in tea and coffee.

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14. The reaction between aluminium and ferric oxide can generate temperatures up to 3273 K and is used in welding metals. (Atomic mass of Al = 27 u Atomic mass of 0 = 16 u) $2Al + Fe_2O_3 \rightarrow Al_2O_3 + 2Fe$, If, in this process, 324 g of aluminium is allowed to react with 1.12 kg of ferric oxide.

(i) Calculate the mass of Al_2O_3 formed.

(ii) How much of the excess reagent is left at the end of the reaction?

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15. How many moles of ethane is equaired to produce 44 g of $CO_{2(g)}$ after combustion.

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16. Hydrogen peroxide is an oxidising agent. It oxidises ferrous ion to ferric ion and reduced itself to water. Write a balanced equation.

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17. Calculate the empirical and molecular formula of a compound containing 76.6% carbon, 6.38 % hydrogen and rest oxygen its vapour density is 47

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18. A compound on analysis gave the following percentage composition: Na=14.31% S = 9.97%, H = 6.22%, O = 69.5%, calcualte the molecular formula of the compound on the assumption that all the hydrogen in the compound is present in combination with oxygen as water of crystallisation. Molecular mass of the compound is 322 [Na = 23, S = 32, H = 1, O = 16].

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19. Balance the following equations by oxidation number method

(i) $Kr_2Cr_2O_7 + KI + H_2SO_4 \rightarrow K_2SO_4 + Cr_2(SO_4)_3 + I_2 + H_2O$

(ii)$KMnO_4 + Na_2SO_3 \rightarrow MnO_2 + Na_2SO_4 + KOH$

(iii)$Cu + HNO_3 \rightarrow Cu(NO_3)_2 + H_2O$

(iv)

$KMnO_4 + H_2C_2O_4 + H_2SO_4 \rightarrow K_2SO_4 + MnSO_4 + CO_2 + H_2O$

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20. Balance the following equations by ion electron method.

(i) $KMnO_4 + SnCl_2 + HCl \rightarrow MnCl_2 + SnCl_4 + H_2O + KCl$

(ii)$C_2O_4^{2-} + Cr_2O_7^{2-} \rightarrow Cr^{3+} + CO_2$ (in acidic medium)

(iii) $Na_2S_2O_3 + I_2 \rightarrow Na_2S_4O_6 + NaI$

$Zn + NO_3^- \rightarrow Zn^{2+} + NO$(in acidic medium)

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In Text Questions Evaluate Yourself

1. By applying the knowledge of chemical classification, classify each of the following into elements, compounds or mixtures

(i) Sugar

(ii) Sea water

(iii) Distilled water

(iv) Carbon dioxide

(v) Copper wire

(vi) Table salt

(vii) Silver plate

(viii) Naphthalene balls

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2. Calculate the relative molecular mass of the following.

(i) Ethanol (C_2H_5OH)

(ii) Potassium permanganate $(KMnO_4)$

(iii) Potassium dichromate $(K_2Cr_2O_7)$

(iv) Sucrose $(C_{12}H_{22}O_{11})$

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3. Calculate the number of moles present in 9 g of ethane

Calculate the number of molecules of oxygen gas that occupies a volume of 224 ml at 273 K and 3 atm pressure.

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4. (a) 0.456 g of a metal gives 0.606 g of its chloride. Calculate the equivalent mass of the metal

(b)Calculate the equivalent mass of potassium dichromate. The reduction half-reaction in acid medium is,

$$Cr_2O_7^{2-} + 14H^+ + 6e^- \rightarrow 2Cr^{3+} + 7H_2O$$

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5. A compound on analysis gave the following percentage composition:

C - 54.54%, H = 9.09%, O = 36.36%

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6. Experimental analysis of a compound containing the elements x,y,z on analysis gave the following data, x = 32 %, y = 24 %, z = 44 %. The relative number of atoms of x, y and z are 2,1 and 0.5, respectively. (Molecular mass of the compound is 400 g) Find out.

(i) The atomic masses of the element x,y,z.

(ii) Empirical formula of the compound and

(iii) Molecular formula of the compound.

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7. The balanced equation for a reaction is given below $2x + 3y \rightarrow 4l + m$ When 8 moles of x react with 15 moles of y, then

(i) Which is the limiting reagent?

(ii) Calculate the amount of products formed.

(iii) Calculate the amount of excess reactant left at the end of the reaction.

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8. Balance the following equation using oxidation number method

$As_2S_3 + HNO_3 + H_2O \rightarrow H_3AsO_4 + H_2SO_4 + NO$

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Textual Calculation Based On Stoichiometry Solved

1. How many moles of hydrogen is required to produce 10 moles of ammonia ?

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2. Calculate the amount of water produced by the combustion of 32 g of methane.

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3. How much volume of carbon dioxide is produced when 50 g of calcium carbonate is heated completely under standard condition ?

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4. How much volume of chlorine is required to form 11.2 L of HC1 at 273 K and 1 atm pressure?

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5. Calculate the percentage composition of the elements present in magnesium carbonate. How many kilogram of CO_2 can be obtained by

heating 1 kg of 90 % pure magnesium carbonate.

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6. In a process, 646 g of ammonia is allowed to react with 1.144 kg of CO_2 to form urea.

(i) If the entire quantity of all the reactants is not consumed in the reaction which is the limiting reagent ?

(ii) Calculate the quantity of urea formed and unreacted quantity of the excess reagent. The balanced equation is

$$2NH_3 + CO_2 \underset{H_2NCONH_2 + H_2O}{}$$

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Additional Questions Solved Choose The Correct

1. Which one among the following is the standard for atomic mass?

A. ${}_1H^1$

B. ${}_6C_{12}$

C. ${}_6C_{14}$

D. ${}_8O^{16}$

Answer: B

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2. Two containers A and B of equal volume contain 6 g of O_2 and SO_2 at 300K. and 1 atm. Then

A. No. of molecules in A is less than that in B

B. No. of molecules in A is more than that in B

C. No. of molecules in A and B are same

D. none of these

Answer: B

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3. Which of the following contains same number of carbon atoms as are in 6.0g of carbon (C-12)?

A. 6.0 g ethane

B. 8.0 g methane

C. 21.0 g Propane

D. 28.0 g CO

Answer: B

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4. How many equivalents of Sodium sulphate is formed when Sulphuric acid is completely neutralized with a base NaOH?

A. 0.2

B. 2

C. 0.1

D. 1

Answer: D

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5. Cl_2 changes to Cl^- and ClO^- in cold NaOH. Equivalent mass of Cl_2 will be.

A. Molar mass/2

B. Molar mass/1

C. Molar mass/3

D. $2 \times$ Molar mass/2

Answer: A

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6. Equivalent mass of $KMnO_4$ in acidic medium, concentrated alkaline medium and dilute basic medium respectively are M, M, M. Reduced products can be

A. MnO_2, MnO_4^-, Mn^{2+}

B. $MnO_2, Mn^{2+}, MnO_4^{2-}$

C. $Mn^{2+}, MnO_2, MnO_4^{2-}$

D. $Mn^{2+}, MnO_4^{2-}, MnO_2$

Answer: C

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7. 20.0 g of a magnesium carbonate sample decomposes on heating to give carbon dioxide and 8.0 g magnesium oxide. What will be the percentage of purity of magnesium carbonate in the sample?

A. 60

B. 84

C. 75

D. 96

Answer: B

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8. What is the mass of the precipitate formed when the preparation of alkyl halides 50 ml of 16.9% solution of $AgNO_3$ is mixed with 50 ml of 5.8 % NaCl solution?

A. 7g

B. 14g

C. 28g

D. 35g

Answer: A

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9. Which of the following is a mono-atomic molecule?

A. Hydrogen

B. Oxygen

C. Sodium

D. Ozone

Answer: C

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10. Which one of the following is a diatomic molecule?

A. Ozone

B. Copper

C. Hydrogen

D. Gold

Answer: C

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11. Which of the following method is used to prevent rusting of iron?

A. Galvanisation

B. Painting

C. Chrome plating

D. all the above

Answer: D

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12. Which of the following is not a redox reaction?

A. $H_2 + F_2 \rightarrow 2HF$

B. $Cu + 4HNO_3 \rightarrow Cu(NO_3)_2 + 2NO_2 + 2H_2O$

C. $2H_2 + O_2 \rightarrow 2H_2O$

D. $AgCl + NH_3 \rightarrow \left[Ag(NH_3)_2\right]Cl$

Answer: D

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13. How many H_2O molecules are there in a snowflake weighing 1 mg?

A. 3.35×10^{19}

B. 6.023×10^{23}

C. 3.35×10^{19}

D. 100

Answer: A

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14. The equivalent mass of Aluminium is .....

A. 27

B. 13.5

C. 54

D. 9

Answer: D

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15. The equivalent mass of H_2SO_4 is .....

A. 98

B. 97

C. 49

D. 96

Answer: C

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16. The equivalent mass of NaCl is

A. 40

B. 58.5

C. 35.5

D. 23

Answer: D

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17. How many moles of hydrogen is required to produce 4 moles of ammonia?

A. 15 moles

B. 20 moles

C. 6 moles

D. 4 moles

Answer: C

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18. How much volume of carbon dioxide is produced when 50 g of calcium carbonate is heated completely under standard condition ?

A. $2.24 \times 10^{-2} m^3$

B. 22.4L

C. 11.2L

D. 22400 cm^3

Answer: C

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19. Which one of the following is not a redox reaction?

A. Rusting of iron

B. Extraction of metal Na

C. Electroplating

D. Aluminothermic process

Answer: A

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20. In this reaction $2AuCl_3 + 3SnCl_2 \rightarrow 2Au + 3SnCl_4$ which is an oxidising agent?

A. $AuCl_3$

B. Au

C. $SnCl_2$

D. Both $AuCl_3$ and $SnCl_2$

Answer: A

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21. Identify the compound formed during the rusting of iron

A. Fe_2O_3

B. $Fe_2O_3 . xH_2O$

C. $FeO . xH_2O$

D. FeO

Answer: B

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22. The oxidation number of fluorine in all its compounds is equal to

A. -1

B. 1

C. -2

D. 2

Answer: A

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23. $Zn_{(s)} + Cu^{2+}_{(aq)} \rightarrow Zn^{2+}_{(aq)} + Cu_{(s)}$. In this reaction, which gets oxidised?

A. Cu^{2+}

B. Zn^{2+}

C. Zn

D. ZN, Cu^{2+}

Answer: C

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

A. $CuSO_4 + Zn \rightarrow ZnSO_4 + Cu$

B. $2KClO_3 \rightarrow 2KCl + 3O_2$

C. $PCl_5 \rightarrow PCl_3 + Cl_2$

D. $4H_3PO_3 \rightarrow 3H_3PO_4 + PH_3$

Answer: D

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25. How many molecules are present in 32 g of methane?

A. $2 \times 6.023 \times 10^{23}$

B. $6.023 \times 10^{23} / 2$

C. 6.023×10^{-23}

D. 3.011×10^{23}

Answer: A

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26. How many moles of water is present in IL of water?

A. 1

B. 18

C. 55.55

D. 5.555

Answer: C

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27. How many moles of Hydrogen atoms are present in 1 mole of C_2H_6 ?

A. 18 moles

B. 6 moles

C. 3 moles

D. 1 mole

Answer: B

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28. How many grams are contained in 1 gram atom of Na?

A. 13 g

B. 1g

C. 23 g

D. 1/23g

Answer: C

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29. Which of the following has the highest mass?

A. 1 g atom of C

B. 1/2 mole of CH_4

C. 10 ml of water

D. 3.011×10^{23} atoms of oxygen

Answer: A

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30. Which of the following halogens do not exhibit positive oxidation number in its compounds?

A. Fluorine

B. Chlorine

C. Iodine

D. Bromine

Answer: A

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31. Which of the following is the most powerful oxidising agent?

A. $KMnO_4$

B. $K_2Cr_2O_7$

C. O_3

D. H_2O_2

Answer: A

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32. The oxidation number of carbon is zero in

A. HCHO

B. $C_{12}H_{22}O_{11}$

C. $C_6H_{12}O_6$

D. all of the above

Answer: D

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33. Among the following molecules in which Chlorine shows maximum oxidation state?

A. Cl_2

B. KCl

C. $KClO_3$

D. Cl_2O_7

Answer: D

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Additional Questions Solved Match The Following

1. Match the List-I and List-II using the correct code given below the list.

	List-I (Acids)	List-II (Basicity)
A.	HCl	1. 3
B.	H_2SO_4	2. 4
C.	$H_4P_2O_7$	3. 2
D.	H_3PO_4	4. 1

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2. Match the List-I and List-II using the correct code given below the list.

	List-I (Empirical formula)	List-II (Molecular formula)
A.	Benzene – CH	1. H_2O_2
B.	Fructose – CH_2O	2. C_2H_2
C.	Acetylene – CH	3. C_6H_6
D.	Hydrogen peroxide–OH	4. $C_6H_{12}O_6$

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3. Match the List-I and List-II using the correct code given below the list.

	List-I	List-II
A.	Molar volume	1. $\frac{\text{Atomic mass}}{\text{Valency}}$
B.	Avogadro Number	2. $2 \times$ Vapour density
C.	Equivalent mass	3. $2.24 \times 10^{-2} m^3$
D.	Molecular mass	4. 6.023×10^{23}

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Additional Questions Solved Fill In The Blanks

1. One mole of CO_2 contains

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2. The number of moles of H_2 in 0.224 litre of hydrogen gas at STP is

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3. 10 g of hydrogen and 64 g of oxygen were filled in a steel vessel and exploded. The amount of water produced in this reaction will be

A. 3 mole

B. 4 mole

C. 2 mole

D. 1 mole

Answer: b

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4. 6.023×10^{20} molecules of urea are present in 100 ml of its solution. The concentration of the solution is

A. 0.001 M

B. 0.01 M

C. 0.02 M

D. 0.1 M

Answer: A

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5. The number of molecules in 16g of methane is .....

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6. Number of atoms in 4.25 g of ammonia is

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7. The number of molecules in a drop of water (0.0018 ml) at room temperature is

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8. 7.5 g of a gas occupies a volume of 5.6 litres at $0^{\circ}C$ and 1 atm pressure. The gas is

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9. The mass in grams of 0.45 mole of Ca^{2+} ions

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10. The mass of one molecule of HI in grams is

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11. Avogadro's number is the number of molecules present in

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12. Equivalent mass of $KMnO_4$ when it is converted to MnSO4 is equal to molar mass divide by.....

A. 6

B. 4

C. 5

D. 2

Answer:

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13. The empirical formula of hydrogen peroxide is

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14. Molecular mass =.....

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15. When 22.4 litres of H_2 (g) is mixed with 11.2 litres of Cl_2(g), each at 273 K at 1 atm the moles of HCl (g). formed is equal to

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16. 5.6 L of a gas at STP are found to have mass of 11 g. The molecular mass of the gas is

A. Phosphine

B. Phosgene

C. Nitric Oxide

D. Nitrous Oxide

Answer: D

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17. The oxidation number of fluorine in all its compounds is equal to

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18. The value of Avogardro's number is _____.

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19. 46 g of ethanol contains

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20. The mass of one mole of $CaCl_2$ is ..... .

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21. 22 g of CO_2 contains ..... molecules of CO_2.

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22. The formula weight of ethanol (C_2H_5OH) is

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23. The number of moles of ethane in 60 g is

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24. The volume of HCI gas weighing 73 g at STP is

A. 2.24 x 10-2m3

B.

C.

D.

Answer: A::B::C::D

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25. The molar volume of 22 g of CO_2 is.....

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26. The number of moles of oxygen required to prepare 1 mole of water is

A. 1 mole

B. 0.5 mole

C. 2 mole

D. 0.4 mole

Answer:

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27. The oxidation state of a substance in its elementary state is equal to

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28. The oxidation number of Cr in $K_2Cr_2O_7$ is.....

A. +6

B. +4

C. -2

D. +7

Answer:

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29. The oxidation number of N in $NH4^{+}$ ion is

A. +4

B. +3

C. -3

D. -4

Answer: C

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30. The number of molecules in 40 g of sodium hydroxide is .....

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31. The mass of one molecule of AgCl in grams is

A. 108g

B. 143.5g

C. 35.5g

D. 243.5g

Answer: A::C::D

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32. The empirical formula of Alkene is:.....

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33. 22 g of a gas occupies 11.2 litres of volume at STP. The gas is

A. CH_4

B. CO_2

C. NO

D. CO

Answer: B::C

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34. The number of moles of H_2 in 2.24 litre of hydrogen gas at STP

A. 0.1 mole

B. 0.01 mole

C. 0.001 mole

D. 1 mole

Answer: A

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35. The empirical formula of glucose is

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36. The molar mass of Na_2SO_4 is

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37. One mole of CO_2 contains

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38. 5.6 litres of oxygen at STP is equivalent to

A. 1/4 mole

B. 1 mole

C. 1/2 mole

D. 1/8 mole

Answer: A::D

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39. 12 g of Mg will react completely with an acid to give

A. 1 mole of O_2

B. 1/2 mole of H_2

C. 1 mole of H_2

D. 2 mole of H_2

Answer: B

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40. The empirical formula of sucrose is .....

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41. The number of grams of oxygen in 0.10 mol of $Na_2CO_3.10H_2O$ is

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42. The mass of 1 atom of nitrogen is

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43. On the reaction $2Ag + H_2SO_4 \rightarrow Ag_2SO_4 + 2H_2O + SO_2$. Sulphuric acid acts as

A. reducing agent

B. hydrolysing agent

C. dehydrating agent

D. oxidising agent

Answer: A::C::D

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44. The oxidation number of carboxylic carbon atom in CH_3COOH is

A. +2

B. +4

C. +1

D. +3

Answer: C

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45. When methane is burnt in oxygen to produce CO_2 and H_2O, the oxidation number of carbon changes by

A. 8

B. 3

C. 0

D. 4

Answer: A

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46. The oxidation number of Fe in $Fe_2(SO_4)_3$ is

A. +2

B. +3

C. +1

D. 0

Answer: C

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47. The oxidation number of carbon in $CH_3 - CH_2OH$ is

A. -3

B. -2

C. +2

D. +4

Answer: B

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Additional Questions Solved Choose The Odd One Out

1. Choose the odd one out

A. Copper

B. Copper oxide

C. Copper sulphate

D. Copper nitrate

Answer: A

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2. Choose the odd one out

A. Green tea

B. Sugar solution

C. Salt water

D. Oil in water

Answer: D

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3. Choose the odd one out

A. Copper

B. Neon

C. Gold

D. Phosphorous

Answer: D

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4. Choose the odd one out

A. Rusting of iron

B. Burning of LPG

C. Digestion of carbohydrate

D. Formation of vanaspathy

Answer: D

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Additional Questions Solved Choose The Correct Pair

1. Choose the correct pair

A. Fluorine oxidation state is -1

B. H_2 : oxidation state is +1

C. Cl_2 : oxidation state is -1

D. SO_4^{2-} oxidation state of S is -4

Answer: A

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2. Choose the correct pair

A. Molar mass of Vinegar : 90 g mol^{-1}

B. Molar mass of Lactic acid : 60 g mol^{-1}

C. Molar mass of Acetic acid : 90 g mol^{-1}

D. Molar mass Lactic acid : 90 g mol^{-1}

Answer: D

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3. Choose the correct pair

A. Vinegar: $C_3H_6O_3$

B. Lactic acid: $C_3H_6O_3$

C. Vinegar :CH_2O

D. Lactic acid : CH_2O

Answer: B

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4. Choose the correct pair

A. 1 mole : 6.023×10^{23} entities

B. ice : Liquid

C. Green tea : Heterogeneous mixture

D. Copper sulphate : Element

Answer: A

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Additional Questions Solved Choose The Incorrect Pair

1. Choose the incorrect pair

A. Monoatomic unit : Phosphorous

B. Polyatomic unit : Sulphur

C. Monoatomic unit : Gold

D. Monoatomic unit : Copper

Answer: A

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2. Choose the incorrect pair

A. Carbon dioxide: CO_2

B. Glucose: $C_{12}H_{22}O_{11}$

C. Sodium chloride :NaCl

D. Hydrogen sulphide : H_2S

Answer: B

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3. Choose the incorrect pair

A. Gastric acid : Hydrochloric acid

B. Antacids : Sodium hydroxide

C. Avogadro Number : 6.023×10^{23}

D. Rusting of iron : oxidation reaction

Answer: B

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4. Choose the incorrect pair

A. Oxidation number of O in H_2O_2 : -1

B. Oxidation number of O in H_2O : -2

C. Oxidation number of O in OF_2 : -2

D. Oxidation number of O in OF_2 : +2

Answer: D

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Additional Questions Solved Assertion Reason

1. Assertion (A): Antacids are used as medicines for treating heartbum and acidity.

Reason (R): Gastric acid produced in stomach is hydrochloric acid. Antacid is used to treat acidity because they contain bases such as magnesium hydroxide and Aluminium hydroxide.

A. Both (A) and (R) are correct and (R) is the correct explanation of (A).

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

C. (A) is correct but (R) is wrong.

D. (A) is wrong but (R) is correct

Answer: A

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2. Assertion (A): Zinc metal when placed in copper sulphate solution, zinc turns brown. Reason (R): Due to metal displacement reaction, copper sulphate reacts with zinc, Cu gets deposited over zinc and so it turns brown.

A. Both (A) and (R) are correct but (R) is not the correct explanation of (A)

B. Both (A) and (R) are correct and (R) is the correct explanation of (A).

C. (A) is correct but (R) is wrong.

D. (A) is wrong but (R) is correct

Answer: A

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Additional Questions Solved Choose The Incorrect Statement

1. Choose the incorrect statement

A. Empirical formula shows the actual number of atoms of different elements in one molecule of the compound

B. Ozone (O_3) is another form of oxygen gas at room temperature

C. Gases are easily compressible

D. Pressure is defined as force divided by the area perpendicular to which the force is applied

Answer: A

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2. Choose the incorrect statement

A. The sum of the oxidation number of all the atoms in neutral molecule is equal to zero

B. Fluorine has an oxidation number + 1 in all its compounds

C. The oxidation number of a substance in its elementary state is equal to zero.

D. Oxidation number of oxygen, in water (H_2O) is -2.

Answer: B

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3. Choose the correct statement

A. In redox reaction, number of electrons lost is more than number of electrons gained

B. In redox reaction, number of electrons lost is less than number of electrons gained

C. In redox reaction, number of electrons lost is equal number of electrons gained

D. In redox reaction, no transfer and gain of electrons during the reaction.

Answer: C

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Additional Questions Solved 2 Mark Questions

1. State Avogadro's Hypothesis.

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2. What is molar volume?

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3. The approximate production of Na_2CO_3 per month is 424×10^6 g while that of methyl alcohol is 320×10^6 g. Which is produced more in terms of moles?

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4. Calculate the number of moles of carbon atoms in three moles of ethane.

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5. Find the molecular mass of $FeSO_4 7H_2O$.

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6. Mass of one atom of an element is 6.66×10^{-23} g. How many moles of element are there in 0.320 kg?

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7. How many moles of glucose are present in 720 g of glucose ?

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8. Calculate the weight of 0.2 mole of sodium carbonate.

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9. What do you understand by the terms acidity and basicity?

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10. Calculate the equivalent mass of bicarbonate ion.

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11. Calculate the equivalent mass of barium hydroxide.

Watch Video Solution

12. Calculate the equivalent mass of hydrated sodium carbonate.

Watch Video Solution

13. What do you understand by the terms empirical formula and molecular formula?

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14. Boric acid, H_3BO_3 is a mild antiseptic and is often used as an eye wash. A sample contains 0.543 mol H_3BO_3. What is the mass of boric acid in the sample?.

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15. A compound contains $50\ \%$ of X (atomic mass 10)and $50\ \%$ Y (atomic mass 20) . Give its molecular formula .

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16. Calculate the mass of sodium (in kg) present in 95 kg of a crude sample of sodium nitrate whose percentage purity is 70%.

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17. Define matter. What are the types of matter?

Watch Video Solution

18. Prove that states of matter are interconvertible.

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19. What is meant by Plasma state? Give an example.

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20. Differentiate an element and an atom

Watch Video Solution

21. Distinguish between a molecule and a compound.

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22. Chlorine has fractional average atomic mass. Justify this statement.

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23. Define molecular mass of a substance.

Watch Video Solution

24. Relative molarcular mass of sulphuric acid is _____.

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25. Define the avogadro's number :

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26. The number of moles of ethane in 60 g is

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27. Calculate the equivalent mass of Copper. (Atomic mass of copper = 63.5)

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28. Calculate the equivalent mass of (i) Sulphate ion (ii) Phosphate ion.

Watch Video Solution

29. Calculate the equivalent mass of H_2SO_4 .

Watch Video Solution

30. How many moles of hydrogen is required to produce 20 moles of ammonia?

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31. Calculate the amount of water produced by the combustion of 32 g of methane.

Watch Video Solution

32. How much volume of Carbon dioxide is produced when 25 g of calcium carbonate is heated completely under standard conditions?

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33. How much volume of chlorine is required to prepare 89.6 L of HCl gas at STP?

Watch Video Solution

34. Define limiting reagent .

Watch Video Solution

35. On the formation of SF_6 by the direct combination of S and F_2 which is the limiting reagent? Prove it.

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36. Mention any 4 redox reaction that takes place in our daily life.

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37. Calculate the oxidation number of underlined elements in the following.

(i) $KMnO_4$ (ii) $Cr_2O_7^{2-}$

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38. If ten volumes of dihydrogen gases react with five volumes of dioxygen gases that, how many volumes of water vapour would be produced ?

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39. Which one of the following will have largest number of atoms?

(i) 1 g of Au (s) (ii) 1 g of Na (s) (iii) 1 g of Li (s) (iv) 1g $Cl_2(g)$

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40. What will be the mass of one ^{12}C atom in g?

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41. Justify the following reaction is a redox reaction.

$$CuO_{(s)} + H_{2(g)} \rightarrow Cu_{(s)} + H_2O_{(g)}$$

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Additional Questions Solved 3 Mark Questions

1. Distinguish among the different physical states of matter

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2. Define equivalent mass

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3. How much copper can be obtained from 100 g of anhydrous copper sulphate?

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4. Calculate the equivalent mass of hydrated ferrous sulphate.

Watch Video Solution

5. Give difference between empirical and molecular formula.

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6. A sample of hydrated copper sulphate is heated to drive off the water of crystallization, cooled and reweighed 0.869 g of $CuSO_4$aH_2O gave a residue of 0.556 g. Find the molecular formula of hydrated copper sulphate.

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7. Balance by oxidation number method:

$Mg + HNO_3 \rightarrow Mg(NO_3)_2 + NO_2 + H_2O.$

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8. Explain about the classification of matter

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9. Calculate the mass of the following atoms in amu

(a) Helium (mass of He =6.641×10^{-24}g)

(b) Silver (mass of Ag = 1.790×10^{-22} g)

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10. Calculate the number of atoms present in 1 Kg of gold.

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11. Calculate the molar volume of 146 g of HC1 gas and the number of molecules present in it.

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12. Calculate the molar mass of 20 L of gas weighing 23.2 g at STP.

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13. 0.6 g of a metal gives on oxidation 1 g of its oxide. Calculate its equivalent mass.

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14. How would you calculate the equivalent mass of anhydrous oxalic acid and hydrated oxalic acid.

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15. A compound on decomposition in the laboratory produces 24.5 g of nitrogen and 70 g of oxygen. Calculate the empirical formula of the compound.

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16. What is the steps involve in the calculation of molecular formula from empirical formula ?

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17. What is combination reaction ? Give example.

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18. What is decomposition reaction? Give two examples

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19. What is displacement reactions ? Give its types. Explain with example.

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20. What is disproportionation reactions? Give example.

Watch Video Solution

21. What are competive electron transfer reaction ? Give example.

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22. Balance the following equation using oxidation number method.

S + $HNO_3 \rightarrow H_2SO_4 + NO_2 + H_2O$

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23. Determine the empirical formula of an oxide of iron which has 69.9% iron and 30.1% oxygen by mass.

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24. In three moles of ethane (C_2H_6) calculate the following:

(i) Number of moles of carbon atoms.

(ii) Number of moles of hydrogen atoms.

(iii) Number of molecules of ethane.

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25. Chlorine is prepared in the laboratory by treating manganese dioxide (MnO_2) with aqueous hydrochloric acid according to the reaction.

$$4HCl_{(aq)} + MnO_2 \rightarrow 2H_2O + MnCl_{2_{(aq)}} + Cl_{2_{(aq)}}$$

How many grams of HCI react with 5.0 g of manganese dioxide ?

Atomic mass of Mn = 55 g).

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26. The density of Water at room temperature is 1.0 g/ml. How many molecules are there in a drop of water if its volume is 0.05 ml ?

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27. Balance the following equation by oxidation number method.

$MnO_4^- + Fe^{2+} \rightarrow Mn^{2+} + Fe^{3+}$ (acidic medium)

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Additional Questions Solved 5 Mark Questions

1. Define the following (a) equivalent mass of an acid (b) equivalent mass of a base (c) equivlent mass of an oxidising agent (d) equivalent mass of a reducing agent

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2. Calculate the percentage composition of the elements present in lead nitrate. How many Kg of O_2 can be obtained from 50 kg of 70% pure lead nitrate?

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3. Determine the empirical formula of a compound containing $K = 24.75\,\%$, $Mn = 34.77\,\%$ and rest is oxygen.

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4. Write the steps to be followed for writing empirical formula.

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5. An organic compound was found to have contained carbon = 40.65%, hydrogen = 8.55% and Nitrogen = 23.7%. Its vapour - density was found to be 29.5. What is the molecular formula of the compound?

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6. A compound contains 32% carbon, 4% hydrogen and rest oxygen. Its vapour density is 75. Calculate the empirical and molecular formula.

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7. Explain the different types of redox reactions with example.

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8. Write the steps to be followed while balancing redox equation by oxidation number method.

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9. Balance the following equation by oxidation number method:

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10. Balance the following equation by ion-electron method.

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11. Define equivalent mass of an oxidising agent

How would you calculate the equivalent mass of potassium permanganate?

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12. Define equivalent mass of an reducing agent.

How would you determine the equivalent mass of Ferrous sulphate?

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13. A compound on analysis gave the following percentage composition:

C = 24.47%, H= 4.07 %, Cl = 71.65%. Find out its empirical formula.

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14. A laboratory analysis of an organic compound gives the following mass percentage composition: C = 60%, H = 4.48% and remaining oxygen. Find out the Empirical Formula of the compound.

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15. An insecticide has the following percentage composition by mass. 47.5 % C, 2.54 % H and 50.0% Cl. Determine its empirical formula and molecular formulae. Molar mass of the substance is 354.5 $gmol^{-1}$

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16. An organic fruit smelling compound on analysis has the following composition by mass: C = 54.54%, H = 9.09%, O = 36.36%. Find out the molecular formula of the compound. The vapour density of the compound was found to be 44

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17. Calculate the percentage composition of the elements present in magnesium carbonate. How many Kg of CO_2 can be obtained from 100 Kg of is 90% pure magnesium carbonate

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18. Urea is prepared by the reaction between ammonia and carbon dioxide.

$$2NH_{3(g)} + CO_{2(g)} \rightarrow (NH_4)_2CO_{aq} + H_2O_{(l)}$$

In one process, 637.2 g of NH_3 are allowed to react with 1142 g of CO_2

(a) Which of the two reactants is the limiting reagent?

$$2NH_{3(g)} + CO_{2(g)} \rightarrow (NH_4)_2CO_{aq} + H_2O_{(l)}$$

(b) Calculate the mass of $(NH_4)_2CO$ formed.

$$2NH_{3(g)} + CO_{2(g)} \rightarrow (NH_4)_2CO_{aq} + H_2O_{(l)}$$

(c) How much of the excess reagent in grams is left at the end of the reaction?

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19. Define oxidation number.

What are the rules used to assign oxidation number?

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20. Balance the following equation by oxidation number method

$C_6H_6 + O_2 \rightarrow CO_2 + H_2O$

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21. Balance the following equation by oxidation number method.

$KMNO_4 + HCl \rightarrow KCl + MnCl_2 + H_2O + Cl_2$

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22. Balance the following equation by oxidation number method.

$KMnO_4 + FeSO_4 + H_2SO_4 \rightarrow K_2SO_4 + MnSO_4 + Fe_2(SO_4)_3 + H_2O$

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23. Balancing of molecular equation in alkaline medium.

$MnO_2 + O_2 + KOH \rightarrow K_2MnO_4 + H_2O$

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24. Explain the steps involved in ion-electron method for balancing redox reaction.

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25. Write balanced equation for the oxidation of Ferrous ions to Ferric ions by permanganate ions in acid solution. The permanganate ion

forms Mn^{2+} ions under these conditions.

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26. A flask A contains 0.5 mole of oxygen gas. Another flask B contains 0.4 mole of ozone gas Which of the two flasks contains greater number of oxygen atoms.

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27. Formulate possible compounds of 'Cl' in its oxidation state is:

0, -1, +1, +3, +5, +7

H_2O_2 act as an oxidising agent as well as reducing agent where as O_3 act as only oxidizing agent. Prove it.

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28. The Mn^{3+} ion is unstable in solution and undergoes disproportionation to give Mn^{2+} , MnO_2 and H^+ ion. Write a balanced ionic equation for the reaction.

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29. Chlorine is used to purify drinking water. Excess of chlorine is harmful. The excess chlorine is removed by treating with sulphur dioxide. Present a balanced equation for the reaction for this redox change taking place in water.

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