



## CHEMISTRY

### BOOKS - MTG CHEMISTRY (ENGLISH)

#### SOME BASIC CONCEPTS OF CHEMISTRY

##### Mcq

1. Few quantities with their units are listed below. Mark the units which are not correctly matched.

(i) Density :  $\text{kg } m^{-3}$

(ii) Velocity of light :  $\text{m } s^{-1}$

(iii) Planck's constant :  $J^{-1} s^{-1}$

(iv) Acceleration :  $\text{m } s^{-2}$

A. (ii) and (iv)

B. (i) and (iii)

C. (iii) and (v)

D. (iv) and (v)

**Answer:**



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**2. Mark the conversion factor which is not correct.**

A.  $1 \text{ atm} = 1.01325 \times 10^5 \text{ pa}$

B.  $1 \text{ metre} = 39.37 \text{ inches}$

C.  $1 \text{ litre} = 10^{-3} \text{ m}^3$

D.  $1 \text{ inch} = 3.33 \text{ cm}$

**Answer:**



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**3.** Few figures are expressed in scientific notation. Mark the incorrect one.

A.  $234000 = 2.34 \times 10^5$

B.  $8008 = 8 \times 10^3$

C.  $0.0048 = 4.8 \times 10^{-3}$

D.  $500.0 = 5.00 \times 10^2$

**Answer:**



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4. Mark the rule which is not correctly stated about determination of significant figures.

A. Zeros preceding the first non-zero digit are not significant.

B. Zero between two non-zero digits are not significant.

C. Zero at the end or right of the number are significant if they are on the right side of decimal point.

D. All non-zero digits are significant.

**Answer: B**



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5. Which of the following rules regarding the significant figures and calculations involving them is not correct?

A. The result of an addition or subtraction is reported to the same number of decimal places as present in number with least decimal places.

B. Result of multiplication or division should have same number of significant figures as present in most precise figure.

C. The result of multiplication or division should be rounded off to same number of significant figures as present in least precise figure.

D. The non-significant figures in the measurements are rounded off.

**Answer:**

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6. The result of the operation  $2.5 \times 1.25$  should be which of the following on the basis of significant figures?

A. 3.125

B. 3.13

C. 3.1

D. 31.25

**Answer:**



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7. How many significant figures are present in  $0.010100 \times 10^3$  ?

A. 7

B. 5

C. 3

D. 10

**Answer: B**



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8. What will be the answer in appropriate significant figures as a result of addition of 3.0223 and 5.041 ?

A. 80.633

B. 8.0633

C. 8.063

D. 806.33

**Answer:**



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9. Which of the following is the most accurate measurement?

A. 9m



B. 9.0m

C. 9.00m

D. 9.000m

**Answer:**



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**10.** Which of the following option is not correct ?

A.  $2.300+0.02017+0.02015=2.340$

B. 126, 000 has 3 significant figures.

C.  $15.15\mu s = 1.515 \times 10^{-5} s$

D.  $0.0048 = 48 \times 10^{-3}$

**Answer:**



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11. What should be the volume of the milk (in  $m^3$ ) which measures 5L?

A.  $5 \times 10^{-3}m^3$

B.  $5 \times 10^3m^3$

C.  $5 \times 1000m^3$

D.  $5 \times 10^6m^3$

**Answer:**



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12. How many seconds are there in 3 days?

A. 259200 s

B. 172800 s

C. 24800 s

D. 72000 s

**Answer:**



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13. 18.72 g of a substance 'X' occupies  $1.81 \text{ cm}^3$ . What will be its density measured in correct significant figures?

A.  $10.3 \text{ gcm}^{-3}$

B.  $10.34\text{gcm}^{-3}$

C.  $10.4\text{gcm}^{-3}$

D.  $10.3425\text{gcm}^{-3}$

**Answer:**

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14. 4.88 g of  $KClO_3$  when heated produced 1.92 g of  $O_2$  and 2.96 g of KCl. Which of the following statements regarding the experiment is correct?

A. The result illustrates the law of conservation of mass.

B. The result of illustrates the law of multiple proportions.

C. The result illustrates the law of constant proportion.

D. None of the above laws is followed.

**Answer:**

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15. How much mass of silver nitrates will react with 5.85 g of sodium chloride to produce 14.35 g of silver chloride and 8.5 g of sodium nitrates if law of conservation of mass is followed?

A. 22.85 g

B. 108 g

C. 17.0 g

D. 28.70 g

**Answer: C**



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**16.** What mass of hydrochloric acid is needed to decompose 50 g of limestone?

A. 36.5 g

B. 73 g

C. 50 g

D. 100 g

**Answer: A**



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17. What mass of sodium chloride would be decomposed by 9.8 g of sulphuric acid if 12 g of sodium bisulphate and 2.75 g of hydrogen chloride were produced in a reaction?

A. 14.75 g

B. 3.8 g

C. 4.95 g

D. 2.2 g

**Answer: C**



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**18.** In an experiment 2.4g of iron oxide in reduction with hydrogen gave 1.68 g of iron. In another experiment, 2.7 g of iron oxide gave 1.89 g of iron on reduction. Which law is illustrated from the above data?

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

**Answer:**



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19. Which of the following statements indicates that law of multiple proportion is being followed?

A. An element forms two oxides,  $XO$  and  $XO_2$  containing 50% and 60% oxygen respectively. The ratio of masses of oxygen which combines with 1 g of element is 2 : 3.

B. Hydrogen sulphide contains 5.89% hydrogen, water contains 11.1% hydrogen and sulphur dioxide contains 50% oxygen.

C. 3.47 g of  $BaCl_2$  reacts with 2.36g of  $Na_2SO_4$  to give 3.88 of  $BaSO_4$  and 1.95 g of NaCl.

D. 20mL of ammonia gives 10 volumes of  $N_2$  and 30 volumes of  $H_2$  at constant temperature and pressure.

**Answer:**



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**20.** Give below are few statements. Mark the statement which is not correct.

A. Atoms are neither created nor destroyed in a chemical reaction.

B. Law of definite proportion state that a given compound always contains exactly the same proportion of elements by weight.

C. Gay Lussac's law of chemical combination is valid for all substances.

D. A pure compound has always a fixed proportion of masses of its constituents.

**Answer:**

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**21.** Are the atomic masses of some elements actually fractional ?

- A. They exist as a mixture of isotopes of different masses
- B. They contain impurities of other atoms
- C. They are mixtures of isobars
- D. They cannot be weighted accurately.

**Answer: A**



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**22.** Oxygen occurs in nature as a mixture of isotopes  $^{16}\text{O}$ ,  $^{17}\text{O}$  and  $^{18}\text{O}$  having masses of 15.995 u, 16.999 u and 17.999 u and relative abundance of 99.763%, 0.037% and 0.200% respectively. What is the average atomic mass of oxygen?

- A. 15.999 u
- B. 16.999 u
- C. 17.999 u
- D. 18.999 u

**Answer: A**



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**23.** For every one  $^{37}\text{Cl}$  isotopes there are three  $^{35}\text{Cl}$  isotopes in a sample of chlorine. What will be the average atomic mass of chlorine?

A. 35

B. 37

C. 35.5

D. 35.6

**Answer:**



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24. Carbon occur in nature as a mixture of  $C - 12$  and  $C - 13$ . Average atomic mass of carbon is 12.011 what is the % abundance of  $C - 12$  in nature ?

A. 0.889

B. 0.989

C. 0.899

D. 0.799

**Answer:**



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25. What is the mass of carbon dioxide which contains the same number of molecules as are contained in 40 g of oxygen?

A. 40g

B. 55g

C. 32g

D. 44g

**Answer: B**



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26. The number of oxygen atoms present in 1 mole of oxalic acids dihydrate is

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

B.  $6.022 \times 10^{34}$

C.  $7.22 \times 10^{23}$

D.  $36.13 \times 10^{23}$

**Answer: D**



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**27.** The measured density at *NTP* of *He* is  $0.1784\text{gL}^{-1}$ .

Calculate the weight of 1mole of *He*.

A. 3.99 g

B. 22.4 g

C. 3.56 g



D. 29 g

**Answer:**



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**28.** Which of the following gases will have least volume if 10g of each gas is taken at same temperature and pressure?

A.  $CO_2$

B.  $N_2$

C.  $CH_4$

D. HCl

**Answer:**



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29. How many number of molecules and atoms respectively are present in 2.8 liters of a diatomic gas at STP ?

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

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

C.  $7.5 \times 10^{22}$ ,  $15 \times 10^{22}$

D.  $15 \times 10^{22}$ ,  $7.5 \times 10^{23}$

**Answer:**



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30. Total number of atoms present in 34 g of  $NH_3$  is

A.  $4 \times 10^{23}$

B.  $4.8 \times 10^{21}$

C.  $2 \times 10^{23}$

D.  $48 \times 10^{23}$

**Answer: D**



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**31. What will be the mass of 100 atoms of hydrogen?**

A. 100g

B.  $1.66 \times 10^{-22}g$

C.  $6.023 \times 10^{23}g$

D.  $100 \times 6.023 \times 10^{23}g$

**Answer:**



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**32.** How many atoms in total are present in 1kg of sugar?

A.  $7.92 \times 10^{25}$  atoms

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

C.  $6.022 \times 10^{25}$  atoms

D. 1000 atoms

**Answer:**



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**33.** 1.4 moles of phosphorus trichloride are present in a sample. How many atoms are there in the sample?

A. 5.6

B. 34

C.  $2.4 \times 10^{23}$

D.  $3.372 \times 10^{24}$

**Answer:**



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**34.** What will be the standard molar volume of He, if its density is 0.1784 g/L at STP?

A. 11.2 L

B. 22.4 L

C. 5.6 L

D. 2.8 L

**Answer:**



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**35.** In a mixture of gases, the volume content of a gas is 0.06% at STP. Calculate the number of molecules of the gas in 1 L of the mixture.

A.  $1.613 \times 10^{23}$

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

C.  $1.61 \times 10^{27}$

D.  $1.61 \times 10^{19}$

**Answer:**



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**36.** What will be the weight of CO having the same number of oxygen atoms at present in 22 g of  $CO_2$ ?

A. 28g

B. 22g

C. 44g

D. 72g

**Answer:**



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**37.** Calculate the number of aluminium ions present in 0.051 g of aluminium oxide.

(Hint: The mass of an ion is the same as that of an atom of the same element. Atomic mass of Al = 27 u)

A.  $6.023 \times 10^{20}$  ions

B. 3 ions

C.  $6.023 \times 10^{23}$  ions

D. 9 ions

**Answer:**







**38.** Which of the following correctly represents 180 g of water ?

5 moles of water

(ii) 10 moles of water

(iii)  $6.023 \times 10^{23}$  molecules of water

(iv)  $6.023 \times 10^{24}$  molecules of water

A. (i) and (ii)

B. (i) and (iv)

C. (ii) and (iv)

D. (ii) and (iii)

**Answer:**



39. How many oxygen atoms will be present in 88 g of  $CO_2$  ?

A.  $24.08 \times 10^{23}$

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

C.  $44 \times 10^{23}$

D.  $22 \times 10^{24}$

**Answer: A**

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40. Calculate the total number of electrons present in 1.6 g of methane

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

B. 16

C.  $12.04 \times 10^{23}$

D.  $6.023 \times 10^{24}$

**Answer:**



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**41.** A mixture having 2 g of hydrogen and 32 oxygen occupies how much volume at NTP?

A. 44.8 L

B. 22.4 L

C. 11.2 L

D. 76.2 L

**Answer:**



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42. One atom of an element weight  $3.32 \times 10^{-23}$  g. How many number of gram atoms are in 20 kg of the element?

A. 2000

B. 20

C. 200

D. 1000

**Answer:**



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43. How much copper is present in 50 g of  $CuSO_4$

A. 19.90 g

B. 39.81 g

C. 63.5 g

D. 31.71 g

**Answer:**



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44. 0.48 g of a sample of a compound containing boron and oxygen contains 0.192 g of boron and 0.288 g of oxygen.

What will be the percentage composition of the compound?

A. 60% and 40% B and O respectively

B. 40% and 60% B and O respectively

C. 30% and 70% B and O respectively

D. 70% and 30% B and O respectively

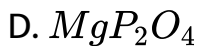
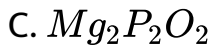
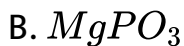
**Answer: B**



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**45.** A compound of magnesium contains 21.9% magnesium, 27.8% phosphorus and 50.3% oxygen. What will be the simplest formula of the compound?

A.  $Mg_2P_2O_7$

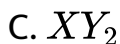
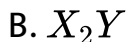


**Answer: A**



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**46.** A compound contains two elements 'X' and 'Y' in the ratio of 50% each. Atomic mass 'X' is 20 and 'Y' is 40. what can be its simplest formula?



D.  $X_2Y_3$

**Answer: B**



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47. The empirical formula of a compound is  $CH_2O_2$ . What could be its molecular formula?

A.  $C_2H_2O_2$

B.  $C_2H_2O_4$

C.  $C_2H_4O_4$

D.  $CH_4O_4$

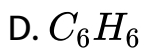
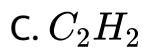
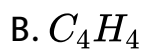
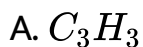
**Answer: C**



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48. A gas has molecular formula  $(CH)_n$ . If vapour density of the gas is 39, what should be the formula of the compound ?



**Answer:**



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49. Determine the molecular formula of an oxide of iron in which the mass percent of iron and oxygen are 69.9 and 30.1, respectively.

A. FeO

B.  $Fe_3O_4$

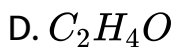
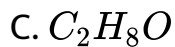
C.  $Fe_2O_3$

D.  $FeO_2$

**Answer:**

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50. An organic compound on analysis gave C=54.2%, H=9.2% by mass. Its empirical formula is

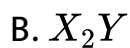


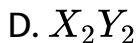
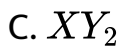
**Answer:**



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**51.** The relative number of mass of elements, 'X' and 'Y' in a compound is 0.25 and 0.5. The empirical formula of compound is

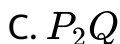
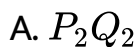




**Answer:**

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**52.** Two elements 'P' and 'Q' combine to form a compound. Atomic mass of 'p' is 12 and 'Q' is 16. percentage of 'P' in the compound is 27.3. What will be the empirical formula of the compound ?



D.  $PQ_2$

**Answer:**



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**53.** 1g of Mg is burnt in a closed vessel which contains 0.5g of  $O_2$

(i) Which reactants is left in excess

(ii) Find the mass of the excess reactant.

A.  $O_2$  is a limiting reagent and Mg is in excess by 0.25 g.

B. Mg is a limiting reagent and is in excess by 0.5 g.

C.  $O_2$  is a limiting reagent and is in excess by 0.25 g.

D.  $O_2$  is a limiting reagent and Mg is in excess by 0.75 g.

**Answer:**



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**54.** In a reaction container, 100g of hydrogen and 100 g of  $Cl_2$  are mixed for the formation of HCl gas. What is the limiting reagent and how much HCl is formed in the reaction ?

- A.  $H_2$  is limiting reagent and 36.5 g of HCl are formed.
- B.  $Cl_2$  is limiting reagent and 102.8 g of HCl are formed.
- C.  $H_2$  is limiting reagent and 142 g of HCl are formed.
- D.  $Cl_2$  is limiting reagent and 73 g of HCl are formed.

**Answer:**



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55. If 40g of  $CaCO_3$  is treated with 40g of HCl, which of the reactants will act as limiting reagent?

- A.  $CaCO_3$
- B. HCl
- C. Both (a) and (b)
- D. None of these

**Answer:**

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56. The weight of AgCl precipitated when a solution containing 5.85 g of NaCl is added to a solution containing 3.4g of  $AgNO_3$  is

- A. 28g
- B. 9.25g
- C. 2.870g
- D. 58g

**Answer:**



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57. How much oxygen is required for complete combustion of 560 g of ethene?



A. 6.4 kg

B. 1.92 Kg

C. 2.8 kg

D. 9.6 kg

**Answer:**



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**58.** How many moles of oxygen gas can be produced during electricity decomposition of 180 g of water ?

A. 2.5 moles

B. 5 moles

C. 10 moles

D. 7 moles

**Answer:**



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59. How many grams of  $CaO$  are required to neutralise 852g of  $P_4O_{10}$ ? Draw the structure of  $P_4O_{10}$ .

A. 852g

B. 1008g

C. 85g

D. 7095g

**Answer:**



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60. What volume of dioxygen is required for complete combustion of 2 volume of acetylene gas at NTP ?

- A. 2 volumes
- B. 5 volumes
- C. 10 volumes
- D. 4 volumes

**Answer:**



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61. What quantity of copper(II) oxide will react 2.80litre of hydrogen at NTP

A. 79.5 g

B. 2 g

C. 9.9 g

D. 22.4 g

**Answer:**

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62. At NTP, 1L of  $O_2$  reacts with 3L of carbon monoxide. What will be the volume of CO and  $CO_2$  after the reaction?

A. 1L  $CO_2$ , 1L CO

B. 2L  $CO_2$ , 2L CO

C. 1L  $CO_2$ , 2L CO

D. 2L  $CO_2$ , 1L CO

**Answer:**



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**63.** Calcium carbonate decomposes on heating to give calcium oxide and carbon dioxide. How much volume of  $CO_2$  will be obtained by thermal decomposition of 50g  $CaCO_3$  ?

A. 1L

B. 11.2 L

C. 44 L

D. 22.4 L

**Answer:**

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**64.** Chlorine gas is prepared by reaction of  $H_2SO_4$  with  $MnO_2$  and NaCl. What volume of  $Cl_2$  will be produced at STP if 50 g of NaCl is taken in the reaction ?

A. 1.915 L

B. 22.4 L

C. 11.2 L

D. 9.57 L

**Answer:**



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**65.** HCl is produced in the stomach which can be neutralised by  $Mg(OH)_2$  in the form of milk of magnesia. How much  $Mg(OH)_2$  is required to neutralise one mole of stomach acid?

A. 29.16 g

B. 34.3 g

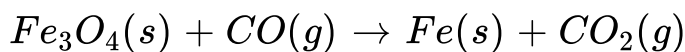
C. 58.33 g

D. 68.66g

**Answer:**



66. Magnetite,  $Fe_3O_4$ , can be converted into metallic iron by heating with carbon monoxide as represented by this equation:



The kilograms of  $Fe_3O_4$  which must be processed in this way to obtain  $5.00\text{kg}$  of iron, if the process is  $85\%$  efficient is closest to? [ $M: = Fe = 56$ ]

A. 8.12 kg

B. 4.14 kg

C. 6.94 kg

D. 16.8 kg

**Answer:**





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67. What is the mass percent of oxygen in ethanol ?

A. 52.14

B. 13.13

C. 16

D. 34.78

Answer:



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68. How much mass of sodium acetate is required to make 250 mL of 0.575 molar aqueous solution?

A. 11.79 g

B. 15.38 g

C. 10.81 g

D. 25.35 g

**Answer:**



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**69.** A solution is prepared by adding 5g of a solute 'X' to 45 g of solvent 'Y'. What is the mass percent of the solute 'X' ?

A. 10

B. 11.1

C. 90

D. 75

**Answer:**



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**70.** A 1.50g sample of an ore containing silver was dissolved, and all of the  $Ag^+$  was converted to 0.125 g of  $Ag_2S$ . What was the percentage of silver in the ore?

A. 0.216

B. 0.072

C. 0.017

D. 0.248

**Answer:**



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71. 2.82g of glucose is dissolved in 30g of water. The mole fraction of glucose in the solution is

- A. 0.01
- B. 0.99
- C. 0.52
- D. 1.66

**Answer:**



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72. What volume of water is to be added to  $100 \text{ cm}^3$  of 0.5M NaOH solution to make it 0.1 M solution?

A.  $200 \text{ cm}^3$

B.  $400 \text{ cm}^3$

C.  $500 \text{ cm}^3$

D.  $100 \text{ cm}^3$

**Answer:**



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73. Molarity equation of a mixture of solution of same substance is given by

A.

$$M_1 + V_1 \times M_2 + V_2 \times M_3 + V_3 + \dots = M_1 + M_2 + M_3$$

B.  $M_1V_1 + M_2V_2 + M_3V_3 + \dots = M(V_1 + V_2 + V_3)$

C.  $\frac{M_1}{V_1} + \frac{M_2}{V_2} + \frac{M_3}{V_3} + \dots = M\left(\frac{1}{V_1} + \frac{1}{V_2} + \frac{1}{V_3}\right)$

D.  $\frac{M_1}{V_1} \times \frac{M_2}{V_2} \times \frac{M_3}{V_3} + \dots = M_1\left(\frac{1}{V_1} \times \frac{1}{V_2} \times \frac{1}{V_3}\right)$

**Answer:**



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**74.** The final molarity of a solution made by mixing 50 mL of 0.5 M HCl, 150 mL of 0.25 M HCl and water to make the volume 250 mL is

A. 0.5 M

B. 1M

C. 0.75 M

D. 0.25 M

**Answer:**



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**75.** A solution is made by dissolving 49g of  $H_2SO_4$  in 250 mL of water. The molarity of the solution prepared is

A. 2 M

B. 1 M

C. 4 M

D. 5 M

**Answer:**



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**76.** What is the concentration of copper sulphate (in  $\text{mol L}^{-1}$ ) if 80 of it is dissolved in enough water to make a final volume of 3 L?

A. 0.0167

B. 0.167

C. 1.067

D. 10.67

**Answer:**



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77. 4.28g of NaOH is dissolved in water and the solution is made to 250 cc. what will be the molarity of the solution ?

A.  $0.615 \text{ mol L}^{-1}$

B.  $0.428 \text{ mol L}^{-1}$

C.  $0.99 \text{ mol L}^{-1}$

D.  $0.301 \text{ mol L}^{-1}$

**Answer:**



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78. What volume of 5M  $\text{Na}_2\text{SO}_4$  must be added to 25 mL of 1M  $\text{BaCl}_2$  to produce 10 g of  $\text{BaSO}_4$  ?

A. 8.58 mL

B. 7.2 mL

C. 10 mL

D. 12 mL

**Answer:**



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**79.** What will be the molarity of the solution in which 0.365 g of HCl gas is dissolved in 100 mL of solution ?

A. 2 M

B. 0.2 M

C. 1 M

D. 0.1 M

**Answer:**



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**80.** Which mode of concentration does not change with temperature ?

A. Molarity

B. Normality

C. Molality

D. All of these

**Answer:**



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81. What will be the molality of the solution made by dissolving 10 g of NaOH in 100g of water ?

A. 2.5 m

B. 5 m

C. 10 m

D. 1.25 m

**Answer:**



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82. What will be the molality of chloroform in the water sample which contains 15 ppm chloroform by mass?

A.  $1.25 \times 10^{-4} \text{ m}$

B.  $2.5 \times 10^{-4} \text{ m}$

C.  $1.5 \times 10^{-3} \text{ m}$

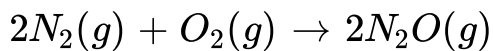
D.  $1.25 \times 10^{-5} \text{ m}$

**Answer:**

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**Hots**

1. 45.4L of dinitrogen reacted with 22.7L of dioxygen and 45.4 L of nitrous oxide was formed the reaction is given below



Which law is being obeyed in this experiment? Write the statement of the law?

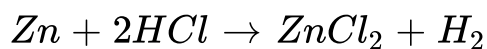
- A. Gay Lussac's law
- B. Law of definite proportion
- C. Law of multiple proportions
- D. Avogadro's law

**Answer:**



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2. Hydrogen gas is prepared in the laboratory by reacting dilute HCl with granulated zinc, Following reaction takes place



Calculate the volume of hydrogen gas liberated at STP when 32.65 g of zinc reacts with HCl. 1 mol of a gas occupies 22.7 L volume at STP, atomic mass of Zn=65 .3u

- A. 10.03 L
- B. 11.35 L
- C. 11.57 L
- D. 9.53 L

**Answer:**



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**3.** Chemical reactions involve interaction of atoms and molecules. A large number of atoms and molecules (approximately  $6.022 \times 10^{23}$ ) are present in a few grams of any chemical compound varying with their atomic/molecular masses. To handle such a large number conveniently, the mole concept was introduced. This concept has implications in diverse areas such as analytical chemistry, biochemistry, electrochemistry and radiochemistry. The following example illustrate a typical case involving chemical/electrochemical reaction which requires a clear understanding of mole concept.

A 4.0 molar aqueous solution of NaCl is prepared and 500 mL of the solution is electrolyzed. This lead to the evolution of chlorine gas at one of the electrodes (atomic mass : Na = 23 ,



Hg = 200 , 1F = 96500 C)

The total number of moles of chlorine gas evolved is :

A. 0.5

B. 1

C. 2

D. 3

**Answer:**

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4. Chemical reactions involve interaction of atoms and molecules. A large number of atoms and molecules (approximately  $6.022 \times 10^{23}$ ) are present in a few grams of any chemical compound varying with their atomic/molecular

masses. To handle such a large number conveniently, the mole concept was introduced. This concept has implications in diverse areas such as analytical chemistry, biochemistry, electrochemistry and radiochemistry. The following examples illustrate a typical case involving chemical/electrochemical reaction which requires a clear understanding of mole concept.

A 4.0 molar aqueous solution of NaCl is prepared and 500 mL of the solution is electrolysed. This leads to the evolution of chlorine gas at one of the electrodes (atomic mass : Na = 23 , Hg = 200 ,  $1F = 96500 \text{ C}$ )

If the cathode is a Hg electrode, the maximum weight (g) of amalgam formed from the solution is :

A. 200

B. 225

C. 400

D. 446

**Answer:**



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5. The total charge (coulombs) required for complete electrolysis is

A. 24125

B. 48250

C. 96500

D. 193000

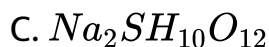
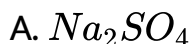
**Answer:**

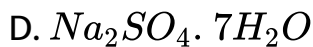
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6. A compound on analysis was found to contain the following composition :

$Na = 14.31\%$  ,  $S = 9.97\%$  ,  $O = 69.50\%$  and  $H = 6.22\%$

Calculate the molecular formula of the compound assuming that the whole of hydrogen in the compound is present as water of crystallisation. Molecular mass of the compound is 322.





**Answer:**



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7. The reactant which is entirely consumed in reaction is known as limiting reagent. In the reaction  $2A + 4B \rightarrow 3C + 4D$ , when 5 moles of A react with 6 moles of B, then

(a) which is the limiting reagent?

(b) calculate the amount of C formed?

A. C, 4.5 mol

B. B, 4.5 mol

C. B, 3.5 mol

D. C, 4.0 mol

**Answer:**



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8. The density of 3 molal solution of NaOH is  $1.110\text{g mL}^{-1}$ .

Calculate the molarity of the solution.

A. 2.69 M

B. 2.97 M

C. 4.57 M

D. 6.70 M

**Answer: B**



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9. 1L of 0.1MNaOH, 1L of 0.1MKOH, and 2L of 0.05MBa(OH)<sub>2</sub> are mixed together. What is the final concentration of the solution.

- A. 0.01 M
- B. 0.01 N
- C. 0.1 N
- D. 0.001 M

**Answer:**



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1. What will be the molarity of a solution, which contains 5.85g of  $NaCl(s)$  per 500mL?

A.  $4 \text{ mol } L^{-1}$

B.  $20 \text{ mol } L^{-1}$

C.  $0.2 \text{ mol } L^{-1}$

D.  $2 \text{ mol } L^{-1}$

**Answer:**

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2. If 500mL of a 5M solution is diluted to 1500 mL, what will be the molarity of the solution obtained?



A. 1.5 M

B. 1.66 M

C. 0.017 M

D. 1.59 M

**Answer: B**



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**3.** The number of atoms present in one mole of an element is equal to Avogadro number. Which of the following elements contains the greatest number of atoms ?

A. 4 g He

B. 46 g Na

C. 0.4 g Ca

D. 12 g He

**Answer:**

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4. If the concentration of glucose ( $C_6H_{12}O_6$ ) in blood is  $0.9 \text{ g L}^{-1}$ , what will be the molarity of glucose in blood?

A. 5 M

B. 50 M

C. 0.005 M

D. 0.5 M

**Answer: C**



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5. What will be the molality of the solution containing 18.25 g of HCl gas in 500 g of water ?

A. 0.1 m

B. 1 M

C. 0.5 m

D. 1 m

**Answer:**



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6. One mole of any substance contains  $6.022 \times 10^{23}$  atoms/molecules. Number of molecules of  $H_2SO_4$  present in 100mL of 0.02M  $H_2SO_4$  solution is

A.  $12.044 \times 10^{20}$

B.  $6.022 \times 10^{23}$

C.  $1 \times 10^{23}$

D.  $12.044 \times 10^{23}$

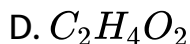
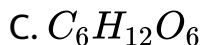
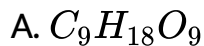
**Answer:**



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7. The empirical formula and molecular mass of a compound are  $CH_2O$  and 180 g respectively. What will be the molecular

formula of the compound ?



**Answer:**



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**8.** If the density of a solution is  $3.12\text{g mL}^{-1}$ , the mass of 1.5 mL solution in significant figures is

A. 4.7 g

B.  $4680 \times 10^{-3}$  g

C. 4.680 g

D. 46.80 g

**Answer:**

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**9.** Which of the following statements about a compound is incorrect ?

A. A molecule of a compound has atoms of different elements.

B. A compound cannot be separated into its constituent elements by physical methods of separation.

C. A compound retains the physical properties of its constituents elements.

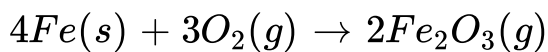
D. The ratio of atoms of different elements in a compound is fixed.

**Answer:**



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**10.** Which of the following statements is correct about the reaction given below:-



A. Total mass of iron and oxygen in reactants = total mass of iron and oxygen in product, therefore, it follows law

of conservation of mass.

B. Total mass of reactant = total mass of product,

therefore, law of multiple proportions is followed.

C. Amount of  $Fe_2O_3$  can be increased by taking any one

of the reactants (iron or oxygen ) in excess.

D. Amount of  $Fe_2O_3$  produced will decreased if the

amount of any one of the reactants (iron or oxygen ) is

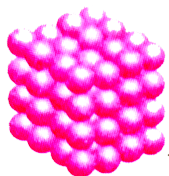
taken in excess.

**Answer:**



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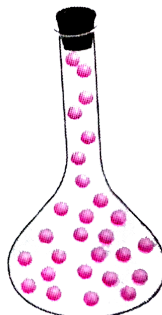




**Solid I**



**Liquid II**



**Gas III**

1.

Choose the correct statement about I, II and III.

A. I and II have definite volume but III does not have this property

B. I, II and III are interconvertible by changing the conditions of temperature by pressure.

C. In the particles of I, freedom of movement is large.

D. Both (a) and (b)

**Answer: D**



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2. Few quantities with their units are listed below. Mark the units which are not correctly matched.

(i) Density :  $\text{kg } m^{-3}$

(ii) Velocity of light :  $\text{m } s^{-1}$

(iii) Planck's constant :  $J^{-1} s^{-1}$

(iv) Acceleration :  $\text{m } s^{-2}$

A. (ii) and (iv)

B. (i) and (iii)

C. (iii) and (v)

D. (iv) and (v)

**Answer:**



3. Match the prefixes present in column I with their multiples in column II and mark the appropriate choice.

Column I (Prefixes)		Column II (Multiples)	
(A)	pico	(i)	$10^9$
(B)	femto	(ii)	$10^{-3}$
(C)	milli	(iii)	$10^{-12}$
(D)	giga	(iv)	$10^{-15}$

A. (A)  $\rightarrow$  (i), (B)  $\rightarrow$  (ii), (C)  $\rightarrow$  (iii), (D)  $\rightarrow$  (iv)

B. (A)  $\rightarrow$  (ii), (B)  $\rightarrow$  (i), (C)  $\rightarrow$  (iv), (D)  $\rightarrow$  (iii)

C. (A)  $\rightarrow$  (iv), (B)  $\rightarrow$  (iii), (C)  $\rightarrow$  (i), (D)  $\rightarrow$  (ii)

D. (A)  $\rightarrow$  (iii), (B)  $\rightarrow$  (iv), (C)  $\rightarrow$  (ii), (D)  $\rightarrow$  (i)

**Answer:**



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4. Mark the conversion factor which is not correct.

A.  $1 \text{ atm} = 1.01325 \times 10^5 \text{ pa}$

B.  $1 \text{ metre} = 39.37 \text{ inches}$

C.  $1 \text{ litre} = 10^{-3} m^3$

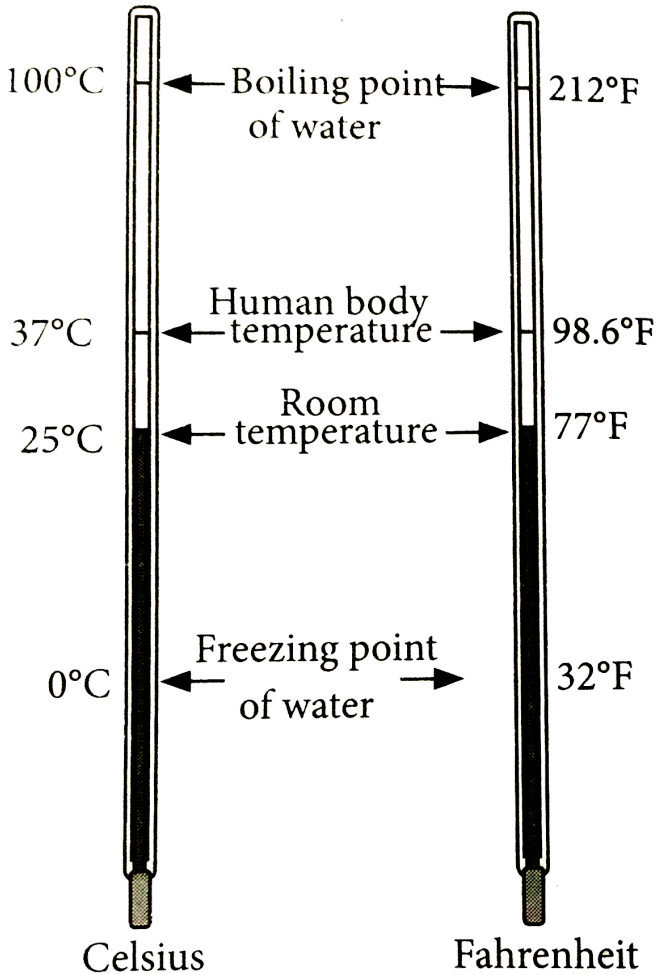
D.  $1 \text{ inch} = 3.33 \text{ cm}$

**Answer:**



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5. Consider the following figure,



The correct relationship between fahrenheit and celsius scale is

A.  $^{\circ}F = ^{\circ}C + 273.15$

$$\text{B. } ^\circ F = \frac{2}{5} ^\circ C + 16$$

$$\text{C. } ^\circ F = \frac{9}{5} ^\circ C + 32$$

$$\text{D. } ^\circ F = \frac{1}{3} ^\circ C + 32$$

**Answer:**

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## Uncertainty Of Measurement

1. Few figures are expressed in scientific notation. Mark the incorrect one.

A.  $234000 = 2.34 \times 10^5$

B.  $8008 = 8 \times 10^3$

C.  $0.0048 = 4.8 \times 10^{-3}$

D.  $500.0 = 5.00 \times 10^2$

**Answer:**

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2. Mark the rule which is not correctly stated about determination of significant figures.

A. Zeros preceding to first non-zero digit are not significant.

B. Zero between two non-zero digits are not significant.

C. Zero at the end or right of the number are significant if they are on the right side of decimal point.

D. All non - zero digits are significant.

**Answer: B**



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3. Which of the following rules regarding the significant figures and calculations involving them is not correct?

A. The result of an addition or subtraction is reported to the same number of decimal places as present in number with least decimal places.

B. Result of multiplication or division should have same number of significant figures as present in most precise figure.



C. The result of multiplication or division should be rounded off to same number of significant figures as present in least precise figure.

D. The non-significant figures in the measurements are rounded off.

**Answer:**



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4. The result of the operation  $2.5 \times 1.25$  should be which of the following on the basis of significant figures?

A. 3.125

B. 3.13

C. 3.1

D. 31.25

**Answer:**



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5. How many significant figures are present in  $0.010100 \times 10^3$  ?

A. 7

B. 5

C. 3

D. 10

**Answer: B**



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6. What will be the answer in appropriate significant figures as a result of addition of 3.0223 and 5.041 ?

A. 80.633

B. 8.0633

C. 8.063

D. 806.33

**Answer:**



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7. Which of the following is the most accurate measurement?

A. 9m

B. 9.0m

C. 9.00m

D. 9.000m

**Answer:**



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8. Which set of figures will be obtained after rounding up the following up to three significant figures?

34.216, 0.04597, 10.4107

A. 34.3, 0.0461, 10.4

B. 34.2, 0.0460, 10.4

C. 34.20, 0.460, 10.40

D. 34.21, 4.597, 1.04

**Answer:**



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**9. Which of the following option is not correct ?**

A.  $2.300 + 0.02017 + 0.02015 = 2.340$

B. 126, 000 has 3 significant figures.

C.  $15.15\mu s = 1.515 \times 10^{-5} s$

D.  $0.0048 = 48 \times 10^{-3}$

**Answer:**



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**10.** What should be the volume of the milk (in  $m^3$ ) which measures 5L?

A.  $5 \times 10^{-3}m^3$

B.  $5 \times 10^3m^3$

C.  $5 \times 1000m^3$

D.  $5 \times 10^6m^3$

**Answer:**



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11. How many seconds are there in 3 days?

A. 259200 s

B. 172800 s

C. 24800 s

D. 72000 s

**Answer:**



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12. 18.72 g of a substance 'X' occupies  $1.81 \text{ cm}^3$ . What will be its density measured in correct significant figures?

A.  $10.3 \text{ gcm}^{-3}$

B.  $10.34\text{gcm}^{-3}$

C.  $10.4\text{gcm}^{-3}$

D.  $10.3425\text{gcm}^{-3}$

**Answer:**

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## Laws Of Chemical Combination

1. 4.88 g of  $KClO_3$  when heated produced 1.92 g of  $O_2$  and 2.96 g of KCl. Which of the following statements regarding the experiment is correct?

A. The result illustrates the law of conservation of mass.



B. The result of illustrates the law of multiple proportions.

C. The result illustrates the law of constant proportion.

D. None of the above laws is followed.

**Answer:**



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2. How much mass of silver nitrates will react with 5.85 g of sodium chloride to produce 14.35 g of silver chloride and 8.5 g of sodium nitrates if law of conservation of mass is followed?

A. 22.85 g

B. 108 g

C. 17.0 g

D. 28.70 g

**Answer: C**



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**3.** What mass of hydrochloric acid is needed to decompose 50 g of limestone?

A. 36.5 g

B. 73 g

C. 50 g

D. 100 g

**Answer: A**



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4. Which one of the following best explains the law of conservation of mass ? (a) 100 g of water is heated to give steam. (b) A sample of  $N_2$  gas is heated at constant pressure without any change in mass. (c) 36 g of carbon combines with 32 g of oxygen to form 68 g of  $CO_2$  (d) 10 g of carbon is heated in vacume without any change in mass.

A. 100 g of water is heated to give steam.

B. A sample of  $N_2$  gas is heated at constant pressure without any change in mass.

- C. 36 g of carbon combines with 32 g of oxygen to form 68 g of  $CO_2$
- D. 10 g of carbon is heated in vacuume without any change in mass.

**Answer:**



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5. What mass of sodium chloride would be decomposed by 9.8 g of sulphuric acid if 12 g of sodium bisulphate and 2.75 g of hydrogen chloride were produced in a reaction?

A. 14.75 g

B. 3.8 g

C. 4.95 g

D. 2.2 g

**Answer: C**

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6. In an experiment 2.4g of iron oxide in reduction with hydrogen gave 1.68 g of iron. In another experiment, 2.7 g of iron oxide gave 1.89 g of iron on reduction. Which law is illustrated from the above data?

A. Law of constant proportions

B. Law of multiple proportions

C. Law of reciprocal proportions

## D. Law of conservation proportions

**Answer:**

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7. The following data are obtained when dinitrogen and dioxygen react together to form different compounds:

<b>Mass of dinitrogen</b>	<b>Mass of dioxygen</b>
14 g	16 g
14 g	32 g
28 g	32 g
28 g	96 g

Which law of chemical combination is obeyed by the above experimental data ?

A. Law of conservation of mass

B. Law of definite proportions

C. Law of multiple proportions

D. Avogadro's law

**Answer:**

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8. Which of the following statements indicates that law of multiple proportion is being followed?

A. An element forms two oxides,  $XO$  and  $XO_2$  containing 50% and 60% oxygen respectively. The ratio of masses of oxygen which combines with 1 g of element is 2 : 3.

B. Hydrogen sulphide contains 5.89% hydrogen, water contains 11.1% hydrogen and sulphur dioxide contains

50% oxygen.

C. 3.47 g of  $BaCl_2$  reacts with 2.36g of  $Na_2SO_4$  to give

3.88 of  $BaSO_4$  and 1.95 g of NaCl.

D. 20mL of ammonia gives 10 volumes of  $N_2$  and 30

volumes of  $H_2$  at constant temperature and pressure.

**Answer:**



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9. Which one of the following pairs of compound illustrates the law of multiple proportion

A.  $PH_3$ ,  $HCl$

B.  $PbO$ ,  $PbO_2$



C.  $H_2S$ ,  $SO_2$

D.  $CuCl_2$ ,  $CuSO_4$

**Answer: B**

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**10.** The statements for laws of chemical combinations are given below. Mark the option which is not correctly matched.

A. Matter can neither be created nor destroyed: Law of conservation of mass

B. A compound always contains exactly the same proportions of elements by weight : Law of definite proportions

C. When gases combine they do so in a simple ratio by

weight : Gay Lussac's Law

D. Equal volumes of gases at same temperature and

pressure contain same number of molecules:

Avogadro's Law

**Answer:**



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**11.** Give below are few statements. Mark the statement which is not correct.

A. Atoms are neither created nor destroyed in a chemical reaction.

B. Law of definite proportion state that a given compound always contains exactly the same proportion of elements by weight.

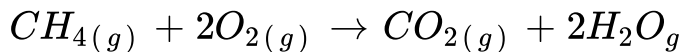
C. Gay Lussac's law of chemical combination is valid for all substances.

D. A pure compound has always a fixed proportion of masses of its constituents.

**Answer:**

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**12.** A balanced equation for combustion of methane is given below:



Which of the following statements is not correct on the basis of the above chemical equation? (A) one mole of  $CH_4$  reacts with 2 moles of oxygen to give one mole of  $CO_2$  (B) one molecule of  $CH_4$  reacts with 2 molecules of oxygen to give one molecule of  $CO_2$  and 2 molecules of water (C) 22.4L methane reacts with 44.8L of oxygen to give 44.8L of  $CO_2$  and 22.4L of water (D) 16g of methane reacts with 64g of  $O_2$  to give 44g of  $CO_2$  and 36g of water

A. One mole of  $CH_4$  reacts with 2 moles of oxygen to give one mole of  $CO_2$  and 2 moles of water.

B. One molecules of  $CH_4$  reacts with 2 molecules of oxygen to give one molecule of  $CO_2$  and 2 molecules of water.

C. 22.4 L of methane reacts with 44.8 L of oxygen to give 44.8 L of  $CO_2$  and 22.4 L of water.

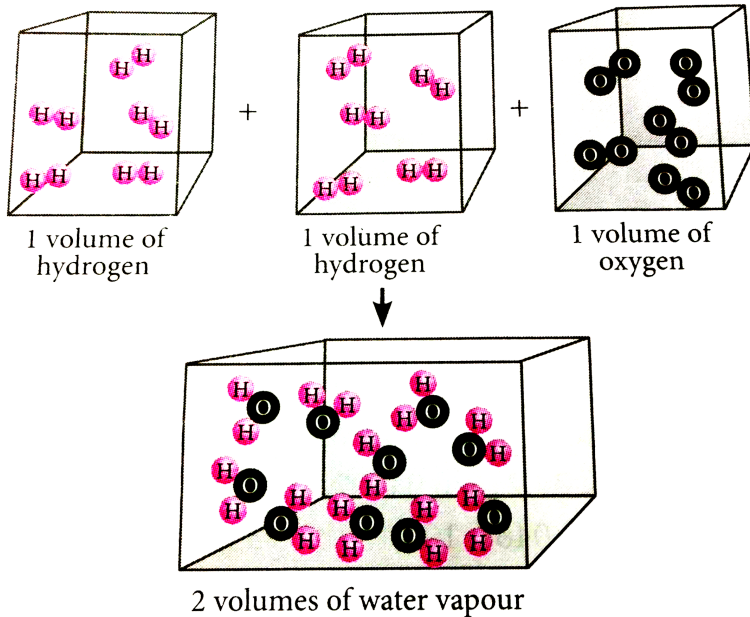
D. 16 g of methane reacts with 64 g of  $O_2$  to give 44 g of  $CO_2$  and 36 g of water.

**Answer:**



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**13.** Which of the following law of chemical combination is satisfied by the figure?



- A. Law of multiple proportion
- B. Dalton's law
- C. Avogadro law
- D. Law of conservation of mass

Answer:



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## Atomic And Molecular Masses

1. The reference standard used for defining atomic mass is

- A. H-1
- B. C-12
- C. C-13
- D. C-14

**Answer: B**



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2. Are the atomic masses of some elements actually fractional ?

- A. They exist as a mixture of isotopes of different masses
- B. They contain impurities of other atoms
- C. They are mixtures of isobars
- D. They cannot be weighted accurately.

**Answer: A**



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3. Oxygen occurs in nature as a mixture of isotopes  $^{16}\text{O}$ ,  $^{17}\text{O}$  and  $^{18}\text{O}$  having masses of 15.995 u, 16.999 u and 17.999 u and relative abundance of 99.763%, 0.037% and 0.200% respectively. What is the average atomic mass of oxygen?



A. 15.999 u

B. 16.999 u

C. 17.999 u

D. 18.999 u

**Answer: A**



**Watch Video Solution**

4. For every one  $^{37}\text{Cl}$  isotopes there are three  $^{35}\text{Cl}$  isotopes in a sample of chlorine. What will be the average atomic mass of chlorine?

A. 35

B. 37

C. 35.5

D. 35.6

**Answer:**



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5. Carbon occur in nature as a mixture of  $C - 12$  and  $C - 13$ . Average atomic mass of carbon is 12.011 what is the % abundance of  $C - 12$  in nature ?

A. 0.889

B. 0.989

C. 0.899

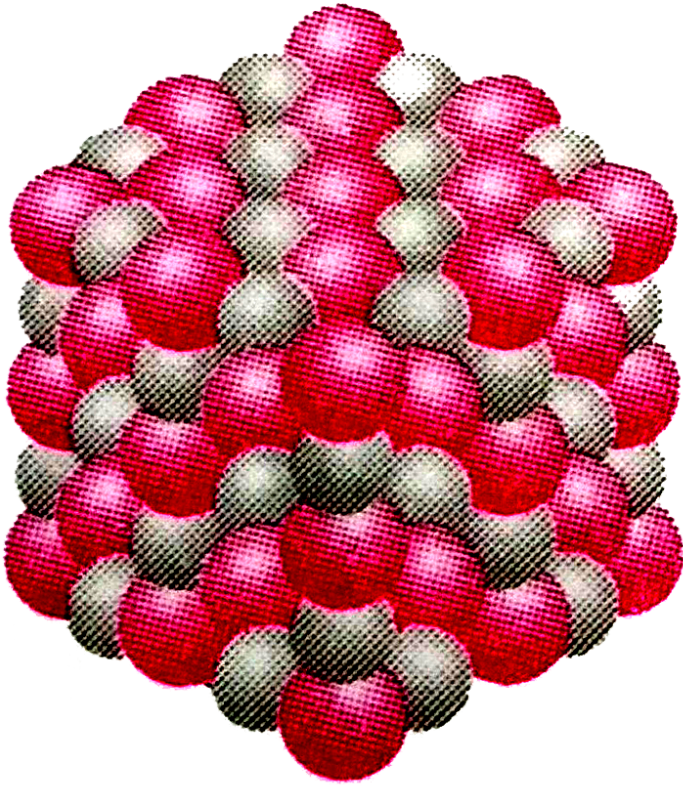
D. 0.799

**Answer:**



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6. Packing of  $Na^+$  and  $Cl^-$  ions in sodium chloride is depicted by the given figure. Choose the correct option regarding formula mass of sodium chloride.



(A) in solid

state, sodium chloride does not exist as a single entity (B)

formula mass of NaCl is 68.0u (C) formula mass of NaCl is the

sum of atomic masses of Na and Cl (D) both A and C

A. In the solid, sodium chloride does not exist as a single entity.

B. Formula mass of NaCl is 68.0 u.

C. Formula mass of NaCl is the sum of atomic masses of Na and Cl

D. Both (a) and (c)

**Answer:**



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## Mole Concept And Molecular Masses

1. What is the mass of carbon dioxide which contains the same number of molecules as are contained in 40 g of oxygen?

A. 40g

B. 55g

C. 32g

D. 44g

**Answer: B**



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2. Match the column I with column II and mark the appropriate choice.

Column I		Column II	
(A)	Mass of $H_2$ produced when 0.5 mole of zinc reacts with excess of HCl	(i)	$3.01 \times 10^{23}$ molecules
(B)	Mass of all atoms of a compound with formula $C_{70}H_{22}$	(ii)	$6.023 \times 10^{23}$ molecules
(C)	Number of molecules in 35.5 g of $Cl_2$	(iii)	$1.43 \times 10^{-21}$ g
(D)	Number of molecules in 64 g of $SO_2$	(iv)	1 g

A. (A)  $\rightarrow$  (ii), (B)  $\rightarrow$  (i), (C)  $\rightarrow$  (iv), (D)  $\rightarrow$  (iii)

B. (A)  $\rightarrow$  (i), (B)  $\rightarrow$  (ii), (C)  $\rightarrow$  (iii), (D)  $\rightarrow$  (iv)

C. (A)  $\rightarrow$  (iv), (B)  $\rightarrow$  (iii), (C)  $\rightarrow$  (i), (D)  $\rightarrow$  (ii)

D. (A)  $\rightarrow$  (iv), (B)  $\rightarrow$  (iii), (C)  $\rightarrow$  (ii), (D)  $\rightarrow$  (i)

**Answer:**



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3. The number of oxygen atoms present in 1 mole of oxalic acids dihydrate is

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

B.  $6.022 \times 10^{34}$

C.  $7.22 \times 10^{23}$

D.  $36.13 \times 10^{23}$

**Answer: D**



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4. The measured density at *NTP* of *He* is  $0.1784\text{gL}^{-1}$ .

Calculate the weight of 1mole of *He*.



A. 39.9 g

B. 22.4 g

C. 3.56 g

D. 29 g

**Answer:**



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5. Which of the following gases will have least volume if 10g of each gas is taken at same temperature and pressure?

A.  $CO_2$

B.  $N_2$

C.  $CH_4$

D. HCl

**Answer:**



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6. How many number of molecules and atoms respectively are present in 2.8 liters of a diatomic gas at STP ?

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

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

C.  $7.5 \times 10^{22}$ ,  $15 \times 10^{22}$

D.  $15 \times 10^{22}$ ,  $7.5 \times 10^{23}$

**Answer:**



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7. Total number of atoms present in 34 g of  $NH_3$  is

A.  $4 \times 10^{23}$

B.  $4.8 \times 10^{21}$

C.  $2 \times 10^{23}$

D.  $48 \times 10^{23}$

**Answer: D**



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8. What will be the mass of 100 atoms of hydrogen?

A. 100g

B.  $1.66 \times 10^{-22} g$

C.  $6.023 \times 10^{23} g$

D.  $100 \times 6.023 \times 10^{23} g$

**Answer:**



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**9. How many atoms in total are present in 1kg of sugar?**

A.  $7.92 \times 10^{25}$  atoms

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

C.  $6.022 \times 10^{25}$  atoms

D. 1000 atoms

**Answer:**



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**10.** 1.4 moles of phosphorus trichloride are present in a sample. How many atoms are there in the sample?

A. 5.6

B. 34

C.  $2.4 \times 10^{23}$

D.  $3.372 \times 10^{24}$

**Answer:**



[Watch Video Solution](#)

11. What will be the standard molar volume of He, if its density is 0.1784 g/L at STP?

A. 11.2 L

B. 22.4 L

C. 5.6 L

D. 2.8 L

**Answer:**



[Watch Video Solution](#)

12. In a mixture of gases, the volume content of a gas is 0.06% at STP. Calculate the number of molecules of the gas in 1 L of the mixture.

A.  $1.613 \times 10^{23}$

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

C.  $1.61 \times 10^{27}$

D.  $1.61 \times 10^{19}$

**Answer:**



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**13.** What will be the weight of CO having the same number of oxygen atoms at present in 22 g of  $CO_2$ ?

A. 28g

B. 22g

C. 44g

D. 72g

**Answer:**

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**14.** Match the mass of elements given in column I with the no. of moles given in column II and mark the appropriate choice.

Column I		Column II	
(A)	28 g of He	(i)	2 moles
(B)	46 g of Na	(ii)	7 moles
(C)	60 g of Ca	(iii)	1 mole
(D)	27 g of Al	(iv)	1.5 moles

A. (A)  $\rightarrow$  (iv), (B)  $\rightarrow$  (iii), (C)  $\rightarrow$  (ii), (D)  $\rightarrow$  (i)

B. (A)  $\rightarrow$  (i), (B)  $\rightarrow$  (iii), (C)  $\rightarrow$  (ii), (D)  $\rightarrow$  (iv)



C.  $(A) \rightarrow (iii), (B) \rightarrow (ii), (C) \rightarrow (i), (D) \rightarrow (iv)$

D.  $(A) \rightarrow (ii), (B) \rightarrow (i), (C) \rightarrow (iv), (D) \rightarrow (iii)$

**Answer:**

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**15.** Calculate the number of aluminium ions present in 0.051 g of aluminium oxide.

(Hint: The mass of an ion is the same as that of an atom of the same element. Atomic mass of Al = 27 u)

A.  $6.023 \times 10^{20}$  ions

B. 3 ions

C.  $6.023 \times 10^{23}$  ions

D. 9 ions

**Answer:**



**Watch Video Solution**

**16.** Which of the following correctly represents 180 g of water

?

5 moles of water

(ii) 10 moles of water

(iii)  $6.023 \times 10^{23}$  molecules of water

(iv)  $6.023 \times 10^{24}$  molecules of water

A. (i) and (ii)

B. (i) and (iv)

C. (ii) and (iv)

D. (ii) and (iii)

**Answer:**



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17. How many oxygen atoms will be present in 88 g of  $CO_2$  ?

A.  $24.08 \times 10^{23}$

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

C.  $44 \times 10^{23}$

D.  $22 \times 10^{24}$

**Answer: A**



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18. Calculate the total number of electrons present in 1.6 g of methane

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

B. 16

C.  $12.04 \times 10^{23}$

D.  $6.023 \times 10^{24}$

**Answer:**



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19. A mixture having 2 g of hydrogen and 32 oxygen occupies how much volume at NTP?

A. 44.8 L

B. 22.4 L

C. 11.2 L

D. 76.2 L

**Answer:**



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**20.** One atom of an element weight  $3.32 \times 10^{-23}$  g. How many number of gram atoms are in 20 kg of the element?

A. 2000

B. 20

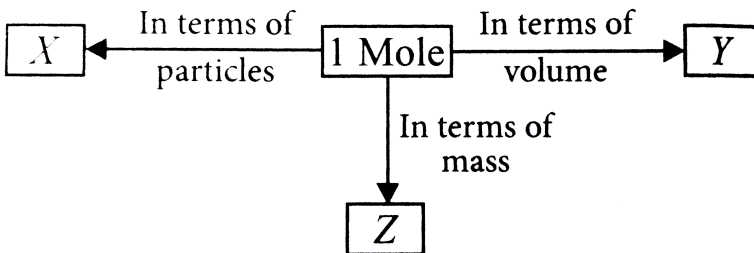
C. 200

D. 1000

Answer:

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21. Fill in the blanks by choosing the correct option.



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22. The mass of one mole of a substance in grams is called its

A. Molecular mass

B. Molar mass

C. Avogadro's mass

D. Formula mass.

**Answer:**



**Watch Video Solution**

**23.** How much copper is present in 50 g of  $CuSO_4$

A. 19.90 g

B. 39.81 g

C. 63.5 g

D. 31.71 g

**Answer:**



**Watch Video Solution**

## Percentage Composition

1. 0.48 g of a sample of a compound containing boron and oxygen contains 0.192 g of boron and 0.288 g of oxygen.

What will be the percentage composition of the compound?

- A. 60% and 40% B and O respectively
- B. 40% and 60% B and O respectively
- C. 30% and 70% B and O respectively
- D. 70% and 30% B and O respectively

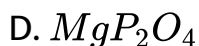
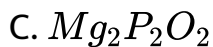
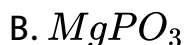
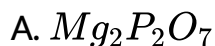


**Answer: B**



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2. A compound of magnesium contains 21.9% magnesium, 27.8% phosphorus and 50.3% oxygen. What will be the simplest formula of the compound?



**Answer: A**



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3. A compound contains two elements 'X' and 'Y' in the ratio of 50% each. Atomic mass 'X' is 20 and 'Y' is 40. what can be its simplest formula?

A. XY

B.  $X_2Y$

C.  $XY_2$

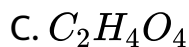
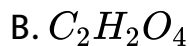
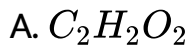
D.  $X_2Y_3$

**Answer: B**



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4. The empirical formula of a compound is  $CH_2O_2$ . What could be its molecular formula?

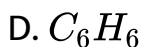
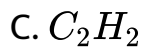
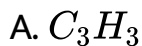


**Answer: C**



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5. A gas has molecular formula  $(CH)_n$ . If vapour density of the gas is 39, what should be the formula of the compound ?

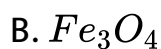


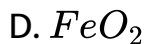
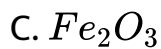
**Answer:**



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6. Determine the molecular formula of an oxide of iron in which the mass percent of iron and oxygen are 69.9 and 30.1, respectively.



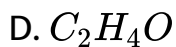
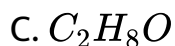


**Answer:**



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7. An organic compound on analysis gave C=54.2%, H=9.2% by mass. Its empirical formula is



**Answer:**



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8. The relative number of mass of elements, 'X' and 'Y' in a compound is 0.25 and 0.5. The empirical formula of compound is

A. XY

B.  $X_2Y$

C.  $XY_2$

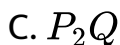
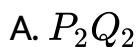
D.  $X_2Y_2$

**Answer:**



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9. Two elements 'P' and 'Q' combine to form a compound. Atomic mass of 'p' is 12 and 'Q' is 16. percentage of 'P' in the compound is 27.3. What will be the empirical formula of the compound ?



**Answer:**



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1. 1g of Mg is burnt in a closed vessel which contains

0.5g of  $O_2$

(i) Which reactant is left in excess

(ii) Find the mass of the excess reactant.

A.  $O_2$  is a limiting reagent and Mg is in excess by 0.25 g.

B. Mg is a limiting reagent and is in excess by 0.5 g.

C.  $O_2$  is a limiting reagent and is in excess by 0.25 g.

D.  $O_2$  is a limiting reagent and Mg is in excess by 0.75 g.

**Answer:**



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2. In a reaction container, 100g of hydrogen and 100 g of  $Cl_2$  are mixed for the formation of HCl gas. What is the limiting reagent and how much HCl is formed in the reaction ?

- A.  $H_2$  is limiting reagent and 36.5 g of HCl are formed.
- B.  $Cl_2$  is limiting reagent and 102.8 g of HCl are formed.
- C.  $H_2$  is limiting reagent and 142 g of HCl are formed.
- D.  $Cl_2$  is limiting reagent and 73 g of HCl are formed.

**Answer:**

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3. If 40g of  $CaCO_3$  is treated with 40g of HCl, which of the reactants will act as limiting reagent?

A.  $CaCO_3$

B. HCl

C. Both (a) and (b)

D. None of these

**Answer:**



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4. The weight of AgCl precipitated when a solution containing 5.85 g of NaCl is added to a solution containing 3.4g of  $AgNO_3$  is

A. 28g

B. 9.25g

C. 2.870g

D. 58g

**Answer:**



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5. How much oxygen is required for complete combustion of 560 g of ethene?

A. 6.4 kg

B. 1.92 Kg

C. 2.8 kg

D. 9.6 kg

**Answer:**



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6. How many moles of oxygen gas can be produced during electricity decomposition of 180 g of water ?

A. 2.5 moles

B. 5 moles

C. 10 moles

D. 7 moles

**Answer:**



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7. How many grams of  $CaO$  are required to neutralise 852g of  $P_4O_{10}$  ? Draw the structure of  $P_4O_{10}$ .

A. 852g

B. 1008g

C. 85g

D. 7095g

**Answer:**



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8. What volume of dioxygen is required for complete combustion of 2 volume of acetylene gas at NTP ?

A. 2 volumes

B. 5 volumes

C. 10 volumes

D. 4 volumes

**Answer:**



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**9.** What quantity of copper(II) oxide will react 2.80litre of hydrogen at NTP

A. 79.5 g

B. 2 g

C. 9.9 g

D. 22.4 g

**Answer:**



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10. At NTP, 1L of  $O_2$  reacts with 3L of carbon monoxide. What will be the volume of CO and  $CO_2$  after the reaction?

A. 1L  $CO_2$ , 1L CO

B. 2L  $CO_2$ , 2L CO

C. 1L  $CO_2$ , 2L CO

D. 2L  $CO_2$ , 1L CO

**Answer:**



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11. Calcium carbonate decomposes on heating to give calcium oxide and carbon dioxide. How much volume of  $CO_2$  will be obtained by thermal decomposition of 50g  $CaCO_3$  ?

- A. 1L
- B. 11.2 L
- C. 44 L
- D. 22.4 L

**Answer:**



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12. Chlorine gas is prepared by reaction of  $H_2SO_4$  with  $MnO_2$  and NaCl. What volume of  $Cl_2$  will be produced at STP if 50 g of NaCl is taken in the reaction ?

A. 1.915 L

B. 22.4 L

C. 11.2 L

D. 9.57 L

**Answer:**

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13. HCl is produced in the stomach which can be neutralised by  $Mg(OH)_2$  in the form of milk of magnesia. How much

$Mg(OH)_2$  is required to neutralise one mole of stomach acid?

A. 29.16 g

B. 34.3 g

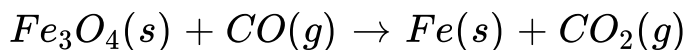
C. 58.33 g

D. 68.66g

**Answer:**

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**14.** Magnetite,  $Fe_3O_4$ , can be converted into metallic iron by heating with carbon monoxide as represented by this equation:



The kilograms of  $Fe_3O_4$  which must be processed in this way to obtain  $5.00\text{kg}$  of iron, if the process is  $85\%$  efficient is closest to? [ $M: = Fe = 56$ ]

A. 8.12 kg

B. 4.14 kg

C. 6.94 kg

D. 16.8 kg

**Answer:**

 [Watch Video Solution](#)

15. What is the mass percent of oxygen in ethanol ?

A. 0.5214

B. 0.1313

C. 0.16

D. 0.3473

**Answer:**



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**16.** How much mass of sodium acetate is required to make 250 mL of 0.575 molar aqueous solution?

A. 11.79 g

B. 15.38 g

C. 10.81 g

D. 25.35 g

**Answer:**



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17. A solution is prepared by adding 5g of a solute 'X' to 45 g of solvent 'Y'. What is the mass percent of the solute 'X' ?

A. 0.1

B. 0.111

C. 0.9

D. 0.75

**Answer:**



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18. A 1.50g sample of an ore containing silver was dissolved, and all of the  $Ag^+$  was converted to 0.125 g of  $Ag_2S$ . What was the percentage of silver in the ore?

A. 0.216

B. 0.072

C. 0.017

D. 0.248

**Answer:**



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19. 2.82g of glucose is dissolved in 30g of water. The mole fraction of glucose in the solution is

A. 0.01

B. 0.99

C. 0.52

D. 1.66

**Answer:**



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**20.** What volume of water is to be added to  $100 \text{ cm}^3$  of 0.5M NaOH solution to make it 0.1 M solution?

A.  $200 \text{ cm}^3$

B.  $400 \text{ cm}^3$

C.  $500 \text{ cm}^3$

D.  $100\text{cm}^3$

**Answer:**



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**21.** The final molarity of a solution made by mixing 50 mL of 0.5 M HCl, 150 mL of 0.25 M HCl and water to make the volume 250 mL is

A. 0.5 M

B. 1M

C. 0.75 M

D. 0.25 M

**Answer:**





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22. A solution is made by dissolving 49g of  $H_2SO_4$  in 250 mL of water. The molarity of the solution prepared is

A. 2 M

B. 1 M

C. 4 M

D. 5 M

**Answer:**



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**23.** What is the concentration of copper sulphate (in mol  $L^{-1}$ ) if 80 of it is dissolved in enough water to make a final volume of 3 L?

A. 0.0167

B. 0.167

C. 1.067

D. 10.67

**Answer:**



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**24.** 4.28g of NaOH is dissolved in water and the solution is made to 250 cc. what will be the molarity of the solution ?

A.  $0.615 \text{ mol L}^{-1}$

B.  $0.428 \text{ mol L}^{-1}$

C.  $0.99 \text{ mol L}^{-1}$

D.  $0.301 \text{ mol L}^{-1}$

**Answer:**



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25. What volume of  $5\text{M Na}_2\text{SO}_4$  must be added to  $25 \text{ mL}$  of  $1\text{M BaCl}_2$  to produce  $10 \text{ g}$  of  $\text{BaSO}_4$  ?

A.  $8.58 \text{ mL}$

B.  $7.2 \text{ mL}$

C.  $10 \text{ mL}$

D. 12 mL

**Answer:**



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**26.** What will be the molarity of the solution in which 0.365 g of HCl gas is dissolved in 100 mL of solution ?

A. 2 M

B. 0.2 M

C. 1 M

D. 0.1 M

**Answer:**



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27. What will be the molality of the solution made by dissolving 10 g of NaOH in 100g of water ?

A. 2.5 m

B. 5 m

C. 10 m

D. 1.25 m

**Answer:**



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28. What will be the molality of chloroform in the water sample which contains 15 ppm chloroform by mass?

A.  $1.25 \times 10^{-4} \text{ m}$

B.  $2.5 \times 10^{-4} \text{ m}$

C.  $1.5 \times 10^{-3} \text{ m}$

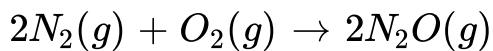
D.  $1.25 \times 10^{-5} \text{ m}$

**Answer:**

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**Higher Order Thinking Skills**

1. 45.4L of dinitrogen reacted with 22.7L of dioxygen and 45.4 L of nitrous oxide was formed the reaction is given below



Which law is being obeyed in this experiment? Write the statement of the law?

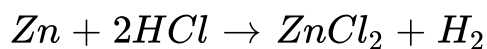
- A. Gay Lussac's law
- B. Law of definite proportion
- C. Law of multiple proportions
- D. Avogadro's law

**Answer:**



**Watch Video Solution**

2. Hydrogen gas is prepared in the laboratory by reacting dilute HCl with granulated zinc, Following reaction takes place



Calculate the volume of hydrogen gas liberated at STP when 32.65 g of zinc reacts with HCl. 1 mol of a gas occupies 22.7 L volume at STP, atomic mass of Zn=65 .3u

- A. 10.03 L
- B. 11.35 L
- C. 11.57 L
- D. 9.53 L

**Answer:**



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**3.** Chemical reactions involve interaction of atoms and molecules. A large number of atoms and molecules (approximately  $6.022 \times 10^{23}$ ) are present in a few grams of any chemical compound varying with their atomic/molecular masses. To handle such a large number conveniently, the mole concept was introduced. This concept has implications in diverse areas such as analytical chemistry, biochemistry, electrochemistry and radiochemistry. The following example illustrate a typical case involving chemical/electrochemical reaction which requires a clear understanding of mole concept.

A 4.0 molar aqueous solution of NaCl is prepared and 500 mL of the solution is electrolyzed. This lead to the evolution of chlorine gas at one of the electrodes (atomic mass : Na = 23 ,

Hg = 200 , 1F = 96500 C)

The total number of moles of chlorine gas evolved is :

A. 0.5

B. 1

C. 2

D. 3

**Answer:**

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4. Chemical reactions involve interaction of atoms and molecules. A large number of atoms and molecules (approximately  $6.022 \times 10^{23}$ ) are present in a few grams of any chemical compound varying with their atomic/molecular

masses. To handle such a large number conveniently, the mole concept was introduced. This concept has implications in diverse areas such as analytical chemistry, biochemistry, electrochemistry and radiochemistry. The following examples illustrate a typical case involving chemical/electrochemical reaction which requires a clear understanding of mole concept.

A 4.0 molar aqueous solution of NaCl is prepared and 500 mL of the solution is electrolysed. This leads to the evolution of chlorine gas at one of electrodes (atomic mass : Na = 23 , Hg = 200 ,  $1F = 96500 \text{ C}$ )

If the cathode is a Hg electrode, the maximum weight (g) of amalgam formed from the solution is :

A. 200

B. 225

C. 400

D. 446

**Answer:**



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5. The total charge (coulombs) required for complete electrolysis is

A. 24125

B. 48250

C. 96500

D. 193000

**Answer:**

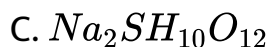
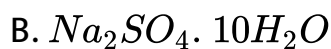
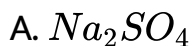


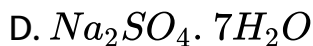
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6. A compound on analysis was found to contain the following composition :

$Na = 14.31\%$  ,  $S = 9.97\%$  ,  $O = 69.50\%$  and  $H = 6.22\%$

Calculate the molecular formula of the compound assuming that the whole of hydrogen in the compound is present as water of crystallisation. Molecular mass of the compound is 322.





**Answer:**



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7. The reactant which is entirely consumed in reaction is known as limiting reagent. In the reaction  $2A + 4B \rightarrow 3C + 4D$ , when 5 moles of A react with 6 moles of B, then

(a) which is the limiting reagent?

(b) calculate the amount of C formed?

A. C, 4.5 mol

B. B, 4.5 mol

C. B, 3.5 mol

D. C, 4.0 mol

**Answer:**



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8. The density of 3 molal solution of NaOH is  $1.110\text{g mL}^{-1}$ .

Calculate the molarity of the solution.

A. 2.69 M

B. 2.97 M

C. 4.57 M

D. 6.70 M

**Answer: B**



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9. 1L of 0.1MNaOH, 1L of 0.1MKOH, and 2L of 0.05MBa(OH)<sub>2</sub> are mixed together. What is the final concentration of the solution.

- A. 0.01 M
- B. 0.01 N
- C. 0.1 N
- D. 0.001 M

**Answer:**



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1. Two students performed the same experiment separately and each one of them recovered two readings of mass which are given below. Correct reading of mass is 3.0 g. On the basis of given data, mark the correct option out of the following statements.

Student	Readings	
	(i)	(ii)
<b>A</b>	<b>3.01</b>	<b>2.99</b>
<b>B</b>	<b>3.05</b>	<b>2.95</b>

- A. Results of both the students are neither accurate nor precise.
- B. Results of student A are both precise and accurate.
- C. Results of student B are neither precise nor accurate.
- D. Results of student B are both precise and accurate.

**Answer:**



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2. What will be the molarity of a solution, which contains 5.85g of  $NaCl(s)$  per 500mL?

A.  $4 \text{ mol } L^{-1}$

B.  $20 \text{ mol } L^{-1}$

C.  $0.2 \text{ mol } L^{-1}$

D.  $2 \text{ mol } L^{-1}$

**Answer:**



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3. If 500mL of a 5M solution is diluted to 1500 mL, what will be the molarity of the solution obtained?

A. 1.5 M

B. 1.66 M

C. 0.017 M

D. 1.59 M

**Answer: B**



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4. The number of atoms present in one mole of an element is equal to Avogadro number. Which of the following elements contains the greatest number of atoms ?

A. 4 g He

B. 46 g Na

C. 0.4 g Ca

D. 12 g He

**Answer:**



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5. If the concentration of glucose ( $C_6H_{12}O_6$ ) in blood is  $0.9 \text{ g L}^{-1}$ , what will be the molarity of glucose in blood?

A. 5 M

B. 50 M

C. 0.005 M

D. 0.5 M

**Answer: C**



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**6.** What will be the molality of the solution containing 18.25 g of HCl gas in 500 g of water ?

A. 0.1 m

B. 1 M

C. 0.5 m

D. 1 m

**Answer:**



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7. One mole of any substance contains  $6.022 \times 10^{23}$  atoms/molecules. Number of molecules of  $H_2SO_4$  present in 100mL of 0.02M  $H_2SO_4$  solution is

A.  $12.044 \times 10^{20}$

B.  $6.022 \times 10^{23}$

C.  $1 \times 10^{23}$

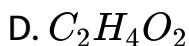
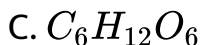
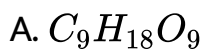
D.  $12.044 \times 10^{23}$

**Answer:**



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8. The empirical formula and molecular mass of a compound are  $CH_2O$  and 180 g respectively. What will be the molecular formula of the compound ?



**Answer:**

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9. If the density of a solution is  $3.12\text{g mL}^{-1}$ , the mass of 1.5 mL solution in significant figures is

A. 4.7 g

B.  $4680 \times 10^{-3}$  g

C. 4.680 g

D. 46.80 g

**Answer:**



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**10.** Which of the following statements about a compound is incorrect ?

A. A molecule of a compound has atoms of different elements.



B. A compound cannot be separated into its constituent elements by physical methods of separation.

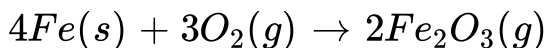
C. A compound retains the physical properties of its constituents elements.

D. The ratio of atoms of different elements in a compound is fixed.

**Answer:**

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11. Which of the following statements is correct about the reaction given below:-



A. Total mass of iron and oxygen in reactants = total mass of iron and oxygen in product, therefore, it follows law of conservation of mass.

B. Total mass of reactant = total mass of product, therefore, law of multiple proportions is followed.

C. Amount of  $Fe_2O_3$  can be increased by taking any one of the reactants (iron or oxygen ) in excess.

D. Amount of  $Fe_2O_3$  produced will decreased if the amount of any one of the reactants (iron or oxygen ) is taken in excess.

**Answer:**



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1. Assertion: Solid have definite volume and shape.

Reason : In solid, the constituent particles are very close to each other and there is not much freedom of movement.

- A. If both assertion and reason are true and reason is the correct explanation of assertion
- B. If both assertion and reason are true but reason is not correct explanation of assertion.
- C. If assertion is true but reason is false.
- D. If both assertion and reason are false.

**Answer:**



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2. Assertion: On heating, a solid usually change to a liquid and the liquid on further heating change to the gaseous state.

Reason : Arrangement of constituent particles is different in solid, liquid and gaseous state.

- A. If both assertion and reason are true and reason is the correct explanation of assertion
- B. If both assertion and reason are true but reason is not correct explanation of assertion.
- C. If assertion is true but reason is false.
- D. If both assertion and reason are false.

**Answer:**



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**3. Assertion :** Components of a homogeneous mixture cannot be separated by using physical methods

**Reason :** Composition of homogeneous mixture is uniform throughout as the components react to form a single compound.

- A. If both assertion and reason are true and reason is the correct explanation of assertion
- B. If both assertion and reason are true but reason is not correct explanation of assertion.
- C. If assertion is true but reason is false.
- D. If both assertion and reason are false.

**Answer:**



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**4. Assertion:** Elements and compound are the examples of pure substances.

**Reason :** The properties of a compound are different from those of its constituent elements.

- A. If both assertion and reason are true and reason is the correct explanation of assertion
- B. If both assertion and reason are true but reason is not correct explanation of assertion.
- C. If assertion is true but reason is false.
- D. If both assertion and reason are false.

**Answer:**



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**5. Assertion:** The mass of a substance is constant whereas its weight may vary from one place to another.

**Reason :** Mass of a substance is the amount of matter present in it while weight is the force exerted by gravity on an object.

- A. If both assertion and reason are true and reason is the correct explanation of assertion
- B. If both assertion and reason are true but reason is not correct explanation of assertion.
- C. If assertion is true but reason is false.

D. If both assertion and reason are false.

**Answer:**



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**6.** Assertion : Temperature below  $0^{\circ}C$  is possible on celsius scale but in Kelvin scale negative temperature is not possible

Reason : The Kelvin scale is related to celsius scale as

$$K = .^{\circ}C - 273.$$

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

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



C. If assertion is true but reason is false.

D. If both assertion and reason are false.

**Answer:**

 [View Text Solution](#)

7. Assertion: Scientific notation for the number 100 is expressed as  $1 \times 10^2$

Reason : The number  $1 \times 10^2$  has two significant figures.

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

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

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

**Answer:**

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**8.** Assertion: Matter can neither be created nor be destroyed.

Reason : This is law of definite proportions.

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

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

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

**Answer: C**



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**9.** Assertion: 12 parts by mass of carbon in CO and  $CO_2$  molecules combine with 16 and 32 parts by mass of oxygen.

Reason : A given compound always contains exactly the same proportion of elements by weight.

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

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

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

**Answer:**

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**10.** Assertion(A) One atomic mass unit is defined as one twelfth of the mass of one carbon-12 atom.

Reason(R) Carbon-12 isotope is the most abundant isotope of carbon and has been chosen as standard.

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

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

C. If assertion is true but reason is false.

D. If both assertion and reason are false.

**Answer:**



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**11.** Assertion: One mole of a substance always contain the same number of entities, no metter what the substance may be.

Reason : One mole is the amount of a substance that contains as many particles or entities as there are atoms in exactly 12 g of the  $^{12}\text{C}$  isotope.

- A. If both assertion and reason are true and reason is the correct explanation of assertion
- B. If both assertion and reason are true but reason is not correct explanation of assertion.
- C. If assertion is true but reason is false.
- D. If both assertion and reason are false.

**Answer:**

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**12.** Assertion: Molecular formula shows the exact number of different types of atoms present in a molecule of a compound.

Reason : Molecular formula can be obtained directly from

empirical formula which represents the simplest whole number ratio of various atoms present in a compound.

- A. If both assertion and reason are true and reason is the correct explanation of assertion
- B. If both assertion and reason are true but reason is not correct explanation of assertion.
- C. If assertion is true but reason is false.
- D. If both assertion and reason are false.

**Answer:**



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**13. Assertion:** The reactant which is present in large amount limits the amount of product formed is called limiting reagent.

**Reason :** Amount of product formed does not depend upon the amount of reactants taken.

- A. If both assertion and reason are true and reason is the correct explanation of assertion
- B. If both assertion and reason are true but reason is not correct explanation of assertion.
- C. If assertion is true but reason is false.
- D. If both assertion and reason are false.

**Answer:**



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**14.** Assertion: Molarity of a solution does not depend upon temperature whereas molality depends.

Reason : Molarity and molality both depend only on the number of moles of solute particles.

- A. If both assertion and reason are true and reason is the correct explanation of assertion
- B. If both assertion and reason are true but reason is not correct explanation of assertion.
- C. If assertion is true but reason is false.
- D. If both assertion and reason are false.

**Answer:**



15. Assertion: In laboratory, a solution of a desired concentration is prepared by diluting a stock solution.

Reason : Stock solution is the solution of higher concentration.

- A. If both assertion and reason are true and reason is the correct explanation of assertion
- B. If both assertion and reason are true but reason is not correct explanation of assertion.
- C. If assertion is true but reason is false.
- D. If both assertion and reason are false.

**Answer:**



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