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Questions:

Case Study Questions

1. Chemistry play an important role in human needs for food, health care products and improving life. Cis platin and taxol are used in chemotherapy, AZT (Azidothymidine) is used for AIDS. SI units are international units of measurement. Matter is classified into elements, compounds and mixtures, which can be homogeneous as well as heterogeneous. A mixture can be separated by physical methods, compounds can be separated by chemical methods only. Atomic mass is average of masses of isotopes depending upon their natural abundance. Empirical formula is calculated with the help of percentage composition of elements in a compound and molecular mass helps to calculate molecular formula. A chemical equation must be balanced so as to follow laws of chemical combination.
(a) Express 2.54 mm into S.I units.
(b) Out of milk, diamond, air, petrol which is pure substance?
(c) Balance the equation: $NO_2 + H_2O \rightarrow HNO_3 + NO$
(d) What is percentage of Na in Na_2CO_3 ? (Na = 23u, C = 12, O = 16u)
(e) $^{35}_{17}Cl$ and $^{37}_{17}Cl$ are in ratio of 3 : 1 in nature. What is atomic mass of Cl?
(f) What is empirical formula of $C_6H_{12}O_6$?
(g) Chlorophyll contains 2.68% magnesium atoms. Calculate mass of magnesium atoms in 2 g of chlorophyll.

5 Marks

2. In a reaction $A + B_2 \rightarrow AB_2$ Identify the limiting reagent, if any, in the following reaction mixtures.
(i) 300 atoms of A + 200 molecules of B
(ii) 2 mol A + 3 mol B
(iii) 100 atoms of A + 100 molecules of B
(iv) 5 mol A + 2.5 mol B
(v) 2.5 mol A + 5 mol B

3 Marks

3. The density of 3 M solution of Na Cl is 1.25 g mL^{-1}. Calculate molality of the solution.

4. A sample of salt has the following percentage composition
Fe = 36.76%, S = 21.11% and O = 42.14% Calculate the empirical formula of the compound.

2 Marks

5. Round up the following upto three significant figures.
0.04597

6. Use the data given in the following table to calculate the molar mass of naturally occuring argon isotopes:

Isotope	Isotopic molar mass	Abundance
^{36}Ar	35.96755 g mol^{-1}	0.337 %
^{38}Ar	37.96272 g mol^{-1}	0.063%
^{40}Ar	39.9624 g mol^{-1}	99.600%

Multiple Choice Question

7. The number of significant figures in 0.0101 is _____.
(a) 3 (b) 2 (c) 4 (d) 5

8. A measured temperature on Fahrenheit scale is 200°F. What will this reading be on celsius scale?
(a) 40°C (b) 94 °C (c) 93.3 °C (d) 30°C

9. Air contains 20% O_2 by volume. How much volume of air will be required for combustion of 100 cc of acetylene?
(a) 500 cc (b) 1064 cc (c) 212.8 cc (d) 1250 cc

10. Zinc sulphate contains 22.65% zinc and 43.9% water of crystallisation. If the law of constant proportions is true then the weight of zinc required to produce 20 g of the zinc sulphate crystals will be _____.
(a) 45.3 g (b) 4.53 g (c) 0.453 g (d) 453 g

11. The solution of A and Bare 0.1 and 0.2 molar in a substance. If 100 mL of 'A' are mixed with 25 mL of B and there is no change in volume, then the final molarity of solution is _____.
(a) 0.15 M (b) 0.18 M (c) 0.12 M (d) 0.30 M

12. Sulphuric acid reacts with sodium hydroxide as follows:
$H_2SO_4 + 2NaOH \longrightarrow Na_2SO_4 + 2H2O$
When 1L of 0.1M sulphuric acid solution is allowed to react with 1L of 0.1M sodium hydroxide solution, the amount of sodium sulphate formed and its molarity in the solution obtained is _____.
(a) 0.1 mol L^{-1} (b) 7.10 g (c) 0.025 mol L^{-1} (d) 3.55 g