

CHEMISTRY-2

Some basic concept of Chemistry

[Set-2]

SECTION-A

- How many moles of oxygen atoms present in 3.22 g of $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$?
($N_A = 23, S = 32, O = 16, H = 1$)
(i) 14 (ii) 4×10^{-2} (iii) 14×10^{-2} (iv) 0.14×10^{-2}
- 1 g of which of the following contain maximum number of neutrons?
(i) CH_4 (ii) NH_3 (iii) H_2O (iv) All equal
- If 500 ml of 5 M solution is diluted to 1500 ml, what will be the molarity of the solution obtained?
(i) 1.5 M (ii) 1.66 M (iii) 0.017 M (iv) 1.59 M
- When the same amount of zinc is treated separately with excess of H_2SO_4 and excess of NaOH , the ratio of volume of hydrogen evolved is
(i) 1 : 1 (ii) 1 : 2 (iii) 2 : 1 (iv) 9 : 4
- Match the following:

Column-I

- A. 88 g CO_2
 B. 6.02×10^{23} molecules of H_2O
 C. 5.6 L of O_2 at STP
 D. 1 mole of any gas

Column-II

1. 0.25 mol
 2. 2.0 mol
 3. 1.0 mol
 4. 6.02×10^{23} molecules

- | | A | B | C | D |
|-------|---|---|---|---|
| (i) | 2 | 1 | 3 | 4 |
| (ii) | 4 | 2 | 1 | 3 |
| (iii) | 2 | 3 | 1 | 4 |
| (iv) | 3 | 1 | 4 | 2 |

Assertion-Reason type Questions:

- (a) Both A and R are true and R is the correct explanation of A
 (b) Both A and R are true and R is not the correct explanation of A
 (c) A is true but R is false
 (d) A is false but R is true

6. A: 1 mol of O and 1 mol O₂ contains equal number of particles.
 R: 1 mole of molecules is always double than 1 mole of atom in all diatomic molecules.
7. A: The empirical formula mass of ethene is equal to its molecular mass.
 R: The empirical formula represents the simplest whole number ratio of various atoms present in a compound.

Passage bases questions:

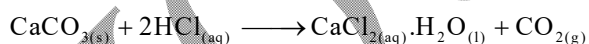
Read the following passage and answer the questions:

A solution is a homogeneous mixture of two or more components. Quantitative study of a solution requires its concentration i.e., the amount of solute present in a given amount of solution. It is important in administering medicines to patients because serious problem or even death can occur from incorrect dosages. There are number of methods to express the concentration of solution: mass percentage, volume percentage, molarity, molality and mole fraction.

8. The mass of magnesium carbonate (MW = 84) present in 500ml of 0.75 M solution is
 (i) 0.375 g (ii) 31.5 g (iii) 27 g (iv) 54.25 g
9. Which of the following will not change on increasing temperature?
 (i) Molarity (ii) Volume percentage (iii) Molality (iv) None of these
10. The molarity of the 38% HCl by mass of density 1.20 g/ml
 (i) 10.4 M (ii) 6.34 M (iii) 12.49 M (iv) 18.42 M

SECTION-B

11. What mass of calcium carbonate is required to react completely with 25 mL of 0.75 M HCl?



OR

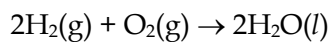
Calculate the number of moles and number of molecules present in 11.2 ml of Ammonia gas at 273 K and 1 atm pressure.

12. Boron has two isotopes $^{10}_5\text{B}$ and $^{11}_5\text{B}$. If the atomic mass of boron is 10.8, then find the percentage abundance of the heavier isotope.
13. An organic compound contains 52.14% C, 13.13% H and the rest is oxygen. If the vapour density of the organic compound is 23, then find the empirical and molecular formula of then organic compound.
14. Calculate the molarity and molality of a 1L solution of H₂SO₄ labelled as 9.8% w/v with a specific gravity of 1.20.

OR

In a mixture of ethanol ($\text{C}_2\text{H}_5\text{OH}$) and water, the mole fraction of the ethanol is 0.04. Calculate the molarity of the solution.

15. 50.0 g of dihydrogen reacts with 640 g of dioxygen according to the equation



- (i) Identify the reactant which has been completely used up.
- (ii) Calculate the maximum mass of water produced
- (iii) What amount of the reactant left in excess?

OR

2.0 g mixture of zinc (at. mass: 65) and aluminium (at. Mass: 27) on reaction with excess of hydrochloric acid liberates 0.896 L of hydrogen gas at STP. Find the percentage composition of the mixture.