CONCENTRATION TERMS

1. The volume strength of 1M H_2O_2 is: (Molar mass of H_2O_2 = 34 g mol^{-1})
(1) 16.8 (2) 11.35 (3) 22.4 (4) 5.6

2. 8g of NaOH is dissolved in 18g of H_2O. Mole fraction of NaOH in solution and molality (in mol kg^{-1}) of the solutions respectively are:
(1) 0.167, 11.11 (2) 0.2, 22.20
(3) 0.2, 11.11 (4) 0.167,22.20

3. A solution of sodium sulfate contains 92 g of Na^+ ions per kilogram of water. The molality of Na^+ ions in that solution in mol kg^{-1} is:
(1) 16 (2) 8 (3) 4 (4) 12

4. The amount of sugar ($C_{12}H_{22}O_{11}$) required to prepare 2 L of its 0.1 M aqueous solution is :
(1) 68.4 g (2) 17.1 g
(3) 34.2 g (4)136.8 g

5. The strength of 11.2 volume solution of H_2O_2 is : [Given that molar mass of H = 1 g mol^{-1} and O = 16 g mol^{-1}]
(1) 13.6% (2) 3.4%
(3) 34% (4) 1.7%

6. The mole fraction of a solvent in aqueous solution of a solute is 0.8. The molality (in mol kg^{-1}) of the aqueous solution is
(1) 13.88×10^{-1}
(2) 13.88×10^{-2}
(3) 13.88
(4) 13.88×10^{-3}

ALLEN

SOLUTION

1. Ans. (2)

1L – 1M H_2O_2 solution will produce 11.35 L O_2 gas at STP.

2. Ans. (1)

8g NaOH, mol of NaOH = $\frac{8}{40} = 0.2\text{mol}$

18g H_2O, mol of H_2O = $\frac{18}{18} = 1\text{mol}$

$\therefore\ X_{NaOH} = \frac{0.2}{1.2} = 0.167$

Molality = $\frac{0.2 \times 1000}{18} = 11.11\ \text{m}$

3. Ans. (3)

$n_{Na^+} = \frac{92}{23} = 4$

So molality = 4

4. Ans. (1)

Molarity = $\frac{(n)_{solute}}{V_{solution}\ (\text{in lit})}$

$0.1 = \frac{\text{wt.}/342}{2}$

wt ($C_{12}H_{22}O_{11}$) = 68.4 gram

5. Ans. (2)

Volume strength = 11.2 × molarity = 11.2

⇒ molarity = 1 M

⇒ strength = 34 g/L

⇒ % w/w = $\frac{34}{1000} \times 100 = 3.4\%$

6. Ans. (3)

$X_{solvent} = 0.8$

If $n_T = 1$

$n_{Solvent} = 0.8$

$n_{Solute} = 0.2$

molality = $\frac{0.2}{\frac{0.8 \times 18}{1000}}$ = 13.88