Question 11. What is the concentration of sugar ($C_{12}H_{22}O_{11}$) in mol L^{-1} if its 20 g are dissolved in enough water to make a final volume up to 2 L?

Answer:

Molar mass of sugar ($C_{12}H_{22}O_{11}$) = $12 \times 12 + 22 \times 1 + 11 \times 16 = 342\ g\ mol^{-1}$

$$\text{No. of moles in 20 g of sugar} = \frac{20\ g}{342\ g\ mol^{-1}} = 0.0585\ \text{mole}$$

$$\text{Molar concentration} = \frac{\text{Moles of solute}}{\text{Volume of sol in L}} = \frac{0.0585}{2\ L} = 0.0293\ mol\ L^{-1} = \mathbf{0.0293\ M.}$$

Question 12. If the density of methanol is 0.793 kgL^{-1}, what is its volume needed for making 2.5 L of its 0.25 M solution?

Answer:

Molar mass of methanol (CH_3OH) = $32\ g\ mol^{-1} = 0.032\ kg\ mol^{-1}$

$$\text{Molarity of the given solution} = \frac{0.793\ kg\ L^{-1}}{0.032\ kg\ mol^{-1}} = 24.78\ mol\ L^{-1}$$

Applying $M_1 \times V_1 = M_2V_2$

(Given solution) (Solution to be prepared)

$24.78 \times V_1 = 0.25 \times 2.5\ L$ or $V_1 = 0.02522\ L = \mathbf{25.22\ mL}$

Question 13. Pressure is determined as force per unit area of the surface. The S.I. unit of pressure, pascal, is as shown below:1 Pa = 1 Nm^{-2}If mass of air at sea level is 1034 gcm^{-2},calculate the pressure in pascal.

Answer: Pressure is the force (i.e., weight) acting per unit area But weight = mg

$$\therefore \quad \text{Pressure} = \text{Weight per unit area} = \frac{1034\ g \times 9.8\ m\ s^{-2}}{cm^2}$$

$$= \frac{1034\ g \times 9.8\ ms^{-2}}{cm^2} \times \frac{1\ kg}{1000\ g} \times \frac{100\ cm}{1\ m} \times \frac{100\ cm}{1\ m} \times 1 \times \frac{1\ N}{kg\ ms^{-2}} \times \frac{1\ Pa}{1\ Nm^{-2}}$$

$= \mathbf{1.01332 \times 10^5\ Pa.}$

Question 14. What is the S.I. unit of mass?

Answer: S.I. unit of mass is kilogram (kg).

Question 15. Match the following prefixes with their multiples:

Prefixes	Multiples
(i) micro	10^6
(ii) deca	10^9
(iii) mega	10^{-6}
(iv) giga	10^{-15}
(v) femto	10

Answer:
micro = 10^{-6}, deca = 10, mega = 10^6, giga = 10^9, femto = 10^{-15}.

Question 16. What do you mean by significant figures?
Answer: The digits in a properly recorded measurement are known as significant figures. It is also defined as follows. The total numbers of figures in a number including the last digit whose value is uncertain is called number of significant figures.

Question 17. A sample of drinking water was found to be severely contaminated with chloroform, CHCly supposed to be carcinogenic in nature. The level of contamination was 15 ppm (by mass).
(i) Express this in percent by mass
(ii) Determine the molality of chloroform in the water sample.
Answer:
(*i*) 15 ppm means 15 parts in million (10^6) parts

$$\therefore \quad \% \text{ by mass} = \frac{15}{10^6} \times 100 = 15 \times 10^{-4} = \mathbf{1.5 \times 10^{-3}\ \%}$$

(*ii*) Molar mass of chloroform ($CHCl_3$) = 12 + 1 + 3 × 35.5 = 119.5 g mol^{-1}
100 g of the sample contain chloroform = 1.5×10^{-3} g
$\therefore$ 1000 g (1 kg) of the sample will contain chloroform = 1.5×10^{-2} g

$$= \frac{1.5 \times 10^{-2}}{119.5} = 1.26 \times 10^{-4} \text{ mole}$$

$\therefore$ Molality = $\mathbf{1.266 \times 10^{-4}}$ **m.**

Question 18. Express the following in scientific notation:
(i) 0.0048
(ii) 234,000
(iii) 8008
(iv) 500.0
(v) 6.0012
Answer:
(*i*) 4.8×10^{-3} (*ii*) 2.34×10^5 (*iii*) 8.008×10^3 (*iv*) 5.000×10^2
(*v*) 6.0012×10^0

Question 19. How many significant figures are present in the following?
(i) 0.0025
(ii) 208
(iii) 5005
(iv) 126,000
(v) 500.0
(vi) 2.0034
Answer:
(i) 2 (ii) 3 (iii) 4 (iv) 3 (v) 4 (vi) 5.

Question 20. Round up the following upto three significant figures:
(i) 34.216
(ii) 10.4107
(iii) 0.04597
(iv) 2808

Answer:
(i) 34.2 (ii) 10.4 (iii) 0.0460 (iv) 2810

********** END **********