Q1 2021 (01 Sep Shift 2)

The number of atoms in 8 g of sodium is $x \times 10^{23}$.

The value of x is ____. (Nearest integer)

[Given : $N_A = 6.02 \times 10^{23}$ mol^{-1}

Atomic mass of Na $= 23.0$u]

Q2 2021 (27 Aug Shift 2)

100 g of propane is completely reacted with 1000 g of oxygen. The mole fraction of carbon dioxide in the resulting mixture is $x \times 10^{-2}$. The value of x is ____. (Nearest integer)

[Atomic weight : $H = 1.008; C = 12.00; O = 16.00$]

Q3 2021 (27 Aug Shift 1)

When 10 mL of an aqueous solution of $KMnO_4$ was titrated in acidic medium, equal volume of 0.1 M of an aqueous solution of ferrous sulphate was required for complete discharge of colour. The strength of $KMnO_4$ in grams per litre is ____ $\times 10^{-2}$. (Nearest integer)

Q4 2021 (26 Aug Shift 2)

100 mL of Na_3PO_4 solution contains 3.45 g of sodium. The molarity of the solution is ____ $\times 10^{-2}$ mol L^{-1}. (Nearest integer)

[Atomic Masses - Na : 23.0u, O : 16.0u, P : 31.0u]

Q5 2021 (26 Aug Shift 1)

An aqueous KCl solution of density 1.20 g mL^{-1} has a molality of 3.30 mol kg^{-1}. The molarity of the solution in mol L^{-1} is ____. (Nearest integer)

[Molar mass of KCl $= 74.5$]

Answer Key

Q1 (2) **Q2** (19) **Q3** (316) **Q4** (50)

Q5 (3)

Q1 (2)

$\text{No. of atoms} = \frac{8}{23} \times 6.02 \times 10^{23} = 2.09 \times 10^{23}$

$\simeq 2 \times 10^{23}$

$= x \times 10^{23}$

$x = 2$

Q2 (19)

$C_3H_{8(g)} + 5O_{2(g)} \longrightarrow 3CO_{2(g)} + 4H_2O_{(\ell)}$

$t = 0 \quad 2.27 \text{ mole } 31.25 \text{ mol}$

$t = \infty \quad 0 \quad 19.9 \text{ mol} \quad 6.81 \text{ mol} \quad 9.08 \text{ mol}$

mole fraction of CO_2 in the final reaction mixture (heterogenous)

$X_{CO_2} = \frac{6.81}{19.9+6.81+9.08}$

$= 0.1902 = 19.02 \times 10^{-2}$

$\Rightarrow 19$

Q3 (316)

Let molarity of $KMnO_4 = x$

$KMnO_4 + FeSO_4 \rightarrow Fe_2(SO_4)_3 + Mn^{2+}$

$n = 5 \quad n = 1$

(Equivalents of $KMnO_4$ reacted $)=$ (Equivalents of $FeSO_4$ reacted)

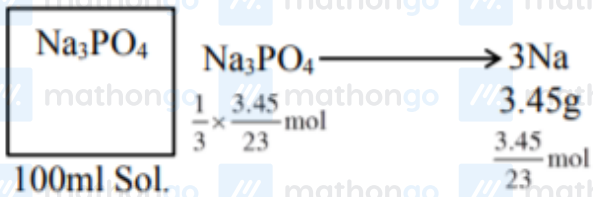
$\Rightarrow (5 \times x \times 10 \text{ ml}) = 1 \times 0.1 \times 10 \text{ ml}$

$\Rightarrow x = 0.02 \text{ M}$

Molar mass of $KMnO_4 = 158 \text{ gm/mol}$

$\Rightarrow \text{Strength} = (x \times 158) = 3.16 \text{ g}/\ell$

Q4 (50)



therefore molarity of Na_3PO_4 Solution $=$

$$\frac{n_{Na_3PO_4}}{\text{volume of solution in L}}$$

$$= \frac{\frac{1}{3}\times\frac{3.45}{23}\text{ mol}}{0.1\text{ L}}$$

$$= 0.5 = 50 \times 10^{-2}$$

Q5 (3)

1000 kg solvent has 3.3 moles of KCl

1000 kg solvent $\longrightarrow 3.3 \times 74.5\text{gm}KCl$

$\longrightarrow \quad 245.85$

Weight of solution $= 1245.85\text{gm}$

Volume of solution $= \frac{1245.85}{1.2}\text{ml}$

So molarity $= \frac{3.3\times1.2}{1245.85} \times 1000 = 3.17$