Q1 - 2024 (05 Apr Shift 1)

An organic compound has 42.1% carbon, 6.4% hydrogen and remainder is oxygen. If its molecular weight is 342, then its molecular formula is :

(1) $C_{11}H_{18}O_{12}$

(2) $C_{12}H_{20}O_{12}$

(3) $C_{12}H_{22}O_{11}$

(4) $C_{14}H_{20}O_{10}$

Q2 - 2024 (05 Apr Shift 1)

9.3 g of pure aniline is treated with bromine water at room temperature to give a white precipitate of the product ' P '. The mass of product ' P ' obtaind is 26.4 g. The percentage yield is _____ %.

Q3 - 2024 (05 Apr Shift 2)

The number of moles of methane required to produce 11 gCO_2(g) after complete combustion is :

(Given molar mass of methane in $gmol^{-1}$: 16)

(1) 0.35

(2) 0.5

(3) 0.75

(4) 0.25

Q4 - 2024 (06 Apr Shift 1)

The density of ' x ' M solution (' X ' molar) of NaOH is 1.12 g mL^{-1}, while in molality, the concentration of the solution is 3 m(3molal). Then x is (Given : Molar mass of NaOH is 40 g/mol)

(1) 3.5

(2) 3.8

(3) 2.8

(4) 3.0

Q5 - 2024 (06 Apr Shift 2)

Molality (m) of 3M aqueous solution of NaCl is :

(Given : Density of solution $= 1.25$ g mL^{-1}, Molar mass in gmol^{-1} : Na $- 23$, Cl $- 35.5$)

(1) 1.9 m

(2) 3.85 m

(3) 2.79 m

(4) 2.90 m

Q6 - 2024 (08 Apr Shift 1)

Combustion of glucose ($C_6H_{12}O_6$) produces CO_2 and water. The amount of oxygen (in g) required for the complete combustion of 900 g of glucose is :

[Molar mass of glucose in gmol^{-1} $= 180$]

(1) 480

(2) 800

(3) 960

(4) 32

Q7 - 2024 (09 Apr Shift 1)

Molarity (M) of an aqueous solution containing x g of anhyd. $CuSO_4$ in 500 mL solution at 32°C is 2×10^{-1}M. Its molality will be _____ $\times 10^{-3}$ m. (nearest integer). [Given density of the solution $= 1.25$ g/mL]

Answer Key

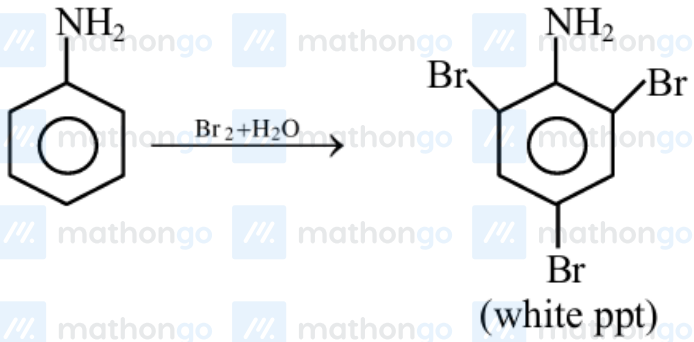
Q1 (3) **Q2** (80) **Q3** (4) **Q4** (4)

Q5 (3) **Q6** (3) **Q7** (164)

Q1

only $C_{12}H_{22}O_{11}$ has 42.1% carbon, 6.4% hydrogen &51.5 percent oxygen.

Q2



93 g of aniline produces 330 g of 2, 4, 6− tribromoaniline. Hence 9.3 g of aniline should produce 33 g of 2, 4, 6-tribromoaniline. Hence percentage yield $\frac{26.4\times100}{33}=80\%$

Q3

$C_nH_{2n+2}+\frac{3n+1}{2}O_2\longrightarrow nCO_2+(n+1)H_2O$

$$\underset{\substack{4gm\\0.25\ mole}}{CH_4}+2O_2\longrightarrow\underset{\substack{11gm\\0.25\ mole}}{CO_2}+2H_2O$$

0.25 mol CH_4 gives 0.25 mole (or 11gm) CO_2

Q4

$$\text{Molality}=\frac{1000\times M}{1000\times d-M\times(Mw)_{solute}}$$

$$3=\frac{1000\times x}{1000\times1.12-(x\times40)}$$

$$x=3$$

Q5

3 moles are present in 1 litre solution

$$\text{molality}=\frac{3\times1000}{1.25\times1000-[3\times58.5]}=2.79\ m$$

Q6

$$C_6H_{12}O_{6(s)} + 6O_{2(g)} \longrightarrow 6CO_{2(g)} + 6H_2O_{(\theta)}$$

$$\frac{900}{180} = 5 \text{ mol} \quad 30 \text{ mol}$$

$$\text{Mass of } O_2 \text{ required} = 30 \times 32 = 960\text{gm}$$

Q7

$$M_{sol^n} = v_{sol^n} \times d_{sol^n}$$

$$= 500 \times 1.25 = 625 \text{ g}$$

$$\text{Mass of solute (x)} = 0.2 \times 0.5 \times 159.5$$

$$= 15.95$$

$$n_{solute} = 0.1,$$

$$\text{Mass of solvent} = \text{Mass of solution} - \text{Mass of solute}$$

$$= 625 - 15.95$$

$$= 609.05$$

$$m = \frac{0.1}{\frac{609.05}{1000}}$$

$$m = 0.164 = 164 \times 10^{-3}$$