Short Practice Test-01

NEET (2023)

CHEMISTRY

1. One mole of carbon atom weighs 12 g. The number of atoms in it is equal to

(1) 6.022×10^{23} (2) 1.2×10^{23}

(3) 6.022×10^{22} (4) 12×10^{22}

2. In which case is number of molecules of water maximum?

(1) 18 mL of water

(2) 0.18 g of water

(3) 10^{-3} mol of water

(4) 0.00224 L of water vapours at 1 atm and 273 K

3. 1.0 g of magnesium is burnt with 0.56 g O_2 in a closed vessel. Which reactant is left in excess and how much? (At. wt. Mg = 24; O = 16)

(1) Mg, 0.16 g (2) O_2, 0.16 g

(3) Mg, 0.44 g (4) O_2, 0.28 g

4. The empirical formula and molecular mass of a compound are CH_2O and 180 respectively. What will be the molecular formula of the compound?

(1) $C_9H_{18}O_9$ (2) CH_2O

(3) $C_6H_{12}O_6$ (4) $C_2H_4O_2$

5. Concentrated aqueous sulphuric acid is 98% H_2SO_4 by mass and has a density of 1.80 gmL^{-1}. Volume of acid required to make one litre of 0.1M H_2SO_4 solution is

(1) 16.65 mL (2) 22.20 mL

(3) 5.55 mL (4) 11.10 mL

6. Mole fraction of solute in aqueous solution of 30% NaOH is

(1) 0.16 (2) 0.05

(3) 0.25 (4) 0.95

7. Which of the following is correct?

(1) For H_2 and He, $Z < 1$ and molar volume at STP is less than 22.4 L.

(2) For H_2 and He, $Z < 1$ and molar volume at STP is more than 22.4 L.

(3) For H_2 and He, $Z > 1$ and molar volume at STP is less than 22.4 L.

(4) For H_2 and He, $Z > 1$ and molar volume at STP is greater than 22.4 L.

8. The ratio between root mean square speed of H_2 and its most probable speed at 50 K is

(1) $\sqrt{3}$ (2) $\sqrt{1.5}$

(3) $\sqrt{2}$ (4) $\sqrt{0.66}$

9. Two non-reactive gases A and B are present in a container with partial pressures 200 and 180 mm of Hg. When a third non-reactive gas C is added then total pressure becomes 1 atm then mole fraction of C will be

(1) 0.75

(2) 0.5

(3) 0.25

(4) Cannot be calculated

10. The rates of diffusion of gases A and B of molecular weights 100 and 81 respectively are in the ratio of

(1) 9 : 10 (2) 10 : 9

(3) 100 : 18 (4) 81 : 100

11. Which of the following postulate of kinetic theory of gases is responsible for deviation from ideal behaviour?

(1) Kinetic energy of the gas molecules increase with increase in temperature

(2) Collisions among the gas molecules are perfectly elastic

(3) There is no forces of attraction or repulsion among gas molecules

(4) Molecules in a gas follow zig-zag path

12. Given van der Waals constant for NH_3, H_2, O_2 and CO_2 are respectively 4.17, 0.244, 1.36 and 3.59, which one of the following gases is most easily liquefied?

(1) NH_3 (2) H_2

(3) CO_2 (4) O_2

ANSWER KEY

1.	**(1)**	**7.**	**(4)**
2.	**(1)**	**8.**	**(2)**
3.	**(1)**	**9.**	**(2)**
4.	**(3)**	**10.**	**(1)**
5.	**(3)**	**11.**	**(3)**
6.	**(1)**	**12.**	**(1)**

Hint and Solutions

1. (1)

1 mole substance contains 6.022×10^{23} particles

1 mole C = 6.022×10^{23} atoms = 12 g

2. (1)

• 18 ml water, density = l g/mL

Mass of water = Volume × density

= 18 g

Number of molecules

$= \frac{18\text{ g}}{18\text{ g/mol}} \times N_A = N_A$ (Maximum)

• 0.18 g water

Number of molecules $= \frac{0.18\text{ g}}{18\text{ g/moL}} \times N_A = 0.01N_A$

• 10^{-3} mol of water

Number of molecules = $10^{-3} \times N_A$

• 0.00224 L of water vapours at STP (273 K, 1 atm)

Number of molecules

$= \frac{0.00224\text{ L}}{22.4\text{ L/mol}} \times N_A = 10^{-4} N_A$

3. (1)

$$2Mg(s) + O_2(g) \rightarrow 2MgO(s)$$

Given mass: 1.0 g 0.56 g

2×24 g Mg reacts with 32 g O_2

1.0 g Mg will require $\rightarrow \frac{32}{48} \times 1.0$ g O_2

= 0.66 g O_2

But given O_2 = 0.56 g

$\Rightarrow$ O_2 is limiting reagent

$\Rightarrow$ Mg will be left in excess

$\Rightarrow$ With 0.56 g O_2, mass of Mg reacting

$= \frac{48}{32} \times 0.56 = 0.84$ g

$\therefore$ Mass of Mg left = 1.0 – 0.84 = 0.16 g

4. (3)

Empirical Formula mass = 12 + 2 + 16 = 30

$$n = \frac{\text{Molecular formula mass}}{\text{Empirical formula mass}} = \frac{180}{30} = 6$$

$\therefore$ Molecular formula = n × Empirical formula

= 6 × CH_2O

= $C_6H_{12}O_6$

5. (3)

$$M_1 = \frac{10 \times d \times (x)}{M'}$$

M_1 = Molarity of solution

d = density of solution

x = mass percent of solute

M' = Molar mass of solute

$$M_1 = \frac{10 \times 1.80 \times 98}{98} = 18\text{ M}$$

$M_1V_1 = M_2V_2$

$$V_1 = \frac{0.1 \times 1000\text{ mL}}{18} = 5.55\text{ mL}$$

6. (1)

30% NaOH aq. solution means 30 g NaOH is present in 100 g solution

$$n_{NaOH} = n_{NaOH} = \frac{30\text{ g}}{40\text{ g/mol}} = \frac{3}{4}\text{ mol} = 0.75\text{ mol}$$

$$n_{H_2O} = \frac{(100-30)\text{g}}{18\text{ g/mol}} = \frac{70}{18}\text{mol} = 3.88\text{mol}$$

$$x_{NaOH} = \frac{n_{NaOH}}{n_{NaOH} + n_{H_2O}} = \frac{0.75}{0.75 + 3.88} = 0.16$$

7. (4)

H_2 and H_2 shows positive deviation from ideal behaviour always

$\Rightarrow Z > 1$

$$Z = \frac{V_{real}}{V_{ideal}}$$

$V_{real} > V_{ideal}$

$\Rightarrow V_{real} > 22.4$ L

8. (2)

$$\frac{C_{rms}}{C_{mps}} = \frac{\sqrt{\frac{3RT}{M}}}{\sqrt{\frac{2RT}{M}}} = \sqrt{\frac{3}{2}} = \sqrt{1.5}$$

9. (2)

P_A = 200 mm Hg

P_B = 180 mm Hg

When 'C' gas is added to mixture of gases 'A' and 'B', then total pressure, P_t = 1 atm

P_t = 760 mmHg = $P_A + P_B + P_C$

$\Rightarrow P_C$ = 760 – (200 + 180) = 380 mmHg

$$x_c = \frac{P_c}{P_t} = \frac{380}{760} = 0.5$$

10. (1)

$$\text{Rate of diffusion} \propto \frac{1}{\sqrt{\text{Molar mass}}}$$

$$\frac{r_A}{r_B} = \sqrt{\frac{M_B}{M_A}} = \sqrt{\frac{81}{100}} = \frac{9}{10}$$

11. **(3)**

Postulate of Kinetic theory which states that there is no forces of attraction or repulsion among gas molecules is responsible for deviation from ideal behaviour as this postulate is invalid at high pressure and low temperature conditions.

12. **(1)**

Ease of liquefaction $\propto T_c \propto a$

NH_3 having the highest 'a' value will be most easily liquefied.