

# Model Paper

11<sup>th</sup> Class - 2024

CHEMISTRY

TIME: 20 MINUTES

MARKS: 17

## OBJECTIVE

- Formula mass of  $\text{MgSO}_4$  is g/mole:  
(A) 150 (B) 120 (C) 130 (D) 140
- One mole of  $\text{SO}_2$  contains oxygen atoms:  
(A)  $6.02 \times 10^{23}$  (B)  $12.04 \times 10^{23}$  (C) 1 mole (D) 3 moles
- The iodine present in water can be separated by which one of the following techniques:  
(A) sublimation (B) chromatography (C) filtration (D) solvent extraction
- Mathematically Boyle's law is shown as:  
(A)  $PT=K$  (B)  $VT=K$  (C)  $P/T=K$  (D)  $PV=K$
- Absolute zero is equal to:  
(A)  $273^\circ\text{C}$  (B)  $-273^\circ\text{C}$  (C)  $0^\circ\text{C}$  (D)  $273\text{ K}$
- At Murree hills water boils at:  
(A)  $98^\circ\text{C}$  (B)  $100^\circ\text{C}$  (C)  $0^\circ\text{C}$  (D)  $50^\circ\text{C}$
- Coordination number of  $\text{Na}^+$  ion in  $\text{NaCl}$  is:  
(A) One (B) Two (C) Four (D) Six
- Quantum number value for 2p orbital are:  
(A)  $n=2, \ell=1$  (B)  $n=1, \ell=2$  (C)  $n=1, \ell=0$  (D)  $n=2, \ell=0$
- Electronegativity values of F, Br, Cl, I are in the order of:  
(A)  $\text{I} > \text{Br} > \text{Cl} > \text{F}$  (B)  $\text{Br} > \text{I} > \text{Cl} > \text{F}$  (C)  $\text{F} > \text{Cl} > \text{I} > \text{Br}$  (D)  $\text{F} > \text{Cl} > \text{Br} > \text{I}$
- Standard enthalpy change is measured at:  
(A)  $298\text{ K}$  (B)  $273^\circ\text{C}$  (C)  $273\text{ K}$  (D)  $373\text{ K}$
- In a bomb calorimeter, the reaction are carried out at constant:  
(A) pressure (B) Work (C) volume (D) None of these
- The term pH was introduced by:  
(A) Henderson (B) Sorenson (C) Goldstein (D) Thomson
- The relationship between  $K_p$  and  $K_c$  is given by:  
(A)  $K_c=K_p$  (B)  $K_c=K_p \left[ \frac{P}{N} \right]^{\Delta n}$  (C)  $K_p=K_c(RT)^{\Delta n}$  (D)  $K_p=K_c(RT)^{-\Delta n}$
- Two solutions of  $\text{NaCl}$  and  $\text{KCl}$  are prepared separately by dissolving same amount of the solute in water. Which of the following statements is true for these solutions?  
(A)  $\text{KCl}$  solution will have higher boiling point than  $\text{NaCl}$  solution  
(B) Both the solutions have different boiling points  
(C)  $\text{KCl}$  and  $\text{NaCl}$  solutions possess same vapour pressure  
(D)  $\text{KCl}$  solution possesses lower freezing point than  $\text{NaCl}$  solution
- Electrolysis is used for:  
(A) electroplating (B) manufacture of Al  
(C) manufacture of sodium metal (D) all of these
- Nelson's cell and Down's cell are example of:  
(A) electrochemical cell (B) galvanic cell (C) electrolytic cell (D) none of these
- Decomposition of nitrogen penta oxide has order of reaction:  
(A) zero (B) first (C) second (D) third

**CHEMISTRY**

**SUBJECTIVE**

**TIME: 2 HRS 40 MINUTES**

**MARKS: 68**

**Note:** Section I is compulsory. Attempt any Three (3) questions from Section II

**(SECTION -I)**

**2. Write short answers to any EIGHT (8) questions:**

**2 × 8 = 16**

- Why actual yield is less than theoretical yield?
- Calculate the mass in grams of 2.74 moles of  $\text{KMnO}_4$  (Atomic mass of K=39, Mn=55 and O=16)
- $\text{N}_2$  and CO have same number of electrons, protons, and neutrons? Justify.
- What are physical states of matter? Why liquid state of matter is less common than solid and gas states?
- Give two statements of Boyle's law.
- State Joule Thomson effect. Write its application.
- What is discharge tube? Draw its labeled diagram.
- Why the gases are non conductor at low voltage and become conductor at high voltage?
- Give reasons for the production of positive rays.
- Why burning of a candle is a spontaneous process?
- Define enthalpy of atomization. Give an example.
- Differentiate between internal energy change ( $\Delta E$ ) and enthalpy change ( $\Delta H$ ).

**3. Write short answers to any EIGHT (8) questions:**

**2 × 8 = 16**

- Define solvent extraction and partition law.
- What is paper chromatography? Name its two types.
- Write down the main characteristics of a solvent selected for crystallization of a compound.
- Name four types of intermolecular forces and define dipole-dipole with one example.
- What are dipole-induced dipole forces?
- Differentiate between crystalline solids and amorphous solids.
- Define molarity and molality. Give their mathematical expression.
- The concentration in terms of molality is independent of temperature but molarity depends upon temperature. Justify it.
- One molal solution of glucose is dilute as compared to one molar solution of glucose. Why?
- What is meant by activation of catalyst? Give two examples?
- Define negative catalyst along with an example.
- Discuss autocatalysis with example.

**4. Write short answers to any SIX (6) questions:**

**2 × 6 = 12**

- Bond distance is the comprise distance between the two atoms. Justify it.
- Why the radius of an atom cannot determine precisely?
- How does atomic radius vary in groups and periods?
- Differentiate between reversible and irreversible reactions.
- What are  $K_c$  and  $K_p$  and how these are related?
- Write two applications of equilibrium constant.
- Explain the difference between electrolytic cell and voltaic cell.
- Differentiate between metallic conduction and electrolytic conduction.
- Explain the difference between ionization and electrolysis.

**(SECTION -II)**

**NOTE:** Attempt any THREE Questions. Each carries 08 marks.

**3 × 8 = 24**

- (a) Define molecular formula with two examples and explain relationship between molecular formula and empirical formula. 4

(b) A gas having a volume of  $10\text{dm}^3$  is enclosed in a vessel at  $0^\circ\text{C}$  and the pressure is 2.5 atmospheres. This gas is allowed to expand until the new pressure is 2 atmospheres. What will be the new volume of this gas, if the temperature is maintained at 273K? 4
- (a) Write down the properties of metallic crystals. 4

(b) Define and explain the term Enthalpy and prove that  $\Delta H = q_p$  4
- (a) What is J.J Thomson's experiment for determining the e/m value of electron? 4

(b)  $\text{N}_2$  and  $\text{H}_2$  gases combine to give  $\text{NH}_3$  gas. The value of  $K_c$  in this reaction at  $500^\circ\text{C}$  is  $6 \times 10^{-2}$  Calculate the value of  $K_p$  for this reaction. 4
- (a) Define ionization energy? Give factors upon which it depends. Also give its variation in periodic table. 4

(b) Define oxidation number and state any six rules for assigning of oxidation number. 4
- (a) Differentiate between : i. ideal and non-ideal solution. ii. Hydration and hydrolysis 4

(b) Discuss any four characteristics of catalyst. 4