

CHEMISTRY Part-I
HSSC-11th-Swat-2026

Time: 20 Minutes Marks: 18

Multiple Choice Questions
01 Mark for each

Paper Code

①
●
②

P-407

Roll No. of the Student							
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Serial No. Of the Answer Book _____

SECTION-A

Note:

- 1) Attempting all MCQs is compulsory. This paper along with the OMR sheet must be returned to the superintendent after due time
- 2) Fill the circle ① ② ③ ④, which one is correct with blue or black ball point in separate OMR Sheet like ●
- 3) If more than one circle in the OMR sheet is filled then no credit will be given to such answer.

- I.i. The structure of ice can best be described as:
- ① Linear arrangement ② Cubic structure without spaces ③ Hexagonal lattice with empty spaces ④ Random arrangement
- ii. The statement which best describes the macroscopic characteristic of equilibrium is:
- ① No reactions occur ② Concentrations of species remain constant ③ Reactants disappear completely ④ Products decrease continuously
- iii. For the reaction, $2\text{NO}_2 \rightleftharpoons \text{N}_2\text{O}_4$, the equilibrium expression is:
- ① $K_c = [\text{NO}_2]^2 / [\text{N}_2\text{O}_4]$ ② $K_c = [\text{N}_2\text{O}_4] / [\text{NO}_2]^2$ ③ $K_c = [\text{NO}_2]^2 + [\text{N}_2\text{O}_4]$ ④ $K_c = [\text{NO}_2] \times [\text{N}_2\text{O}_4]$
- iv. Acidic buffer is made up of:
- ① Weak acid and weak base ② Weak acid and strong acid ③ Weak acid and its conjugate base (salt) ④ Strong acid and its conjugate base
- v. Hydrolysis mainly occurs when a salt is formed from:
- ① Strong acid and strong base ② Weak acid or weak base ③ Two strong bases ④ Only strong acids
- vi. If the rate of a reaction doubles when the concentration of a reactant doubles, the reaction is:
- ① Zero order ② First order ③ Second order ④ Third order
- vii. The best semi-permeable membrane, for low molecular mass solutes in water is a film of:
- ① Copper ferrocyanide ② Ferric ferrocyanide ③ Stannic ferrocyanide ④ Cobaltate ferrocyanide
- viii. The dissolution of sodium hydroxide in water causes the temperature of the solution to increase. This indicates that the reaction is:
- ① Exothermic ② Endothermic ③ Neutral ④ Reversible
- ix. In a redox reaction, oxidation and reduction occur:
- ① Separately ② Simultaneously ③ Collectively ④ Only in acids
- x. A comparison of actual yield and theoretical yield is:
- ① Ideal yield ② Percent yield ③ Non-ideal yield ④ Maximum yield
- xi. The correct electronic configuration of Magnesium ($Z = 12$), according to the Aufbau principle is:
- ① $1s^2 2s^2 2p^6 3p^2$ ② $1s^2 2s^2 2p^6 3s^2$ ③ $1s^2 2s^2 2p^5 3s^3$ ④ $1s^2 2s^2 2p^6 3d^2$
- xii. The electron density in a sigma bond is concentrated:
- ① Above the bond axis ② Along the bond axis ③ Below the bond axis ④ Above and below the bond axis
- xiii. In a bond with ionic character, the atoms develop:
- ① Equal charges ② Positive charges only ③ Negative charges only ④ Partial positive and partial negative charges
- xiv. The property of gases which explains why lighter gases diffuse faster than heavier gases is:
- ① Higher boiling point ② Lower density ③ Lower molar mass ④ Higher melting point
- xv. The value of molar heat of vaporization of water is:
- ① 40.7 KJ.mol^{-1} ② 39.7 KJ.mol^{-1} ③ 38.7 KJ.mol^{-1} ④ 37.7 KJ.mol^{-1}
- xvi. Dynamic equilibrium is called "dynamic" because:
- ① Temperature changes continuously ② Opposite processes keep occurring continuously ③ The reaction stops permanently ④ The substances disappear
- xvii. The strong intermolecular forces in solids mainly cause:
- ① High compressibility ② Free molecular motion ③ Rigid structure and fixed shape ④ Rapid diffusion
- xviii. When a substance exists in more than one crystalline form, the phenomenon is called:
- ① Isomorphism ② Cleavage ③ Polymorphism ④ Symmetry

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Note: Time allowed for section B and C is 2 hours and 40 minutes.

SECTION "B"

Marks: 40

Attempt any Ten Questions out of the following. Each question carries equal marks.

- The reaction between sodium and chlorine is: $2\text{Na} + \text{Cl}_2 \rightarrow 2\text{NaCl}$
 - Write two possible mole ratios from equation.
 - Calculate the moles of NaCl formed from 8 moles of Na.
- Give at least four reasons why is the actual yield of a reaction less than the theoretical yield?
- Using Bohr's model:
 - Calculate the radius of the first orbit ($n=1$) and second orbit ($n=2$) of hydrogen atom.
 - Determine how many times the second and third orbits radius is larger than the first orbit.
- Compare and contrast Valence Shell Electron Pair Repulsion theory and Valence Bond Theory.
- Prove that $P_1 V_1 / T_1 = P_2 V_2 / T_2$.
- What is Pascal? List three units used for measuring pressure.
- Highlight at least four differences between evaporation and boiling.
- What are intermolecular forces? Explain why liquids have a definite volume but no definite shape.
- Why do strong acids such as HCl, HBr and HI exhibit the same strength in water but different strengths in ethanol? Give reasons.
- Define catalyst and catalysis. Mention the types of catalysis and name the catalyst used in the following chemical reactions.
 - decomposition of hydrogen peroxide
 - hydrolysis of ethyl acetate
 - hydrogenation of ethene
 - Oxidation of Sulphur dioxide
- Why do positive and negative ions of a solute separate when dissolved in a polar solvent? Also describe the orientation of water molecules around cations and anions during hydration.
- Define the following thermodynamic terms with examples:
 - system
 - surroundings
 - state of system
 - state function
- Define standard electrode potential. How is the standard electrode potential of a copper electrode measured using the Standard Hydrogen Electrode?

SECTION "C"

Marks: 27

Note: Attempt any Three Questions of the following. Each question carries equal Marks.

- Define bond length. How is it determined experimentally? Describe how atomic size, electronegativity difference and bond energy affect the bond length in hydrogen halides (H-F, H-Cl, H-Br and H-I). 5
 - Discuss the production of characteristic X-rays in four points. 4
- Define crystalline and amorphous solids with examples. Why do crystalline solids possess cleavage planes while amorphous solids do not? Give reason. 5
 - State the partial pressure of gas. When is Dalton's law of pressure applied? 4
 - A mixture contains 10% NH_3 , 25% H_2 , and 65% N_2 gases. If the total pressure is 100 atm, find the partial pressure of each gas
- State Le-Chatelier's Principle. Explain the effects of increase in pressure on the following chemical equilibria:
 - $\text{N}_2(\text{g}) + \text{O}_2(\text{g}) \rightleftharpoons 2\text{NO}(\text{g})$
 - $\text{PCl}_3(\text{g}) + \text{Cl}_2(\text{g}) \rightleftharpoons \text{PCl}_5(\text{g})$
 - $\text{N}_2\text{O}_4(\text{g}) \rightleftharpoons 2\text{NO}_2(\text{g})$5
 - Calculate the lattice energy of NaCl using the following data in kJ mol^{-1} :
 $(\Delta H_f = -411, \Delta H_s = +109, \Delta H_{\text{IE}} = +496, \Delta H_{\text{DE}} = +242 \text{ and } \Delta H_{\text{EA}} = -348)$ 4
- Define the following terms and write their formulas. 5
 - mass percent
 - molarity
 - molality
 - parts per million
 - mole fraction
 - What is electrochemical equivalent? When is it equivalent to the mass of substance liberated?
 - A current of 5 A flows for 10 minutes and mass of substance deposited is 6 g. Calculate the electrochemical equivalent (Z) of the substance. 4