



**Grand  
Test**

**HSC EXAMINATION SET - A  
CHEMISTRY**

**M.Marks : 70**

**Duration : 3 Hrs**

Note: (1) All questions are compulsory

(2) Both the section are to be attempted in the same answer book.

(3) Figures to the right indicate full marks.

(4) Answer to every question, must be started on a new page.

(5) Every new question must be started on a new page.

(6) Use of logarithmic table is allowed.

**SECTION-I**

**Q1 Select and write the most appropriate answer from the given alternatives for each sub-question: [07]**

- (i) Sulphide ores are generally concentrated by 1
- (a) Froth floatation process (b) Magnetic separation  
(c) Gravity separation (d) Chromatography
- (ii) Which solid will have the weakest intermolecular forces? 1
- (a) Ice (b) Phosphorus (c) Naphthalene (d) Sodium fluoride
- (iii) Which is responsible for electrical conduction of molten sodium chloride 1
- (a) Free electrons (b) Free ions  
(c) Free molecules (d) Atoms of sodium and chlorine
- (iv) Which of these does not influence the rate of reaction 1
- (a) Nature of the reactants (b) Concentration of the reactants  
(c) Temperature of the reaction (d) Molecularity of the reaction
- (v) Molarity of 0.2N H<sub>2</sub>SO<sub>4</sub> is 1
- (a) 0.2 (b) 0.4 (c) 0.6 (d) 0.1
- (vi) For the reaction  $\text{CH}_3\text{COOH(l)} + 2\text{O}_2\text{(g)} = 2\text{CO}_2\text{(g)} + 2\text{H}_2\text{O(l)}$  at 298 K and 1 atm. 1  
pressure,  $\Delta H = -874\text{kJ}$ . Then the change in internal energy  $\Delta U$  is
- (a) - 874 kJ (b) - 871.53 kJ (c) - 876.47 kJ (d) + 874 kJ 1
- (vii) Which of the following is the most suitable drying agent for ammonia gas
- (a) Calcium oxide (b) Anhydrous calcium chloride  
(c) Phosphorus pentoxide (d) Conc. sulphuric aci

**Q2 Attempt ANY SIX of the following :** [12]

- (i) Define. (a) Calcination (b) slag 2
- (ii) Derive Van't Hoff equation for osmotic pressure of a solution. 2
- (iii) Distinguish between hexagonal close packing and cubic close packing. 2
- (iv) State and explain Kohlrausch's law of independent migration of ions 2
- (v) Write Arrhenius equation and explain the significance of terms involved in it. 2
- (vi) What are the uses of (A) H<sub>2</sub>SO<sub>4</sub> and (B) Chlorine 2
- (vii) Explain fractional crystallization. 2
- (viii) Explain concept of maximum work? 2

**Q3 Attempt ANY THREE of the following :** [09]

- (i) Explain the structure of SO<sub>2</sub> molecule on the basis of hybridization. 3
- (ii) The energy of activation for a first order reaction is 104 kJ mol<sup>-1</sup>  
The rate constant at 298 K is  $3.7 \times 10^{-5} \text{ s}^{-1}$ . What is rate constant at 303K 3
- (iii)  $2.8 \times 10^2$  mmole of a perfect gas occupies  $127 \times 10^{-1}$  L at 310 K 3  
Calculate the work done when the gas expands  
(a) Isothermally against a constant pressure of  $25 \times 10^{-2}$  atm.  
(b) Isothermally and reversibly  
(c) Into vacuum until its volume has increased by  $33 \times 10^{-1}$  L
- (iv) Boiling point of a solvent is 80.20C. When 0.419 gram of the solute of molar 3  
Mass 252.4 g mol<sup>-1</sup> is dissolved in 75 gram of the above solvent, the boiling  
point of the solution is found to be 80.2560C. Find the molal elevation constant.

**Q4 Attempt ANY ONE of the following:** [ 07]

- (A) (i) Define mole fraction. State and explain Hess's law of constant heat summation. 4  
Write its two applications.
- (ii) Calculate the equilibrium constant for the redox reaction at 298K 3  
 $\text{Sr}_{(s)} + \text{Mg}^{2+}_{(aq)} \rightleftharpoons \text{Sr}^{2+}_{(aq)} + \text{Mg}_{(s)}$   
that occurs in a galvanic cell. Write the conventional cell representation for it.  
 $E^0_{\text{Mg}} = -2.37 \text{ V}$  and  $E^0_{\text{Sr}} = -2.89 \text{ V}$ .
- (B) (i) Explain the trends in ionization enthalpy of noble gases? Write uses of Krypton. 4
- (ii) Niobium is found to crystalline with bcc structure and found to have density of 3  
 $8.55 \text{ g cm}^{-3}$ . Determine the atomic radius of niobium if its atomic mass is 93

## SECTION-II

**Q5 Select and write the most appropriate answer from the given alternatives for each [07] sub-question:**

- (i) Chlorobenzene can be obtained by benzene diazonium chloride by 1  
a) Friedel Craft's reaction      b) Wurtz reaction  
c) Gatterman's reaction      d) Fittig reaction
- (ii) Insulin is \_\_\_\_\_ 1  
a) hormone      b) antibiotic  
c) antiseptic      d) Vitamin
- (iii) Acidified potassium dichromate cannot be oxidize by is 1  
a) ethanol      b) potassium iodide  
c) ferric sulphate      d) hydrogen sulphide
- (iv) Molecular formula of 'Urotropine'  
a)  $C_6H_{12}N_4$       b)  $C_6H_{12}N_4O_2$   
c)  $C_6H_{24}N_4$       d)  $C_6H_{24}N_4O_6$
- (v) Phenol gives characteristic colour with 1  
a) iodine solution      b) bromine water  
c) ammonium hydroxide      d) aqueous ferric chloride solution
- (vi) Which of the following complex will not show colour? 1  
a)  $[Cr(NH_3)_6]Cl_3$       b)  $K_3[VF_6]$   
c)  $[Sc(H_2O)_6]^{3+}$       d)  $[NiCl_4]^{2-}$
- (vii) Identify the compound 'B' in the following series of reactions. 1  
Ethanenitrile  $\xrightarrow{Na/alcohol}$  A  $\xrightarrow{NaNO_2/dil\ HCl}$  B  
(a)  $CH_3CH_2Cl$       (b)  $CH_3CH_2NH_2$   
(c)  $CH_3CH_2OH$       (d)  $CH_3CH_2CH_2OH$

**Q6 Attempt ANY SIX of the following : [ 12]**

- (i) What is the action of following compounds on cyclohexanone in presence of dry hydrogen chloride? 2  
(A) Ethyl alcohol      (B) Ethylene glycol
- (ii) Explain structures of nucleoside and nucleotide? 2
- (iii) How is nylon-6 prepared? 2
- (iv) What is the action of KOH on  $K_2Cr_2O_7$  and HCl on  $K_2CrO_4$ ? 2
- (v) What are soaps? How are they prepared? 2

- (vi) Write the structure and give IUPAC names of following 2  
 (A) Salicylic acid (B) Isobutyric acid
- (vii) What are the antacids and antihistamines? 2
- (viii) Write uses of  $\text{CCl}_4$  and  $\text{CHI}_3$  2

**Q7 Attempt ANY THREE of the following: [ 09]**

- (i) Explain Sandmeyer's reaction. 3
- (ii) Explain :- 3  
 a) Ethylamine is soluble in water whereas aniline is not .  
 b) Aniline cannot be prepared by Gabriel Phthalimide synthesis.  
 c) Triethylamine amines cannot be acylated.
- (iii) What are actanoids? Explain the compounds of copper (II) are coloured but those of zinc are colourless. 3
- (iv) What are linkage and hydrated isomerism? Give example. 3

**Q8 Attempt any ONE of the following:**

**[07]**

- (i) (A) How will you bring following conversions? 4  
 1) pent-3-enitrile to pent-3-enal  
 2) Calcium salt of fatty acid to acetaldehyde  
 3) Benzene to benzaldehyde  
 4) Calcium acetate to dimethyl ketone.
- (B) What is chirality? Explain the optical activity of lactic acid. 3
- (ii) (A) Explain Hoffmann's exhaustive methylation and Hoffmann's carbyl amine test. 4
- (B) What are carbohydrates? How is glucose prepared on commercial scale? 3