

**HISSAN KASKI-Grade XII****Pre- Board Examination – 2071****Chemistry****Programme: Science****Full Marks: 75****Time: 3hrs****Pass Marks: 27**

*Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.*

**Shift : Morning****Group- A**

Attempt any fifteen questions. (15 × 2 = 30)

- Why is H-O-H bond angle in water molecule higher than H-S-H bond angle in H<sub>2</sub>S molecule?
- Find the equivalent weight of the underlined reactants in the reaction given below.  

$$2\underline{\text{KMnO}_4} + 3\underline{\text{H}_2\text{SO}_4} + 5\underline{\text{H}_2\text{C}_2\text{O}_4} \cdot 2\underline{\text{H}_2\text{O}} \longrightarrow \text{K}_2\text{SO}_4 + 2\underline{\text{MnSO}_4} + 18\underline{\text{H}_2\text{O}} + 10\underline{\text{CO}_2}$$
- Why the pH of 10<sup>-8</sup> M HCl is not equal to 8?
- Define Lewis acid and base. Give one example of each.
- Calculate the equivalent conductivity of 1M H<sub>2</sub>SO<sub>4</sub> solution whose conductivity is 26 × 10<sup>-2</sup> ohm<sup>-1</sup>cm<sup>-1</sup>.
- State the first law of thermodynamics.
- Name the two criteria which must be met for a process to be spontaneous regardless of the temperature.
- The rate of a reaction 2A → product, becomes 3 times when concentration of 'A' is increased 27 times. Find the order of the reaction.
- What are the necessary conditions for an organic compound to be aromatic according to Huckel's rule?
- How would you obtain DDT from chlorobenzene?
- What is esterification? Give an example.
- Identify the product X and Y in the following reaction.  

$$\text{CH}_3\text{COCH}_3 \xrightarrow{\text{HCN}} \text{X} \xrightarrow{\text{H}_2\text{O}/\text{H}^+} \text{Y}$$
- Give a chemical test to distinguish between methanoic acid and ethanoic acid.
- Why is -NO<sub>2</sub> group meta directing in electrophilic aromatic substitution reaction?
- What happens when aniline is coupled with benzene diazonium chloride?

- Define lipid. Give two example of it.
- Name four types of base residues present in DNA.
- Distinguish between antibiotic and antiseptics with one example of it.
- What is an azo dye? Give one example of it.
- Which metal can be extracted from the following ore?  
 i) Argentite ii) Chalcopryrite iii) Calamine iv) Magnetite
- Define the terms: annealing and hardening.
- How can you obtain calomel from corrosive sublimate and vice versa?

**Group- B**

Attempt any five questions: (5 × 5 = 25)

- Define decinormal solution. 0.18 gm of a powdered divalent metal was dissolved in 250 ml of a solution of H<sub>2</sub>SO<sub>4</sub> containing 4.9 gm of H<sub>2</sub>SO<sub>4</sub> per litre. 50 ml of the acid solution were found to require 20 ml of N/10 alkali for complete neutralization. Calculate the atomic mass of the metal.
- How many coulombs are required for the following process?  
 i) 1 mole of H<sub>2</sub>O to O<sub>2</sub>  
 ii) 1 mole of MnO<sub>4</sub><sup>-</sup> to Mn<sup>2+</sup>  
 iii) 1 mole of FeO to Fe<sub>2</sub>O<sub>3</sub>  
 iv) 1 mole of H<sub>2</sub>O<sub>2</sub> to O<sub>2</sub>  
 v) 1 mole of Cr<sub>2</sub>O<sub>7</sub><sup>2-</sup> to Cr<sup>3+</sup>
- What is meant by enthalpy of formation? Calculate the enthalpy of formation of acetic acid if it's enthalpy of combustion is -867 KJmol<sup>-1</sup>. The enthalpy of formation of CO<sub>2</sub>(g) and H<sub>2</sub>O(l) are -393.5 KJmol<sup>-1</sup> and -285.9 KJmol<sup>-1</sup> respectively.
- How is chloroform prepared in laboratory from acetone? How does it react with conc. HNO<sub>3</sub>?
- How can you distinguish primary, secondary and tertiary alcohol by Victor Meyer's method?
- An organic compound 'A' reacts with PBr<sub>3</sub> to give 'B'. The compound 'B' produces 'C' when heated with alc. KOH. The compound 'C' undergoes ozonolysis to form ethanal and methanal as major products. The compound 'A' responses iodoform test. Identify the compounds A, B and C. How 'A' is obtained from CH<sub>3</sub>MgBr?
- Describe the extraction of copper from copper pyrite.

**Group- C**

Attempt any two questions: (2 × 10 = 20)

30. a. How is anhydrous formic acid prepared in laboratory?  
 b. Write the reaction of  $C_6H_5COOH$  with: i)  $NaOH$  ii)  $NaOH/CaO$  iii)  $LiAlH_4$  in ether  
 iv)  $SOCl_2$  v) conc.  $HNO_3$  in presence of conc.  $H_2SO_4$ .
31. How is aniline prepared in laboratory? How would you convert aniline into:  
 i) Phenol ii) Phenyl isocyanide iii) Sulphanilic acid iv) p- benzoquinone v) 2,4,6-tribromo aniline.
32. a. Describe the factors affecting the rate of reaction.  
 b. For a reaction,  $2A + B \longrightarrow C + D$ , the following data were obtained:

Experiment	[A] mol/lit	[B] mol/lit	Initial rate of [D] mol/lit
1.	0.1	0.1	$6 \times 10^{-3}$
2.	0.3	0.2	$7.2 \times 10^{-2}$
3.	0.3	0.4	$2.88 \times 10^{-1}$
4.	0.4	0.1	$2.4 \times 10^{-2}$

Find the rate law. What is the order with respect to each reactant and overall order? Also calculate the rate constant. Calculate the rate of formation of C when  $[A] = 0.5$  mol/lit and  $[B] = 0.2$  mol/lit.

33. write short note on any two:  
 (a) Rusting of iron  
 (b) Solubility product principle  
 (c) Chemistry of white vitriol  
 (d) Iodoform test