

**Nagaland Board
Class XII
Chemistry
Sample Paper-1**

Time allowed: 3 hours

Maximum Marks: 70

General Instructions:

- i. Approximately 15 minutes is allotted to read the question paper and revise the answers.
- ii. The question paper consists of 30 questions. All questions are compulsory.
- iii. Marks are indicated against each question.
- iv. Internal choice has been provided in some questions.

N.B: Check that all pages of the question paper is complete as indicated on the top left side.

1. Shape of the receptor gets changed after attachment of [1Mark]
 - (i) messenger
 - (ii) receptor
 - (iii) cell membrane
 - (iv) binding site

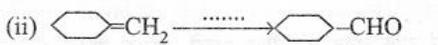
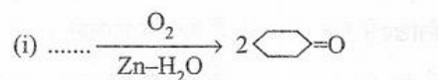
2. Nylon-6,6 is obtained by the process of [1Mark]
 - (i) Synthetic polymerization
 - (ii) Addition polymerization
 - (iii) Natural rubber
 - (iv) Condensation Polymerization

3. The amino acid which is not optically active is [1Mark]
 - (i) Serine
 - (ii) Arginine
 - (iii) Lysine
 - (iv) Glycine

4. Nitro compounds are reduced to amines. The catalyst that is preferred is [1Mark]
 - (i) Sn + HCl
 - (ii) Fe + HCl
 - (iii) Mg + HCl
 - (iv) Ethanol

5. Iodoform test is used for the test of which of the following functional groups[1Mark]
 (i) Carboxylic acids
 (ii) Methyl ketones
 (iii) Aldehydes
 (iv) Ketones
6. What is the co-ordination number of atoms in BCC, HCP, CCP and simple lattices? [1Mark]
7. What is molal elevation constant? What are its units? [1Mark]
8. Why do we use inert electrolytes like KCl, KNO₃, and NH₄Cl in a salt bridge? [1Mark]
9. Define transition state or activation complex. [1Mark]
10. Why should colloids need purification? [1Mark]
11. Why chloroform is kept closed in dark colored bottles?
Or
 What are enantiomers? Give an example. [2Mark]
12. Alcohols are said to be soluble in water but why n-Decyl alcohol is insoluble?
Or
 What happens when propanone is treated with ethyl magnesium bromide and the product is hydrolysed. [2Mark]
13. What happens when amines are treated with water? [2Mark]
14. What are the components of nucleic acid? [2Mark]
15. What are PMMA, PAN and PVC? [2Mark]
16. Compare the two types of voids formed in cubic close packing.
Or [2Mark]
 What are antagonists and agonists in drug action?
17. Setup the electrochemical cell for the reaction given below.
 $2\text{Fe}^{3+}(\text{aq}) + \text{Sn}^{2+}(\text{aq}) \rightarrow 2\text{Fe}^{2+}(\text{aq}) + \text{Sn}^{4+}(\text{aq})$
Or [3Mark]
 Use Kohlrausch's Law to find out the dissociation constant of the weak electrolyte

- 18.** Compare the space available in the two types of voids formed in the solids. [3Mark]
- 19.** Is the vapor pressure of solution always less than the pure volatile solvent? Justify. [3Mark]
- 20.** Derive an equation for calculating the half life of a first order reaction
Or [3Mark]
Write short note on dispersion methods of preparation of colloids
- 21.** Name the process by which Haematite and Magnetite ores can be concentrated. Also draw a well labeled diagram of this process. [3Mark]
- 22.** What is Lanthanoid contraction and what is the factor responsible for that?
Or [3Mark]
Why $[\text{Ti}(\text{H}_2\text{O})_6]^{3+}$ is violet in color but in $[\text{Ti}(\text{H}_2\text{O})_6]\text{Cl}_3$, when water molecules are removed it becomes colourless?
- 23.** Draw open chain structure of an aldopentose and aldohexose. Predict the number of asymmetric carbon atoms present in each. [3Mark]
- 24.** Identify the type of unit cell and describe it. [3Mark]
- 25.** Determine the osmotic pressure of a solution prepared by dissolving 2.5×10^{-2} g of K_2SO_4 in 2L of water at 25°C , assuming that it is completely dissociated. ($R = 0.0821 \text{ L atm K}^{-1} \text{ mol}^{-1}$, Molar mass of $\text{K}_2\text{SO}_4 = 174 \text{ g mol}^{-1}$) [3Mark]
- 26.** Setup the electrochemical cell for the reaction given below.
 $2\text{Fe}^{3+}(\text{aq}) + \text{Sn}^{2+}(\text{aq}) \rightarrow 2\text{Fe}^{2+}(\text{aq}) + \text{Sn}^{4+}(\text{aq})$. [3Mark]
- 27.** Explain mechanism of enzymatic reaction. [3Mark]
- 28.**
(a) Complete the following reaction statements by giving the missing starting material, reagent or product as required:



(b) Describe the following reactions:

- (i) Cannizaro reaction
- (ii) Cross aldol condensation

Or

(a) How would you account for the following?

- (i) Aldehydes are more reactive than ketones towards nucleophiles.
- (ii) The boiling points of aldehydes and ketones are lower than of the corresponding acids.
- (iii) The aldehydes and ketones undergo a number of addition reactions.

(b) Give chemical tests to distinguish between:

- (i) Acetaldehyde and benzaldehyde
- (ii) Propanone and propanol [5Mark]

29.

(a) A reaction is second order in A and first order in B.

- (i) Write the differential rate equation.
- (ii) How is the rate affected on increasing the concentration of A three times?
- (iii) How is the rate affected when the concentrations of both A and B are doubled?

(b) A first order reaction takes 40 minutes for 30% decomposition. Calculate $t_{1/2}$ for this reaction. (Given $\log 1.428 = 0.1548$)

Or

(a) For a first order reaction, show that time required for 99% completion is twice the time required for the completion of 90% of reaction.

(b) Rate constant 'k' of a reaction varies with temperature 'T' according to the equation:

$$\log k = \log A - \frac{E_a}{2.303R} \left(\frac{1}{T} \right)$$

Where E_a is the activation energy. When a graph is plotted for $\log k$ Vs $\frac{1}{T}$, a straight line with a slope of -4250 K is obtained. Calculate ' E_a ' for the reaction. (R = 8.314 JK⁻¹ mol⁻¹) [5Mark]

30.

(a) Give reasons for the following:

(i) Bond enthalpy of F_2 is lower than that of Cl_2 .

(ii) PH_3 has lower boiling point than NH_3 .

(b) Draw the structures of the following molecules:

(i) BrF_3

(ii) $(HPO_3)_3$

(iii) XeF_4

Or

(a) Account for the following:

(i) Helium is used in diving apparatus.

(ii) Fluorine does not exhibit positive oxidation state.

(iii) Oxygen shows catenation behavior less than sulphur.

(b) Draw the structures of the following molecules:

(i) XeF_2

(ii) $H_2S_2O_8$