

**Meghalaya Board
Class XII
Chemistry
Sample Paper 1**

Time allowed: 3 hours**Maximum Marks: 70****General Instructions:**

- (i) Write all answers in the answer script.
- (ii) Attempt all parts of a question together in one place.
- (iii) All questions are compulsory.
- (iv) Marks for each question are indicated against it.
- (v) Question No. 1 of Part --I is of Multiple-choice Type, each of $\frac{1}{2}$ mark. Choose and write the correct answer in the Answer Script from the four options given.
- (vi) Question Nos. 2 to 9 of Part --II are very Short-answer Type Questions of 1 mark each. Answer these either in *one* sentence or in *one* word each.
- (vii) Question Nos. 10 to 17 of Part--III are Short-answer Type-I Questions of 2 marks each. Answer these in about 20–30 words each.
- (viii) Question Nos. 18 to 26 of Part--IV are Short-answer Type-II Questions of 3 marks each. Answer these in about 40–50 words each.
- (ix) Question Nos. 27 to 29 of Part--V are Long-answer Type Questions of 5 marks each. Answer these in about 70–80 words each.
- (x) Use of ordinary Scientific calculators and Log Tables are allowed.
- (xi) Mobile phones and Pagers are not allowed in the examination Hall.

PART-I

1. Choose and write the correct answer in the answer script: $\frac{1}{2} \times 8 = 4$

- (a)** Shape of the receptor gets changed after attachment of $\frac{1}{2}$
- (i) messenger
 - (ii) receptor
 - (iii) cell membrane
 - (iv) binding site
- (b)** Nylon-6,6 is obtained by the process of $\frac{1}{2}$
- (i) Synthetic polymerization
 - (ii) Addition polymerization
 - (iii) Natural rubber
 - (iv) Condensation Polymerization

- (c)** The amino acid which is not optically active is 1/2
- (i) Serine
 - (ii) Arginine
 - (iii) Lysine
 - (iv) Glycine
- (d)** Nitro compounds are reduced to amines. The catalyst that is preferred is 1/2
- (i) Sn + HCl
 - (ii) Fe + HCl
 - (iii) Mg + HCl
 - (iv) Ethanol
- (e)** Iodoform test is used for the test of which of the following functional groups? 1/2
- (i) Carboxylic acids
 - (ii) Methyl ketones
 - (iii) Aldehydes
 - (iv) Ketones
- (f)** To prepare tert-butyl ethyl ether, the reagents required are: 1/2
- (i) Sodium ethoxide and tert-butyl bromide
 - (ii) Sodium tert butoxide and ethyl bromide
 - (iii) Sodium propoxide and propyl bromide
 - (iv) Dimethyl ketone, ethylbromide and sodium
- (g)** Alcoholic solution of KOH is used for 1/2
- (i) Dehalogenation
 - (ii) Dehydrohalogenation
 - (iii) Dehydration
 - (iv) Dehydrogenation
- (h)** The IUPAC nomenclature for $[\text{Ni}(\text{CO})_4]$ is 1/2
- (i) Nickel tetracarbonyl
 - (ii) Tetracarbonylnickel(0)
 - (iii) Nickel carbon monoxide
 - (iv) Tetracarbonylnickel

PART-II

2. What is the co-ordination number of atoms in BCC, HCP, CCP and simple lattices? **1**
3. What is molal elevation constant? What are its units? **1**
4. Why do we use inert electrolytes like KCl, KNO₃, and NH₄Cl in a salt bridge? **1**
5. Define transition state or activation complex. **1**
6. Why should colloids need purification? **1**
7. What type of metals exists in native state in nature? **1**
8. Name two factors on which the electronegativity of an atom depends. **1**
9. Write down the most common oxidation state for lanthanoids. **1**

PART-III

- 10.** What is coordination isomerism? Give example. **2**
- 11.** Why chloroform is kept closed in dark colored bottles?
Or
What are enantiomers? Give an example. **2**
- 12.** Alcohols are said to be soluble in water but why n-Decyl alcohol is insoluble? **2**
- 13.** What happens when propanone is treated with ethyl magnesium bromide and the product is hydrolysed. **2**
- 14.** What happens when amines are treated with water? **2**
- 15.** What are the components of nucleic acid? **2**
- 16.** What are PMMA, PAN and PVC? **2**
- 17.** What are antagonists and agonists in drug action? **2**

PART-IV

- 18.** Compare the space available in the two types of voids formed in the solids. **3**
- 19.** Is the vapor pressure of solution always less than the pure volatile solvent. Justify.
- 20.** 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

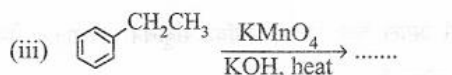
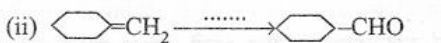
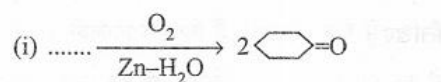
Use Kohlrausch's Law to find out the dissociation constant of the weak electrolyte.

- 21.** Derive an equation for calculating the half life of a first order reaction. **3**
- 22.** Write short note on dispersion methods of preparation of colloids. **3**
- 23.** Name the process by which Haematite and Magnetite ores can be concentrated. Also draw a well labeled diagram of this process. **3**
- 24.** What is Lanthanoid contraction and what is the factor responsible for that? **3**
- 25.** 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? **3**
- 26.** Draw open chain structure of an aldopentose and aldohexose. Predict the number of asymmetric carbon atoms present in each. **3**

PART-V

27.

- (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

28.

(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. ($R = 8.314 \text{ JK}^{-1} \text{ mol}^{-1}$)

29.

(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) $(\text{HPO}_3)_3$
- (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) $\text{H}_2\text{S}_2\text{O}_8$