XII Chemistry Sample Paper
Instructions:

1. Section-A Q. no. 1-8 carry 1 mark each.
2. Section-B Q. no. 9-18 carry 2 marks each.
3. Section-C Q. no. 19-27 carry 3 marks each.
4. Section-D Q. no. 28-30 carry 5 marks each.

Section-A

1. Define the term 'Tyndall effect'.

2. Why is Bi (V) a stronger oxidant than Sb (V)?

3. Write the structure of 3-oxopentanal.

4. Give an example of elastomer.

5. Which point defect in crystals of a solid decreases the density of the solid?

6. Why is an alkylamine more basic than ammonia .

7. Give an example of 'shape-selective catalyst'.

8. Define 'rate of a reaction'

Section-B

9. A reaction is of second order with respect to a reactant. How will the rate of reaction be affected if the concentration of this reactant is

(i) Doubled,
(ii) Reduced to half?

10. Draw the structures of the following molecules:

(i) XeF_4

(ii) BrF_3

11. The rate constant for a reaction of zero order in A is 0.0030 mol L^{-1} s^{-1}. How long will it take for the initial concentration of A to fall from 0.10 M to 0.075 M?

12. Differentiate between molality and molarity of a solution. What is the effect of change in temperature of a solution on its molality and molarity?

13. Explain what is meant by

(i) A peptide linkage
(ii) A glycosidic linkage

14. Name two water soluble vitamins, their sources and the diseases caused due to their deficiency in diet.

15. Explain the following observations:

(i) Transition elements generally form coloured compounds.
(ii) Zinc is not regarded as a transition element.

16. How are the following conversions carried out?

(i) Benzyl chloride to benzyl alcohol,
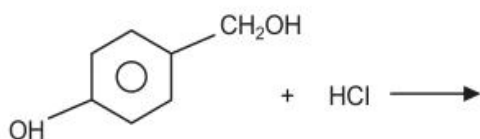**(ii)** Methyl magnesium bromide to 2-methylpropan-2-ol

17. What is the repeating unit in the condensation polymer obtained by combining $HO_2CCH_2CH_2CO_2H$ (succinic acid) and $H_2NCH_2CH_2NH_2$ (ethylene diamine)?

18. Complete the following reaction equations:

(i)
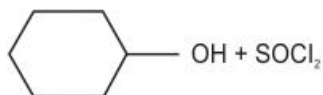
(ii)

Section-C

19. 100 mg of a protein is dissolved in just enough water to make 10.0 mL of solution. If this solution has an osmotic pressure of 13.3 mm Hg at 25°C, what is the molar mass of the protein? (R = 0.0821 L atm mol^{-1} K^{-1} and 760 mm Hg = 1 atm)

20. Iron has a body-centred cubic unit cell with a cell edge of 286.65 pm. The density of iron is 7.87 g cm^{-3}. Use this information to calculate Avogadro's number.

(At. Mass of Fe = 56 g mol^{-1})

21. How are the following colloids different from each other with respect to dispersion medium and dispersed phase? Give one example of each type.

(i) An aerosol (ii) A hydrosol (iii) An emulsion

22. Explain the following situations:

(i) In the structure of HNO_3 molecule, the N − O bond (121 pm) is shorter than the N − OH bond (140 pm).

(ii) SF_4 is easily hydrolysed whereas SF_6 is not easily hydrolysed.

(iii) XeF_2 has a straight linear structure and not a bent angular structure.

23. Describe the role of

(i) NaCN in the extraction of gold from gold ore.

(ii) SiO_2 in the extraction of copper from copper matte.

(iii) Iodine in the refining of zirconium.

Write chemical equations for the involved reactions.

24. Rearrange the compounds as directed:

(i) In an increasing order of basic strength:

$C_6H_5NH_2, C_6H_5 N (CH_3)_2, (C_2H_5)_2 NH$ and CH_3NH_2

(ii) In a decreasing order of basic strength:

Aniline, p-nitroaniline and p-toluidine

(iii) In an increasing order of pK_b values:

$C_2H_5NH_2, C_6H_5 NHCH_3, (C_2H_5)_2 NH$ and $C_6H_5NH_2$

Q 25: For the complex $[Fe(en)_2Cl_2]$ Cl, (en = ethylene diamine), identify

(i) The oxidation number of iron,

(ii) The hybrid orbitals and the shape of the complex,

(iii) The magnetic behaviour of the complex,

(iv) The number of geometrical isomers,

(v) Whether there is an optical isomer also, and

(vi) Name of the complex. (At. No. of Fe = 26)

26. **(i)** State one use each of DDT and iodoform.

(ii) Which compound in the following couples will react faster in S_N2 displacement and why?

(a) 1-Bromopentane or 2-bromopentane

(b) 1-bromo-2-methylbutane or 2-bromo-2-methylbutane.

27. Explain the mechanism of the following reactions:

(i) Addition of Grignard's reagent to the carbonyl group of a compound forming an adduct followed by hydrolysis.

(ii) Acid catalysed dehydration of an alcohol forming an alkene.

(iii) Acid catalysed hydration of an alkene forming an alcohol.

Section-D

28. Give chemical tests to distinguish between the following pairs of compounds:

(i) Ethanal and Propanal

(ii) Phenol and Benzoic acid

Q 29: **(a)** Write the anode and cathode reactions and the overall reaction occurring in a lead storage battery.

(b) A copper-silver cell is set up. The copper ion concentration is 0.10 M. The concentration of silver ion is not known. The cell potential when measured was 0.422 V. Determine the concentration of silver ions in the cell. (Given)

 Q 30: **(a)** Complete the following chemical reaction equations:

(i) $P_4 + SO_2Cl_2 \rightarrow$

(ii) $XeF_4 + H_2O \rightarrow$

(b) Explain the following observations giving appropriate reasons:

(i) The stability of + 5 oxidation state decreases down the group in group 15 of the periodic table.

(ii) Solid phosphorus pentachloride behaves as an ionic compound.

(iii) Halogens are strong oxidizing agents.