Time allowed: 3 Hours **Max. Marks: 70**

General Instructions:

(a) All questions are compulsory
(b) Section A: Q.no. 1 to 5 are very short questions and carry 1 mark each.
(c) Section B: Q. no. 6 to 12 are short answer questions and carry 2 marks each.
(d) Section C: Q. no. 13 to 24 are also short answer questions and carry 3 marks each.
(e) Section D: Q. no. 25 to 27 are long answer questions and carry 5 marks each.
(f) There is no0 overall choice. However an internal choice has been provided in two questions of one mark, two questions of two marks, four questions of three marks and all the three questions of five marks weightage. You have to attempt only one of the choices in such questions.
(g) Use of log tables if necessary, use of calculators is not allowed.

Section-A (1 mark each)

Q1. What is the Normality of 1.5 M H_2SO_4?

OR

Why Al cannot be obtained by electrolysis of fused $AlCl_3$?

Q2. A reaction is found to be zero order. Will its molecularity be also zero.

Q3. Which out of Molarity or Molality varies with temperature?

OR

Define Adsorption.

Q4. Which method is used to concentrate the sulphide ores?

Q5. Name the elements of the 13^{th} group and give general electronic configuration of their valence shells.

Section-B (2 marks each)

Q6. In a close packing of N spheres, how many (i) tetrahedral and (ii) octahedral sites are present?

OR

What is the role of salt-bridge in an electrochemical cell?

Q7. Mention any four factors affecting rate of a reaction.

OR

Describe the two uses of each of the following:

(a) Copper sulphate (b) Silver nitrate
    (i) For copper plating
    (ii) As germicide and fungicide
(b) Uses of Silver nitrate

(i) In lab to detect presence of halides
(ii) In silvering of mirrors

Q8. Give two uses of emulsions.

Q9. Write the IUPAC names of the following coordination compounds.

(a) $[Co(NH_3)_6]Cl_3$ (b) $[Ni(CO)_4]$

Q10. What are antioxidants? Name two antioxidants.

Q11. What is nucleoside? Write two functions of RNA.

Q12. Give reagents for birch reduction.

Section-C (3 marks each)

Q13. What are the characteristics of a non-ideal solution?

Q14. Define Corrosion. How can corrosion be prevented?

Q15. Give 3 difference between Molecularity and Order.

Q16. Give the methods for the purification of Colloidal Solutions.

OR

Write brief notes on the following:
(i) Homogeneous catalysis
(ii) Heterogeneous catalysis
(iii) Enzyme catalysis

Q17. Give three points of resemblance between Boron and Silicon

Q18. Write three points of Werner's theory.

Q19. What is biodegradable polymers? Give the names of two commercial bio-degradable polymers.

OR

Write the IUPAC name of the major product obtained when 2-bromopentane is heated with alcoholic KOH. Give equation and also name the reaction.

Ans. (a) Pent-2-ene

$CH_3CH_2CH_2CHBrCH_3$ + KOH (alcoholic) → $CH_3CH_2CH{=}CHCH_3 + H_2O + KBr$ (pent-2-ene, major product) and $CH_3CH_2CH{=}CHCH_3 + H_2O + KBr$ (Pent-1-ene, minor product)

2-Bromo-pentane

Reason: Saytzeff's rule

Q20. Explain Wurtz fittig reaction.

OR

Give reason for each of the following.

(i) Why aniline weaker base than ammonia?
(ii) Why ethanamine is soluble in water whereas aniline is insoluble
(iii) Why direct nitration of aniline is not possible?

Q21. Give three factors affecting adsorption.

Q22. Mention three properties of yellow phosphorous

OR

Write electronic configuration of Ce^{3+} ion and determine magnetic moment for this ion.

Q23. What is nuclear reactor? Discuss the role of heavy water as moderator.

Q24. Give the monomer units of Teflon, Bakelite and Nylon 66.

Section-D (5 marks each)

Q25. Define Coordination number. What is the coordination number of atoms in (i) in cubic close packed structure (ii) in a body centred cubic structure.

OR

The boiling point of benzene is 353.23 K when 1.80 g of a non-volatile, non-electrolytic solute was dissolved in 90 g of benzene the boiling point was raised to 354.11 K. Calculate the molar mass of the solute. (K_b for benzene = 2.53 K.Kg mol^{-1}).

(b)What is Van't Hoff's factor?

Q26. ΔH and ΔS for the reaction $Ag_2O_{(S)} \longrightarrow 2Ag_{(s)} + ½\ O_{2\ (g)}$ are 30.56 $KJmol^{-1}$ and 6.6 $JK^{-1}\ mol^{-1}$ respectively. Calculate the temperature at which the free energy change for the reaction will be zero. What will be the direction of the reaction at this temperature and temperature below it and why?

OR

Define first order reaction. Calculate the half-life of a first order reaction from their rate constants given below:

(a) 200 s^{-1} (b) 2 min^{-1} (c) 4 $year^{-1}$

Q27. What is a spontaneous reaction? Write differences between rate of reaction and rate constant of reaction.

OR

Define dispersed phase and the dispersion medium. Discuss classification of colloids with example.