

XII - STANDARD CHEMISTRY

Time Allowed: 3 hrs

Max. Marks: 70

Instructions:

1. Check the question paper for fairness of printing. If there is any lack of fairness, inform the Hall Supervisor immediately.
2. Use Blue (or) Black ink to write and underline use pencil to draw diagrams.

PART - I

Note: 1. Answer all the questions.

15×1=15

2. Choose the most appropriate answer from the given four alternatives and write the option code and the corresponding answer.

1. Which of the following is a mineral of Iron?
 - a) Pyrolusite
 - b) Cassiterite
 - c) malachite
 - d) Magnetite
2. On controlled hydrolysis and condensation of R_3SiCl yields
 - a) $R_3Si-O-SiR_3$
 - b) R_3SiOH
 - c) $R_3Si_4O_4$
 - d) R_4Si
3. Most easily liquefiable gas is
 - a) Ar
 - b) Ne
 - c) He
 - d) Kr
4. Which of the following statements about the interstitial compounds is incorrect?
 - a) They retain metallic conductivity
 - b) They are chemically reactive
 - c) They are much harder than the pure metal
 - d) They have higher melting points than the pure metal
5. An excess of silver nitrate is added to 100ml of a 0.01M solution of pentaquachloridochromium (III) chloride. The number of moles of AgCl precipitated would be
 - a) 0.02
 - b) 0.002
 - c) 0.01
 - d) 0.2
6. The cation leaves its normal position in the crystal and moves to some interstitial position, the defect in the crystal is known as
 - a) Schottky defect
 - b) F center
 - c) Frenkel defect
 - d) non-stoichiometric defect
7. The rate constant of a reaction is $5.8 \times 10^{-2} \text{ s}^{-1}$. The order of the reaction is
 - a) First order
 - b) zero order
 - c) Second order
 - d) Third order
8. What is the pH of the resulting solution when equal volumes of 0.1M NaOH and 0.01M HCl are mixed?
 - a) 2.0
 - b) 3
 - c) 7.0
 - d) 12.65
9. molar conductivity of ionic solution depends on
 - a) Temperature
 - b) distance between electrodes
 - c) concentration of electrolytes
 - d) Surface area of electrodes
10. Negative catalyst used in the decomposition reaction of H_2O_2 is
 - a) Pd
 - b) Ethanol
 - c) Mo
 - d) Glycerol
11. Isopropylbenzene on air oxidation in the presence of dilute acid gives
 - a) C_6H_5COOH
 - b) $C_6H_5COCH_3$
 - c) $C_6H_5COC_6H_5$
 - d) C_6H_5-OH

12. Which of the following cannot be prepared using Rosenmund reaction?
 a) Acetaldehyde b) Benzaldehyde c) Formaldehyde d) both (a) and (b)
13. Tertiary nitro compounds do not tautomerise because
 a) there is no double bond c) there is no α -Hydrogen
 b) oxygen is more electronegative than hydrogen d) All of the above
14. A compound 'A' when treated with HNO_3 (in presence of H_2SO_4) gives compound 'B' which is then reduced with Sn and HCl to aniline. The compound 'A' is
 a) Toluene b) benzene c) ethane d) acetamide
15. Among the following the achiral amino acid is
 a) 2-ethylalanine b) 2-methylglycine c) 2-hydroxymethylserine d) Tryptophan

Part - II

Answer any six questions. **Question No. 21 is Compulsory.**

6×2=12

16. Explain magnetic separation of ores.
17. Write a test to identify borate radical.
18. Give the uses of helium.
19. What is pseudo first order reaction? Give one example.
20. State Faraday's second law of electrolysis.
- 21. Give any four differences between DNA and RNA.**
22. Experiment shows that Nickel oxide has the formula $\text{Ni}_{0.96}\text{O}_{1.00}$. What fraction of Nickel exists as of Ni^{2+} and Ni^{3+} ions?
23. Explain Schotten - Baumann reaction.
24. What are reducing and non reducing sugars? Give examples.

Part - III

Answer any six questions. **Question No. 29 is compulsory.**

6×3=18

25. What is lanthanide contraction? Give any one of its consequences.
26. In the complex, $[\text{Pt}(\text{NO}_2)(\text{NH}_3)(\text{H}_2\text{O})_2]\text{Br}$. Identify the following:
 i) Central metal atom/ion
 ii) Ligand(s) and their types
 iii) Oxidation number of the central metal ion
27. Give the differences between rate of a reaction & rate constant of the reaction.
28. Write a short note on peptide bond with example.
- 29. Explain Aldol condensation with mechanism.**

30. Write the expression for the solubility product of $\text{Ca}_3(\text{PO}_4)_2$
31. What is Electrochemical series?
32. Write two tests to identify aldehydes.
33. Explain Hoffmann's degradation reaction.

Part – IV

Answer all the following questions.

5 × 5 = 25

34. a) i) Explain zone refining process with an example.(3)
ii) write the uses of chlorine (2)

(OR)

b) Explain the structure of Graphite and graphene (5).

35. a) i) Compare lanthanides and actinides (3).
ii) What is Standard electrode potential? (2)

(OR)

b) Explain the postulates of Werner's theory (5)

36. a) i) Define rate law and rate constant.(2)

ii) How Kohlrausch's Law is useful to determine the molar conductivity of weak electrolyte at infinite dilution. (3)

(OR)

b) i) Derive Nernst equation. (3) ii) Explain about Hume-Rothery rule to form a substitute alloy. (2)

37. a) Explain how colloids are purified by electrodialysis and ultrafiltration. (5)

(OR)

b) i) Write a short note on i) Perkins' reaction. ii) Knoevenagel reaction. (3)

ii) Ionic conductance at infinite dilution of Al^{3+} and SO_4^{2-} are 189 and 160 mho $\text{cm}^2 \text{equiv}^{-1}$.

Calculate the equivalent and molar conductance of the electrolyte $\text{Al}_2(\text{SO}_4)_3$ at infinite dilution. (2)

38. a) An organic compound A ($\text{C}_7\text{H}_6\text{O}$) has bitter almond smell, with ammonia 'A' gives 'B' ($\text{C}_{21}\text{H}_{18}\text{N}_2$) with aqueous alcoholic KCN 'A' gives 'C' ($\text{C}_{14}\text{H}_{12}\text{O}_2$). With aromatic tertiary amine 'A' gives 'D' ($\text{C}_{23}\text{H}_{26}\text{N}_2$). What are A, B, C and D? Explain the reaction.

(OR)

b) An organic compound (A) of molecular formula $\text{C}_2\text{H}_6\text{O}$ on reaction with Conc. H_2SO_4 at 443 K gives unsaturated hydrocarbon (B). (B) on treatment with Baeyer's reagent gives (C) of molecular formula $\text{C}_2\text{H}_6\text{O}$. (C) on reaction with anhydrous ZnCl_2 gives (D) of formula $\text{C}_2\text{H}_4\text{O}$. Identify A, B, C, D. Explain the reaction.