HMD

HALF YEARLY EXAMINATION - 2023

12 - Std

CHEMISTRY

Time : 3.00 Hrs

Marks : 70

SECTION - I

Note: 1) Answer all the questions. 2) Choose the most suitable answer from the given four alternatives and write the option code and the corresponding answer. 15 X 1 = 15

1. Match items in column - I with the items of column - II and assign the correct code.

	Column - I	Column - II	A	B	C	D
A	Cyanide process	(i) Ultrapure Ge	a)	(i)	(ii)	(iii) (iv)
B	Froth floatation process	(ii) Dressing of ZnS	b)	(iii)	(iv)	(v) (i)
C	Electrolytic reduction	(iii) Extraction of Al	c)	(iv)	(ii)	(iii) (i)
D	Zone refining	(iv) Extraction of Au	d)	(ii)	(iii)	(i) (v)
		(v) Purification of Ni				

2. **Assertion (A):** Aqueous solution of potash alum is acidic
Reason (R): Aluminium sulphate undergoes hydrolysis
a) Both (A) and (R) are true and (R) is the correct explanation of (A)
b) Both (A) and (R) are true and (R) is not the correct explanation of (A)
c) (A) is true but (R) is false d) Both (A) and (R) are false

3. Which of the following is strongest acid among all? a) HI b) HF c) HBr d) HCl

4. For the four successive transition elements (Cr, Mn, Fe & Co) the stability of +2 oxidation state will be there in which of the following order? (atomic number Cr(24), Mn(25), Fe(26) & Co(27)) a) Fe > Mn > Co > Cr b) Co > Mn > Fe > Cr
c) Cr > Mn > Co > Fe d) Mn > Fe > Cr > Co

5. The sum of primary valence and secondary valence of the metal M in the complex $[M(en)_2(Ox)]Cl$ is a) 3 b) 6 c) -3 d) 9

6. In a solid atom M occupies ccp lattice and $\left(\frac{1}{3}\right)$ of tetrahedral voids are occupied by atom N. Find the formula of solid formed by M and N. a) MN b) M_3N c) MN_3 d) M_3N_2

7. The half life period of a First order reaction is 5 minutes, the time required for 99.9% completion is nearly equal to a) 99.9 min b) 49.9 min c) 50 min d) 10 min

8. Equal volumes of three acid solutions of pH 1,2 and 3 are mixed in a vessel. What will be the H^+ ion concentration in the mixture?
a) 3.7×10^{-2} b) 10^{-6} c) 0.111 d) none of these

9. Which of the following statement is not correct with respect to electrolytic conductance?
a) conductivity increases with the decrease in viscosity.
b) conductivity increases with the increase in temperature.
c) Molar conductance of a solution decreases with increase in dilution.
d) conductance decreases with increase in temperature.

10. For Freundlich isotherm a graph of $\log \frac{x}{m}$ is plotted against logP. The slope of the line and its y - axis intercept respectively corresponds to
a) $1/n, k$ b) $\log 1/n, k$ c) $1/n, \log k$ d) $\log 1/n, \log k$

11. Which one of the following is the strongest acid
a) 2 - nitrophenol b) 4 - chlorophenol c) 4 - nitrophenol d) 3 - nitrophenol

12. Which one of the following is incorrectly matched?
a) Tollen's reagent - $AgNO_3 + NH_4OH$
b) Fehling's solution - $CuSO_4$ + Roschelle salt
c) Benedict solution - $CuSO_4$ + Sodium citrate + NaOH
d) Baeyer's reagent - con.HCl + anhyd.$ZnCl_2$

13. Which one of the following is most basic? a) 2,4 - dichloroaniline
b) 2,4 - dimethylaniline c) 2,4 - dinitroaniline d) 2,4 - dibromoaniline

14. The secondary structure of a protein refers to
a) fixed configuration of the polypeptide backbone b) hydrophobic interaction
c) sequence of α- amino acids d) α - helical backbone

15. Non stick cook wares generally have a coating of a polymer, whose monomer is
a) ethane b) prop – 2 – enenitrile c) chloroethene d) 1,1,2,2 – tetrafluoroethane

SECTION – II

Answer any six questions and question number 24 is compulsory. 6 X 2 = 12

16. What is the role of limestone in the extraction of Iron from its oxide ore Fe_2O_3?
17. Why fluorine is more reactive than other halogens?
18. A solution of $[Ni(H_2O)_6]^{+2}$ is green, whereas a solution of $[Ni(CN)_4]^{-2}$ is colurless. Explain.
19. Differentiate crystalline solids and amorphous solids. (any two)
20. What are promoters?
21. Perkins' reaction – Explain.
22. Write a short note on peptide bond.
23. What are bio degradable polymers? Give an example.
24. Calculate p^H of 0.04M HNO_3 solution.

SECTION – III

Answer any six questions and question number 33 is compulsory. 6 x 3 = 18

25. Explain the following terms with suitable examples.
(i) Gangue (ii) Slag
26. A hydride of 2nd period alkali metal (A) on reaction with compound of Boron (B) to give a reducing agent (C). Identify A,B and C.
27. State Hume – Rothery rule for alloy formation.
28. What is an elementary reaction? Give the differences between order and molecularity of a reaction.
29. Derive Henderson - Hasselbalch equation.
30. How is phenol prepared from
(i) Chlorobenzene (ii) Isopropyl benzene.
31. Write the mechanism of Cannizaro reaction.
32. Write short notes on the following.
(i) Carbylamine reaction (ii) Hofmann's bromamide reaction
33. The conductivity of a 0.01M solution of a 1:1 weak electrolyte at 298K is 1.5×10^{-4} S cm^{-1}. i) molar conductivity of the solution.
ii) degree of dissociation of the solution.
Given that $\lambda^{\circ}_{cation} = 248.2 S\,cm^2\,mol^{-1}$. and $\lambda^{\circ}_{anion} = 248.2 S\,cm^2\,mol^{-1}$

SECTION – IV

Answer all the questions. 5 x 5 = 25

34. A) (i) Give the basic requirement for vapour phase refining. (2)
(ii) Give the balanced equation for the reaction between chlorine with cold NaOH and hot NaOH. (3)
(OR)
B) (i) What is lanthanide contraction? (2)
(ii) Mention the uses of alum. (3)
35. A) (i) What is linkage isomerism. Give an example. (2)
(ii) Write the oxidation state, co-ordination number and magnetic property for the complex $K_4[Fe(CN)_6]$. (3)
(OR)
B) i) How do concentration of the reactant influence the rate of reaction? (2)
ii) Explain Schottky and Frenkel defect. (3)
36. A) i) Define solubility product. (2)
ii) Write a short note on Galvanic cell notation. (3)
(OR)
B) (i) Write a note on electro osmosis. (2)
(ii) Explain the intermediate compound formation theory of catalysis with an example. (3)
37. A) (i) How do antiseptics differ from disinfectants? (2)
(ii)Write a note on Coupling reaction and Phthalein reaction. (3)
(OR)
B) (i) What is urotropine? How is it prepared? (2)
(ii) Explain the reducing action of formic acid. (3)
38. A) i) How is chloropicrin prepared? (2)
ii) Account for the following.
a) pK_b of aniline is more than that of methyl amine
b) Amines are more basic than amides. (3)
(OR)