

CHEMISTRY

Time: 3.00 hrs.

Part - I

Marks: 70

I. Choose the correct answer:

15 x 1 = 15

1. The metal oxide which cannot be reduced to metal by carbon is
 - a) PbO
 - b) Al_2O_3
 - c) ZnO
 - d) FeO
2. Assertion : Graphite conducts electricity
Reason : In graphite, successive carbon sheets are held together by weak Vander Waals force.
 - a) Both are correct, reason explains assertion
 - b) Assertion is correct, but reason is wrong
 - c) Assertion is wrong, but reason is correct
 - d) Both are correct, but reason does not explain assertion
3. On hydrolysis, PCl_3 gives
 - a) H_3PO_3
 - b) PH_3
 - c) H_3PO_4
 - d) POCl_3
4. The actinoid elements which show the highest oxidation state of +7 are
 - a) Np, Pu, Am
 - b) U, Fm, Th
 - c) U, Th, Md
 - d) Es, No, Lr
5. Which among the following is not a neutral ligand?
 - a) Aqua
 - b) Ammine
 - c) Oxalato
 - d) Pyridine
6. Graphite and diamond are
 - a) Covalent and molecular crystals
 - b) Ionic and covalent crystals
 - c) Both covalent crystals
 - d) Both molecular crystals
7. During the decomposition of H_2O_2 to give dioxygen, 48 g O_2 is formed per minute at certain point of time. The rate of formation of water at this point is
 - a) $0.75 \text{ mol min}^{-1}$
 - b) 1.5 mol min^{-1}
 - c) $2.25 \text{ mol min}^{-1}$
 - d) 3.0 mol min^{-1}
8.
 - i) Lewis acids - A) Gives H^+ in water
 - ii) Lowry-Bronsted theory - B) $K_a = \alpha^2 c$
 - iii) Arrhenius concept - C) Carbonium ion
 - iv) Ostwald's dilution law - D) Has a tendency to donate proton

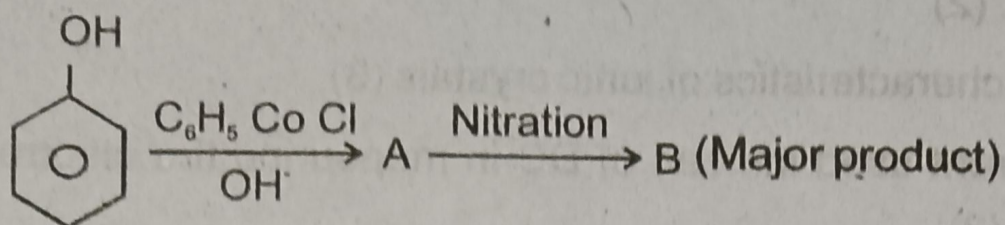
- a) (i) - C (ii) - D (iii) - A (iv) - B b) (i) - D (ii) - C (iii) - B (iv) - A
c) (i) - B (ii) - D (iii) - A (iv) - C d) (i) - A (ii) - D (iii) - C (iv) - B
9. How many Faradays of electricity are required for the following reaction to occur
 $\text{MnO}_4^- \rightarrow \text{Mn}^{2+}$
a) 5 F b) 3 F c) 1 F d) 7 F
10. Hair cream is
a) Gel b) Emulsion c) Solid sol d) Sol
11. Carboic acid is
a) Phenol b) Picric acid c) Benzoic acid d) Phenyl acetic acid
12. IUPAC name of Adipic acid is
a) Pentane dioic acid b) Butane dioic acid
c) Hexane dioic acid d) Ethane dioic acid
13. Nitrobenzene on reaction with $\text{con.HNO}_3/\text{H}_2\text{SO}_4$ at 100°C forms which one of the following products?
a) 1,4-di nitrobenzene b) 2,4,6-tri nitrobenzene
c) 1,2-di nitrobenzene d) 1,3-di nitrobenzene
14. Which of the following base is not present in DNA?
a) Adenine b) Uracil c) Cytosine d) Guanine
15. Nylon is an example of
a) Polythene b) polyamide c) Polyester d) Polysaccharide

Part - II

II. Answer any 6 questions. (Q.No.24 is compulsory) 6 x 2 = 12

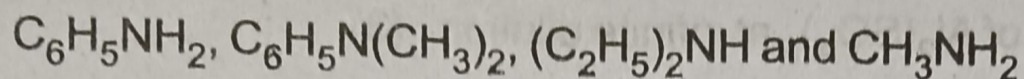
16. Write a short note on hydroboration?
17. What type of hybridisation occur in (a) BrF_5 (b) BrF_3
18. Give one test to differentiate $[\text{Co}(\text{NH}_3)_5 \text{Cl}] \text{SO}_4$ and $[\text{Co}(\text{NH}_3)_5 \text{SO}_4] \text{Cl}$
19. Distinguish tetrahedral and octahedral voids.
20. Write the Lowry-Bronsted concept of acids and bases and give their limitation.
21. What is the difference between homogeneous and heterogeneous catalysis?

22. Complete the following reaction.



23. Write the test for Carboxylic acid group.

24. Arrange the following into increasing order of basic strength.



Part - III

III. Answer any 6 questions. (Q.No.33 is compulsory)

6 x 3 = 18

25. Explain Magnetic separation.

26. How will you prepare chlorine in the laboratory?

27. Water are inner transition elements?

28. Define rate law and rate constant.

29. What is common ion effect?

30. State Faraday's law of electrolysis.

31. How will you prepare cinnamic acid from benzaldehyde?

32. Write a note on denaturation of proteins.

33. Write a short note on : (i) Gattermann reaction (ii) Gomberg reaction

Part - IV

IV. Answer all the questions.

5 x 5 = 25

34. a) i) Give the basic requirement for vapour phase refining. (2)

ii) Write the observations from the Ellingham diagram. (3)

(OR)

b) i) Give the uses of Potash alum. (2)

ii) What is catenation? Write the conditions for catenation. (3)

35. a) i) Transition metal show high melting points. Why? (2)

ii) Explain with example : (3)

* Coordination isomer

* Linkage isomer

(OR)

b) i) The rate constant for a first order reaction is $1.54 \times 10^{-3} \text{ s}^{-1}$. Calculate its half life time. (2)

ii) Give any three characteristics of ionic crystals (3)

36. a) i) Why is AC current used instead of DC in measuring the electrolytic conductance? (2)

ii) Ionic conductance at infinite dilution of Al^{3+} and SO_4^{2-} are 189 and 160 $\text{mho. cm}^2 \text{ equiv}^{-1}$. Calculate the equivalent and molar conductance of the electrolyte of $\text{Al}_2(\text{SO}_4)_3$ at infinite dilution. (3)

(OR)

b) i) What is Tyndall effect? (2)

ii) Differentiate physisorption and chemisorption. (3)

37. a) i) How do you prepare chloropicrin? (2)

ii) Write the note on Rosenmund reduction. (3)

(OR)

b) What are the functions of lipids in living organism?

38. a) i) How do antiseptics differ from disinfectants? (2)

ii) Write a structural formula of Aspirin and Paracetamol. (3)

(OR)

b) An organic compound (A) with molecular formula $\text{C}_2\text{H}_3\text{N}$ undergo reduction with $\text{Na} / \text{Hg} / \text{C}_2\text{H}_5\text{OH}$ gives compound (B) with molecular formula $\text{C}_2\text{H}_7\text{N}$. Compound (B) undergoes carbylamine test. Compound (B) reacts with nitrous acid gives nitrogen and compound (C) with molecular formula $\text{C}_2\text{H}_6\text{O}$. Identify the compound (A), (B) and (C) and write the equations.
