SECOND MID-TERM TEST - 2024	Reg. No.	1	2	0	1	5	X

XII - CHEMISTRY

Time Allowed : 1.30 Hrs. *Maximum Marks: 35*

Part – I

I. **Choose the correct answer:** 10 x 1 = 10

1. A complex in which the oxidation number of the metal is zero is
   a) K_4 [Fe $(CN)_6$] b) [Fe $(CN)_3$ $(NH_3)_3]_3$
   c) [Fe $(CO)_5$] d) both (b) and (c)
2. IUPAC name of the complex K_3 [Al$(C_2O_4)_3$] is
   a) potassiumtrioxalatoaluminium(III) b) potassiumtrioxalatoaluminate(II)
   c) potassiumtrisoxalatoaluminate(III) d) potassiumtrioxalatoaluminate(III)
3. Which of the following is paramagnetic in nature?
   a) $[Zn(NH_3)_4]^{2+}$ b) $[Co(NH_3)_6]^{3+}$
   c) $[Ni(H_2O)_6]^{2+}$ d) $[Ni(CN)_4]^{2-}$
4. Choose the correct statement.
   a) Square planar complexes are more stable than octahedral complexes
   b) The spin only magnetic moment of $[Cu(Cl)_4]^{2-}$ is 1.732 BM and it has square planar structure.
   c) Crystal field splitting energy $(\Delta)_o$ of $[FeF_6]^{4-}$ is higher than the $(\Delta)_o$ of $[Fe(CN)_6]^{4-}$
   d) crystal field stabilization energy of $[V(H_2O)_6]^{2+}$ is higher than the crystal field stabilization of $[Ti(H_2O)_6]^{2+}$
5. The number of electrons that have a total charge of 9650 coulombs is
   a) 6.22×10^{23} b) 6.022×10^{24} c) 6.022×10^{22} d) 6.022×10^{-34}
6. During electrolysis of molten sodium chloride, the time required to produce 0.1 mole of chlorine gas using a current of 3A is
   a) 55 minutes b) 107.2 minutes c) 220 minutes d) 330 minutes
7. Assertion : Pure iron when heated in dry air is converted with a layer of rust.
   Reason : Rust has the composition Fe_3O_4
   a) both assertion and reason are true and reason is the correct explanation of assertion.
   b) both assertion and reason are true but reason is not the correct explanation of assertion.
   c) assertion is true but reason is false
   d) both assertion and reason are false.
8. The product formed by the reaction an aldehyde with a primary amine
   a) carboxylic acid b) aromatic acid c) Schiff's base d) ketone

9. The order of basic strength for methyl substituted amines in aqueous solution is
   a) $N(CH_3)_3 > N(CH_3)_2 H > N(CH_3) H_2 > NH_3$
   b) $N(CH_3) H_2 > N (CH_3)_2 H > N(CH_3)_3 > NH_3$
   c) $NH_3 > N (CH_3) H_2 > N (CH_3)_2 H > N (CH_3)_3$
   d) $N (CH_3)_2 H > N (CH_3) H_2 > N (CH_3)_3 > NH_3$
10. Nitrobenzene on reaction with Con HNO_3 / H_2SO_4 at 80–100°C forms which one of the following products?
   a) 1,4 – dinitrobenzene
   b) 2,4,6 – trinitrobenzene
   c) 1,2 – dinitrobenzene
   d) 1,3 – dinitrobenzene

Part - II

II. Answer any 3 questions (Q.No.15 is compulsory) 3 x 2 = 6

11. What is linkage isomerism? Give an example.
12. What are the limitations of VB theory?
13. State Kohlrausch Law.
14. Why is AC current used instead of DC in measuring the electrolytic conductance?
15. Write the Carbylamine reaction.

Part - III

III. Answer any 3 questions. (Q.No.20 is compulsory) 3 x 3 = 9

16. In an octahedral crystal field, draw the figure to show splitting of d orbitals.
17. State Faraday's Laws of electrolysis.
18. What is Gabriel phthalimide synthesis.
19. Write the Sandmeyer reaction of benzene diazonium chloride.
20. Ionic conductance at infinite dilution of Al^{3+} and SO_4^{2-} are 189 and 160 mho cm^2 $equiv^{-1}$.
   Calculate the equivalent and molar conductance of the electrolyte $Al_2 (SO_4)_3$ at infinite dilution.

Part - IV

IV. Answer all the questions. 2 x 5 = 10

21. a) Write the postulates of Werner's theory.

(OR)

   b) How will you distinguish between primary secondary and tertiary aliphatic amines.

22. a) Derive an expression for Nernst equation

(OR)

   b) Write the various reduction reactions of Nitro Benzene in different mediums.