

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2024
(Fifth Semester)

Branch- CHEMISTRY

INORGANIC CHEMISTRY -I

Time: Three Hours

Maximum: 50 Marks

SECTION-A (5 Marks)

Answer ALL questions

ALL questions carry EQUAL marks

(5 x 1 = 5)

- 1 The d-block element which has positive standard electrode potential among the following is
(i) Copper (ii) Iron
(iii) Nickel (iv) Zinc
- 2 The complex which does not obey EAN rule is
(i) $[\text{Fe}(\text{CN})_6]^{4-}$ (ii) $[\text{CuCl}_2]^-$
(iii) $[\text{Co}(\text{NH}_3)_6]^{3+}$ (iv) $[\text{PtCl}_6]^{2-}$
- 3 Spin-only formula to calculate the magnetic moment is
(i) $\mu = \sqrt{n(n+2)}$ (ii) $\mu = n\sqrt{(n+2)}$
(iii) $\mu = \sqrt{n(n+4)}$ (iv) $\mu = n\sqrt{(n+4)}$
- 4 The metal present in myoglobin is
(i) Mn (ii) Fe
(iii) Cu (iv) K
- 5 An example for a pi acceptor ligand is
(i) NO_2 (ii) NH_3
(iii) en (iv) NO

SECTION - B (15 Marks)

Answer ALL Questions

ALL Questions Carry EQUAL Marks

(5 x 3 = 15)

- 6 a. How do you explain the following?
i. Atomic radii of Cr, Mn, Fe, Co, Ni and Cu are so close to one another.
ii. Transition metals are generally colored.
OR
b. What are the different types of structural isomerism in coordination complexes?
- 7 a. Bring out the salient features of Werner's coordination theory.
OR
b. Describe spectrochemical series.
- 8 a. Compare CFT and VBT.
OR
b. Discuss $\text{S}_\text{N}2$ mechanism for the substitution reactions of square planar complexes.

Cont...

- 9 a. What is sodium pump? Discuss the role played by Na^+ in biological system.
OR
b. Write a note on Ferridoxin.
- 10 a. Discuss the nature of bonding involved in metal carbonyls.
OR
b. Give a brief account on the various types of metal nitrosyls.

SECTION -C (30 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks

(5 x 6 = 30)

- 11 a. Discuss the optical isomerism of square planar complexes.
OR
b. Outline the factors affecting stability of complexes.
- 12 a. Outline the assumptions of VBT. Apply VBT to $[\text{Co}(\text{NH}_3)_6]\text{Cl}_3$ and $\text{K}_2[\text{MnCl}_4]$ complexes to explain the magnetic properties.
OR
b. Summarize crystal field splitting in square planar and octahedral complexes.
- 13 a. Explain the splitting of d-orbitals in tetragonally distorted octahedral complexes by applying CFT.
OR
b. What is Trans effect? Explain the theory which satisfactorily explains the Trans effect of CO.
- 14 a. Illustrate the structure of Hemoglobin. Describe in detail the role played by this bio inorganic compound in biological system.
OR
b. What are coenzymes? Discuss the structure and function of B_{12} coenzyme.
- 15 a. Describe the structure of $\text{Fe}(\text{CO})_5$, $\text{Cr}(\text{CO})_6$ and $\text{Fe}_2(\text{CO})_9$.
OR
b. Summarize the preparation properties and structure of Ferrocene.

Z-Z-Z END