

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2022
(Fifth Semester)

Branch – CHEMISTRY

INORGANIC CHEMISTRY - I

Time: Three Hours

Maximum: 75 Marks

SECTION-A (10 Marks)

Answer ALL questions

ALL questions carry EQUAL marks

(10 x 1 = 10)

- Most powerful oxidizing property of manganese is shown by which of the following oxidation state
(i) +7 (ii) +5 (iii) +3 (iv) +2
- Chelation is
(i) increase the rate of hydrolysis (ii) decrease the rate of hydrolysis
(iii) not affect the rate of hydrolysis (iv) with increases of decreases
- What was the term proposed by Werner for the number of groups bound directly to the metal ion in a coordination complex?
(i) Primary valence (ii) Secondary valence
(iii) Oxidation number (iv) Polyhedra
- Which of the following is a complex salt?
(i) Potassium aluminium sulphate (ii) Ammonium iron(II) sulphate
(iii) Carnallite (iv) Potassium ferrocyanide
- Tetraamminecopper (II) sulphate is _____ in colour.
(i) violet (ii) green
(iii) blue (iv) red
- Which of the following complexes shows zero crystal field stabilization energy?
(i) $[\text{Co}(\text{H}_2\text{O})_6]^{3+}$ (ii) $[\text{Fe}(\text{H}_2\text{O})_6]^{3+}$
(iii) $[\text{Co}(\text{H}_2\text{O})_6]^{2+}$ (iv) $[\text{Mn}(\text{H}_2\text{O})_6]^{3+}$
- An example of iron-sulphur cluster in photosynthetic ferredoxin is
(i) Fe_2S_2 (ii) $\text{Fe}_2\text{S}_2\text{O}_2$
(iii) $\text{Fe}_4\text{S}_4^{2+}$ (iv) FeS
- The oxidation state of iron in oxyhaemoglobin is
(i) +3 (ii) +2
(iii) 0 (iv) +1
- Which of the following statement is not true about ferrocene?
(i) decamethyl ferrocene is staggered in solid state
(ii) cyclopentadienyl rings in ferrocene are almost eclipsed
(iii) cyclopentadienyl ring in ferrocene are staggered
(iv) ferrocene can be nitrated by reaction with dil. HNO_3
- Ferrocene cannot undergo which of the following reaction?
(i) Friedal craft acylation (ii) Diels-Alder reaction
(iii) Oxidation by Ag^+ ions (iv) Electrophilic substitution

Cont...

SECTION - B (25 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks (5 x 5 = 25)

- 11 a Summarise the magnetic properties of d-block elements.
OR
b Outline the nomenclature of coordination compounds.
- 12 a Narrate the limitations of VBT.
OR
b Point out the applications of CFSE.
- 13 a State and explain the polarization theory of trans effect.
OR
b Describe the colour of transition metal complexes.
- 14 a Sketch and explain the structure of chlorophyll.
OR
b Explain the role of essential and trace elements in biological systems.
- 15 a Bring out the classification of structures of $\text{Fe}(\text{CO})_5$.
OR
b Explain about the preparation and properties of cyclopenta diene complex.

SECTION -C (40 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks (5 x 8 = 40)

- 16 a Discuss the hydrate, linkage, ligand and polymerization isomerisms.
OR
b (i) Discuss the factors affecting stability complexes.
(ii) Point out the application of chelates
- 17 a Discuss the Werner's theory of coordination and write its limitations.
OR
b Discuss the splitting of d orbitals in octahedral and tetrahedral fields.
- 18 a Compare the CFT and VBT.
OR
b Elucidate the ligand substitution reactions in square planar complexes.
- 19 a Discuss the structure and functions of myoglobin.
OR
b Discuss the occurrence, structure and functions of Vitamin B_{12} .
- 20 a Elucidate the preparation, properties and nature of bonding of sodium nitroprusside.
OR
b Discuss the preparation, properties and structure of ferrocene.

Z-Z-Z

END