

Exam. Code : 103205

Subject Code : 1330

B.A./B.Sc. 5th Semester

CHEMISTRY

(Inorganic Chemistry—IV)

Time Allowed—3 Hours] [Maximum Marks—35

Note :— Attempt *five* questions by selecting at least *one* question from each section, *fifth* question can be attempted from any section. Each question carries equal marks.

SECTION—A

1. (a) Discuss the crystal field splitting in octahedral and square planar complexes. 5
- (b) All tetrahedral complexes are high spin complexes. Explain. 2
2. (a) Discuss the factors affecting the magnitude of crystal field splitting. 2.5
- (b) Write short note on Jahn Teller effects. 2.5
- (c) What is CFSE ? Calculate CFSE for d^5 strong field octahedral and d^6 tetrahedral. 2

SECTION—B

3. (a) What is magnetic susceptibility ? How does it vary with Temperature ? 3
- (b) What is T.I.P. (Temperature Independent Paramagnetism) ? 2
- (c) What is meant by stability of complexes ? Derive relation between stepwise and overall stability constant. 2

4. (a) Discuss the rate law and the mechanism of nucleophilic substitution reactions in square planar complexes. 3
- (b) Discuss Gouy's method for measuring magnetic susceptibility. Give its advantages and disadvantages. 3
- (c) Which out of Fe^{+3} and Fe^{+2} will have higher magnetic moment and why? 1

SECTION—C

5. (a) What is term symbol? Calculate the term symbol for d^2 system. 3
- (b) Explain the selection rules for d-d transitions. 3
- (c) Calculate the no. of microstates for d^4 and d^6 . 1
6. (a) What are Orgel diagrams? Draw and discuss the Orgel diagram for $[\text{Ti}(\text{H}_2\text{O})_6]^{+3}$ and $[\text{Ni}(\text{H}_2\text{O})_6]^{+2}$. Give its limitations also. 5
- (b) Discuss the spectrochemical series. 2

SECTION—D

7. (a) What are organometallic compounds? Discuss different types of organometallic compounds. Give the structure of organometallic compounds formed by 5, 6 and 8 donor unsaturated molecules. 5

- (b) What is E.A.N. rule? Calculate E.A.N. for the following:
- (i) $\text{Cr}(\text{CO})_6$
- (ii) $[\text{Pt}(\text{NH}_3)_5\text{Cl}]^{+3}$ 2
8. (a) How homogeneous hydrogenation of ethylene is carried out by using Wilkinson's Catalyst? 3
- (b) Discuss the preparation, properties and structure and applications of Organo Lithium compounds. 4