

No. of Printed Pages : 04

Roll No. ....

**18BB1851**

**M. Sc. EXAMINATION, 2020**

(Second Semester)

(C Scheme) (Re-appear)

CHEMISTRY

CH502C

Inorganic Chemistry-II

(Essential Inorganic Chemistry-2)

*Time : 2½ Hours]*

*[Maximum Marks : 75*

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Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

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**Note :** Attempt *Four* questions in all. All questions carry equal marks.

1. (a) Draw and discuss the Orgel diagram for  $d^2$  and  $d^7$  electronic configurations in octahedral field.
- (b) How does Hund's rule help in determining the relative energies of various electronic terms in a free ion ?
- (c) Define term symbol and also determine the ground state term for  $V^{+3}$  ions.
2. (a) Discuss L-L, S-S and L-S coupling of electrons occurring in a free gaseous atom.
- (b) What are Tanabe-Sugano diagrams ? To what use are they put ?
- (c) Explain ligand to metal charge transfer spectra with suitable examples.
3. (a) What is quenching of orbital angular momentum and what are its consequences on the  $\mu_{\text{eff}}$  of transition metal complexes ?
- (b) Define Curie temperature and Neel temperature.
- (c) Predict the spin magnetic moment for  $[\text{Mn}(\text{H}_2\text{O})]^{+2}$  and  $[\text{Fe}(\text{CN})_6]^{4-}$ .

4. (a) How will you determine magnetic susceptibility and magnetic moment by Gouy's method ?
- (b) What is magnetic exchange coupling ? Explain in detail.
5. (a) Draw and discuss the structure of decamolybdate and paramolybdate anion,  $[\text{Mo}_7\text{O}_{24}]^{-6}$  in detail.
- (b) Define isopoly and hetropoly metallates.
- (c) Write short note on pseudo halides.
6. (a) Discuss in detail the nature of bonding in  $\text{B}_6\text{H}_{10}$  and  $\text{B}_5\text{H}_{11}$ .
- (b) Explain in detail the following terms :
- (i) Phosphazenes
- (ii) Borazine.
7. (a) Discuss the chemistry of liquid ammonia as a solvent.
- (b) Discuss the various reactions which take place in sulphuric acid.

8. (a) What are protic and aprotic solvents ?  
Give examples. Is liquid HF a protic or an aprotic solvent ?
- (b) Discuss the following reactions in  $\text{SO}_2$  solvent :
- (i) Acid-base reactions
  - (ii) Solvolytic reactions
  - (iii) Complex formation reactions.
- (c) Discuss the various reactions which take place in  $\text{N}_2\text{O}_4$  solvent.