M.Sc. DEGREE EXAMINATION,ODD SEMESTER 2020
II YEAR III SEMESTER
Inorganic Chemistry - III

Max.marks :25

Answer any **FIVE** questions $(5 \times 5 = 25)$ Marks

1. How can infrared spectroscopy be used to distinguish between the cis-isomer and trans-isomer of metal complex of the type MX_4Y_2 (X and Y are monodentate) or MZ_2Y_2 where Z is bidentate ligand and Y is monodentate ligand.
2. Discuss the spectral consequences of the Jahn-Teller effect.
3. Which of the two, cis-$Fe(CO)_4Cl_2$ or trans-$Fe(CO)_4Cl_2$ would have the larger quadrupole splitting for iron? Explain.
4. Discuss the application of ESR in the identification of Copper and Vanadyl complexes.
5. Explain the principle behind X-ray Fluorescence Spectroscopy and its application in structural determination.
6. Account for the following:
   (a.) The Racah parameter B for $[Co(CN)_6]^{3-}$ is 460cm^{-1}, whereas that of $[Co(NH_3)_6]^{3+}$ is 615 cm^{-1}.

   (b.) The Racah parameter B for $[Ni(H_2O)_6]^{2+}$ is only about 70% of that for free Ni^{2+} ion.
7. (a.) The ^{19}F NMR spectrum of $[WF_6L]$ shows three lines of relative intensity 4:1:1. Account for this.

   (b.) Write brief note on photoelectron spectroscopy.