M.Sc. DEGREE EXAMINATION,NOVEMBER 2019
II Year III Semester
Inorganic Chemistry - III

Time : 3 Hours **Max.marks :75**

Section A $(10 \times 2 = 20)$ Marks

Answer any **TEN** questions

1. Raman spectroscopy is superior to infrared spectroscopy for studying inorganic systems. Why?
2. Draw the twisting mode of vibration of N_2O_4 (planar) and predict whether this mode will be infra red or Raman active.
3. State spin selection rule for absorption of light radiation.
4. What is Lande's splitting factor?
5. What are NMR Shift reagents? Explain.
6. Outline the principle of NQR spectroscopy.
7. Write any two applications of Photoelectron spectroscopy.
8. What is anisotrophy?
9. Define space lattice
10. $Mn_2(CO)_{10}$ has IR band in the range of 2071-2022cm^{-1}. But $Co_2(CO)_8$ has two bands in the range 2071-2022 and 1860-1855cm^{-1}. Explain
11. How is linkage isomerism identified in IR spectra? Give an example.
12. How does Mossbauer spectra of Fe (II) and Fe(III) complexes differ?

Section B $(5 \times 5 = 25)$ Marks

Answer any **FIVE** questions

13. Discuss the application of Raman spectroscopy in the study of metal complexes.
14. Discuss the consequences of Jahn-Teller effect on tetrahedral complexes.
15. Explain the principle behind Mossbauer spectroscopy.
16. Photoelectron spectroscopy is useful for determining the strength with which an electron is bound in a molecule. Explain.
17. Briefly explain about SEM.
18. How is X-ray fluorescence spectroscopy used for structural determination?

19. Predict the number of peaks in the electronic spectrum of $[Ti(H_2O)_6]^{3+}$ using Orgel digram.

Section C $(3 \times 10 = 30)$ Marks

Answer any **THREE** questions

20. Discuss the application of IR spectroscopy in the study of
    i). metal carbonyls ii). metal sandwich compounds.
21. Discuss the application of Orgel diagram to electronic spectra of transition metal complexes.
22. i). Outline NQR spectra of nitrosyl compounds.
    ii). Write short notes on how NMR spectra is used for identification of ^{31}P and ^{19}F.
23. i). Explain Kramer's theorem.
    ii). Discuss the ESR spectra of Cu and Mn complexes.
24. Explain with any two examples on how inorganic crystalline solids are studied with XRD.

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