

M.Sc Sem-3 Examination

503

Chemistry (Inorganic)

November-2024

Time : 2-30 Hours]

[Max. Marks : 70

- Q. 1 (A) Discuss the preparation method for samples for IR spectroscopy. 07
 (B) Discuss instrumentation for UV spectroscopy. 07
 OR
 (A) Discuss the modes of vibration in IR spectroscopy. 07
 (B) Write applications of UV spectroscopy in Inorganic Chemistry. 07
- Q. 2 (A) Explain the spin-spin splitting rule. How does it work and discuss the splitting of proton in trichloroethane 07
 (B) Discuss Double irradiation with suitable example in detail. 07
 OR
 (A) Discuss the principle, working and instrumentation of NMR spectroscopy with brief diagram. 07
 (B) Discuss chemical shift equivalence and magnetic equivalence with example of molecule of Unorganic chemistry. 07
- Q. 3 (A) Write a note on "Survey of EPR spectra of first row transition metal ion complexes". 07
 (B) Write down the fundamental differences between NMR and ESR. 07
 OR
 (A) Write down applications of ESR spectroscopy in understanding of metal complex. 07
 (B) Describe Hyperfine interactions. 07
- Q. 4 (A) Discuss the fundamental of Mossbauer spectroscopy and its application. 07
 (B) Discuss instrumentation of Scanning Electron Microscopy (SEM) and its usefulness for surface analysis in inorganic chemistry. 07
 OR
 (A) Discuss hyperfine interaction between nuclei, electrons and Mossbauer parameters. 07
 (B) Write a short note on Atomic Force Microscopy. 07
- Q. 5 Answer any seven out of twelve 14
 (i) What is the full form of ATR?
 (ii) What is the spin selection rule for UV spectroscopy?
 (iii) Explain "*flipping of the proton.*"
 (iv) Complete the sentence: The orientation of a nuclei in a uniform external magnetic field is determined by _____.
 (v) Give the important characteristics for selection of solvent and 2 examples for NMR spectroscopy.
 (vi) Give an example of "*enantiotropic protons.*"
 (vii) Which type of electromagnetic radiation is used in ESR spectroscopy?
 (viii) What is the unit of magnetic field strength?
 (ix) What is the value of 'Lande' factor (g-factor) for an unbound electron?
 (x) What is Mossbauer effect?
 (xi) Define: Spin-spin relaxation
 (xii) Which electromagnetic radiation is used in Mossbauer spectroscopy?