



DN-003-1104008

Seat No. _____

M. Sc. (Sem. IV) Examination

March - 2022

C(I)-402 : Inorganic Chemistry

(Inorganic Spectroscopy)

Faculty Code : 003

Subject Code : 1104008

Time : **2.30** Hours]

[Total Marks : **70**

- Instructions :** (1) All questions are compulsory.
(2) All questions carry equal marks.

- 1** Answer the following (any seven) **14**
- (a) Give the importance of ESR.
 - (b) What is Kramer's Degeneracy in ESR.
 - (c) Discuss the difference between NMR and ESR.
 - (d) Give the basic idea of NMR.
 - (e) Explain the PES spectrum of Li
 - (f) Give the selection rules of ESR.
 - (g) Define Nuclear Quadruple Resonance.
 - (h) What do you mean by Nuclear Quadruple Resonance ?
 - (i) Give the basic idea of PES.
 - (j) Give the name of nuclei other than proton which can be studied by NMR.
- 2** Answer the following (any two) **14**
- (a) Explain NQR techniques in detail.
 - (b) Discuss the ESR spectrum of H-atom
 - (c) What is Auger Electron Spectroscopy (AES), define Auger effect and Auger electron.

- 3** Answer the following (any two) **14**
- (a) Discuss ESR technique (Instrumentation)
 - (b) Discuss the PES spectrum of O₂ molecule and CO Molecule.
 - (c) Discuss NMR spectra of ¹¹B
 - (d) Discuss the ESR spectrum of Mn⁺² (I=5/2)

- 4** Answer the following. **14**
- (a) Write short note on Hyperfine splitting in ESR.
 - (b) Write note on NMR Shift reagent.

OR

- 5** Answer the following. **14**
- (1) Discuss the NMR spectra of ¹⁹F and its application in inorganic complexes.
 - (2) Give the relation between Koopman's Theorem and Ionization Energy.

OR

- 5** Answer the following. **14**
- Discuss the NQR spectra of Quadrupolar nucleus having I=3/2 and determine energy of each energy level.
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