



MBT-003-1104008

Seat No. _____

M. Sc. (Sem. IV) (CBCS) Examination

April / May- 2018

C(I)-402 : Inorganic Chemistry

(Inorganic Spectroscopy)

Faculty Code : 003

Subject Code : 1104008

Time : $2\frac{1}{2}$ Hours]

[Total Marks : 70

- Instructions :** (1) All Questions are compulsory.
(2) All Questions carry equal Marks.

1 Answer the following : (any seven) **14**

- Define ESR spectroscopy.
- What is Kremer's degeneracy in ESR ?
- Give the basic idea of NMR.
- Define Nuclear Quadruple Resonance.
- Explain the PES spectrum of Li.
- Derive the equation to find out the energy of each state in ESR energy level diagram.
- Give the basic principle of Photoelectron Spectroscopy.
- Give the name of nuclei other than proton which can be studied by NMR.
- Photoelectric effect and Ionization energy. Explain.
- How ESR spectroscopy is useful in structural determination of metal complexes.

2 Answer the following : (any two) **14**

- Discuss the ESR spectrum of $\text{CH}_3\cdot$ radical (One electron influenced by three equivalent protons)
- Give the relation between Koopman's Theorem and Ionization energy
- Discuss the ESR spectrum of VO_2^+ ($I=7/2$)

- 3** Answer the following : (any **two**) **14**
- (a) Discuss the factors affecting 'g' value in ESR.
 - (b) Discuss the PES of CO molecule and N₂ molecule.
 - (c) Write note on NMR shift reagent.

- 4** Answer the following : **14**
- (a) Discuss NMR of ³¹P.
 - (b) Explain NQR techniques in detail.

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

OR

- 5** Answer the following : **14**
- (a) Write short-note on 'g' and factors effecting it?
 - (b) Discuss the principle involved in NMR and Describe the use of NMR in the study of boron compounds.
