PS-003-1104008 Seat No. _____

M. Sc. (Inorganic Chemistry) (Sem. IV) Examination

August - 2020

C(i)-402 : 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**

(a) How ESR spectroscopy is useful in structural determination of Metal complexes ?

(b) Give the name of nuclei other than proton which can be studied by NMR.

(c) Give the basic idea of NMR.

(d) Define Nuclear Quadruple Resonance

(e) Explain the PES spectrum of Li.

(f) Derive the equation to find out the energy of each state in ESR energy level diagram.

(g) Give the basic principle of Photoelectron Spectroscopy

(h) What is Kremer's degeneracy in ESR ?

(i) Photoelectric effects and Ionization energy : Explain.

(j) Define ESR spectroscopy.

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

(a) Discuss the ESR spectrum of H-atom.

(b) Write note on NMR shift reagent.

(c) Discuss the PES spectrum of O_2 molecule or CO molecule.

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

(a) Discuss 'g' value and factures affecting it in ESR.

(b) Discuss the photoelectric effects in PES.

(c) Give the relation between Koopman's Theorem and Ionization energy.

4 Answer the following : **14**

(a) Discuss NMR of ^{31}P

(b) Explain ESR techniques (Instrumentation)

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 : (any **two**) **14**

(a) Define ESR , discuss the limitations and theory of ESR in detail.

(b) What is Auger Electron Spectroscopy (AES), define Auger effect and Auger electron