Roll No. ..... **Total No. of Pages : 2**

PC 13100-N

L-3/2111
INORGANIC SPECTROSCOPY—I, Paper—313
Semester—III

Time Allowed : Three Hours] [Maximum Marks : 55

Note :– The candidates are required to attempt *two* questions each from Sections A and B. Section C will be compulsory.

SECTION—A

I. Explain the chemical process which affect the natural line width of a spectral line. 8

II. Write notes on :

(a) Isomer shift 4

(b) Quadrupole interactions. 4

III. Write applications of nuclear quadrupole resonance spectroscopy. 8

IV. (a) Discuss the effect of solvent polarity on charge transfer spectra. 4

(b) Derive selection rules of electronic absorption spectroscopy. 4

SECTION—B

V. What are orgel diagrams ? Discuss uses of orgel diagrams. 8½

VI. Write notes on :

(a) Force constant 4

(b) Group vibrations. 4½

VII. (a) What are polarised and depolarised Raman lines ? 4

(b) Discuss combination bands and Fermi resonance. 4½

VIII. Discuss applications of Raman and Infrared selection rules to the determination of Inorganic structures. 8½

SECTION—C

IX. (a) What are molecular transitions ?

(b) What is Oscillator strength ?

(c) What do you mean by Spin-orbit coupling ?

(d) Discuss spectrum of formaldehyde.

(e) What is principle of Mossbauer Spectroscopy ?

(f) What are harmonic and anharmonic vibrations ?

(g) What are limitations of group vibration concept ?

(h) What is nephelauxetic effect ?

(i) What is microwave spectroscopy ?

(j) Discuss effect of magnetic field on NQR spectra.

(k) Discuss finger printing in IR spectroscopy. 11×2=22