

K-5/2110

7404/N

**Inorganic Spectroscopy-I-313
(Semester-III)**

[Time: Two Hours]

[Maximum Marks: 55]

Note: Attempt any four questions. All questions carry equal marks.

- 1) (a) Discuss Job's Method of isomolal solutions. 6
(b) Interpretation of IR spectrum in terms of various group frequencies. 7.75
- 2) Describe qualitatively analyses of spectrum of formaldehyde with assignment of transitions. 13.75
- 3) (a) What is polarized absorption spectra? 9
(b) Write the significance of oscillator strength. 4.75
- 4) What is Dq and β ? Calculate Dq and β for nickel ions complexes if observed transitions are 7728, 12970 and 24038 cm^{-1} . Given the value of $15B = 15,840\text{cm}^{-1}$ in gaseous state. 13.75
- 5) Discuss the various applications of Raman and IR spectroscopy in details. 13.75
- 6)(a) How we can get information about the structure of various inorganic compounds from the NQR spectroscopy? 10.75
(b) Which of the following molecules show pure rotational spectra: N_2 , O_2 , Benzene, water and HCl. 3
- 7) (a) Explain the principle of MB spectroscopy and spectral parameters to obtain MB spectra. 9.75
(b) Effect of π bonding in the compound $\text{Fe}(\text{CN})_5 \text{NO}^{2-}$. 4
- 8) (a) Explain spin orbit coupling. 7.5
(b) Explain vibronic coupling. 6.25
- 9) (a) Briefly discuss the Beer's law and discuss about its validation. Also discuss about molar absorptivity and its unit. 11.75
(b) Two major limitations of Beer's law. 2