

J No /6/10/90

June 2009

M. Sc. (Previous) 1Ind Semester Examination

CHEMISTRY

Paper IX (IV) : Spectroscopy - II and Diffraction Methods (MCII-409) (IX)

(Max Marks 35)

Time 3 Hours

Note : Attempt all questions. All questions carry equal marks. The blind candidates will be given 60 minutes extra time.

1. (a) What is Chemical Shift ? Discuss the factors influencing chemical shift. How it is measured ? 5
 (b) Give reasons for selecting TMS as reference compound in NMR Spectroscopy. 2
 OR

Discuss :

- (a) Shielding and deshielding of magnetic nuclei. 3½
 (b) Spin-spin interaction in C_2H_5OH molecule and its NMR spectrum 3½

2. (a) Give the basis and schematic diagram of NQR Spectrometer. Also discuss its applications 5
 (b) What are the limitations of NQR ? 2
 OR

Discuss :

- (a) Symmetrical and nonsymmetrical fields in NQR. 2½
 (b) Effects give rise multiple lines in the NQR spectrum. 2
 (c) How does electric field gradient arises in NQR ? 2

- (a) Give the basic principle of ESR Spectroscopy and its instrumental setup. 4½
 (b) Discuss the 'g' value and factors affecting the 'g' value. 2½
 OR

Discuss :

- (a) Spin densities and McConnell relationship. 3½
 (b) Hyperfine splitting of ESR signal and its interpretations. 3½
 (c) Give Bragg conditions and derive the Bragg's equation. 3½
 (d) Describe the Laue's Spot Method of X-ray structural analysis of crystals. 3½
 OR

Explain :

- (a) Determination of absolute configuration of molecule by X-ray method. 2½
 (b) Identification of FCC unit cell from systematic absence in diffraction pattern. 2½
 (c) Index System of Miller for crystallographic designation. 2

Write applicability of

- (a) Low energy electron diffraction studies for surface structure. 3½
 (b) Neutron diffraction for the elucidation of structure of magnetically ordered unit cell. 3½
 OR

Write note on

- (a) Wierl equation. 3½
 (b) Measurement technique of Neutron diffraction. 3½