

Code No.: **8639/AB**

**FACULTY OF SCIENCE**

**M.Sc. I Semester Examination, May/June 2012**

CHEMISTRY

**Paper IV**

(Biology and Spectroscopy)

(To be answered by the students without Biology in B.Sc.,)

Time : 3 Hours]

[Max. Marks : 80

(i) Write **all** the answers in one answer sheet only.

(ii) Answer **all** questions.

**Section A** – (Marks :  $4 \times 8 = 32$ )

1. (a) Give the structure and name of the nucleic acid bases.  
(b) Draw the figure of mitochondria and give its functions.
2. (a) What is spin-spin coupling? Explain with suitable examples.  
(b) How can  $^1\text{H}$  NMR be used to study keto-enol tautomerism.
3. (a) Classify the molecules based on moment of Inertia.  
(b) Explain Fermi resonance with suitable example.
4. (a) Explain various types of electronic transitions in molecules.  
(b) Write a note on charge transfer spectra.

**Section B** – ( Marks :  $4 \times 12 = 48$ )

5. (a) Define cell specialisation and explain it by considering nerve cells.  
(b) What is metabolism? Explain glycolysis.

Or

- (c) Draw the double helix structure of DNA and identify the hydrogen bonded base pairs in it.
- (d) Write a note on marker enzymes.

[P.T.O.]

6. (a) Define chemical shift and discuss the factors influencing the chemical shift.  
(b) Discuss the use of  $^1\text{H}$ NMR to study (i) Hydrogen Bonding  
(ii) Keto enol tautomerism.

Or

- (c) Sketch the  $^1\text{H}$ NMR spectrum of (i)  $[\text{HN}_1(\text{OPE}_3)_4]^+$  (ii)  $[\text{HRh}(\text{CN})_5]^{3+}$ .  
(d) What is spin-spin coupling? Discuss various types of couplings in  $^1\text{H}$ NMR spectroscopy.
7. (a) Outline the application of I.R. spectra to study the metal ligand bonding involving mono and bidentate ligands.  
(b) With the help of a neat sketch, discuss the working of an I.R. spectrometer.

Or

- (c) Describe the isotopic effect on Rotational spectra.  
(d) What are Stoke's and Anti-Stokes in Rotational lines? Explain their importance.
8. (a) State and explain Lambert-Beer's Law in UV spectroscopy. What is its importance?  
(b) Discuss the applications of UV-Visible spectroscopy in stereochemical studies.

Or

- (c) Discuss the application of electronic spectra in the study of  $3d^1$  and  $3d^9$  hexa aquo metal complexes.  
(d) Explain the principle involved in Rotational spectroscopy of molecules.
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