

Roll No.

Total Pages : 4

1789/M

M-35/2051

**BIO-PHYSICAL CHEMISTRY AND ADVANCED
SPECTROSCOPY**

Paper-432

Semester-IV

Time allowed : 3 Hours] [Maximum Marks : 55

Note: The candidates are required to attempt two questions each from Section A carrying 8 marks each and Section B carrying 8½ marks each and the entire Section C consisting of 11 short answer type questions carrying 2 marks each.

SECTION-A

1. Discuss in detail Hydrophobic and Hydrophilic interaction in Biological systems. 8
2. (a) Discuss the effect of solvent polarity, pH and temperature on the stability of proteins. 4

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(b) Describe the forces that determine the shape of proteins. 4

3. (a) Describe the laser action with respect to two level system by taking a suitable example. 4

(b) Write a note on Helium-Neon gas laser. 4

4. Write a note on the followings :

(a) Raman laser action and stimulated Raman scattering. 4

(b) Bond model theory for metals. 4

SECTION-B

5. Describe principle and basic instrumentation involved in mass spectrometer. How is it utilized for the determination of molecular mass of a volatile liquid / compound? 8½

6. (a) Give an account on principle and instrumentation of Photoelectron spectrometer. 4½

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- (b) Discuss the applications of Frank-Condon principle to photoelectron spectra. 4
7. (a) State and explain Koopman's theorem. 4½
- (b) Discuss the factors that affects cleavage in mass spectrometry. 4
8. Write a note on the following :
- (a) Photo Electron spectra of halogen acids. 4½
- (b) Ionization Efficiency Curves. 4

- (v) Define Enzymes.
- (vi) Give two applications of Lasers.
- (vii) What is meant by Q-Switching? Explain.
- (viii) Define Isoelectric point.
- (ix) Define Protein folding.
- (x) Explain the term "Fluorescence."
- (xi) What is XPS?

11×2 = 22

SECTION-C

9. Answer the following in short :
- (i) Explain basic peak in mass spectrometry.
- (ii) Explain in terms Atomization and Photosensitization.
- (iii) Explain Spin Orbit Coupling.
- (iv) What are the characteristics of laser beam?