S.Y.M.Sc.(Physics) (CBCS Pattern) Fourth Semester CBCS

PSCPHYT16.1-F 2.1 Foundation Course-II-Paper-16
Spectroscopic Application

P. Pages : 2 **GUG/W/18/11419**

Time : Three Hours * 3 5 1 0 * Max. Marks : 80

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1. Either

a) Explain deviations from Beer's Law in spectroscopy. **8**

b) Draw schematic diagram of a phototube and explain photovoltaic cell in radiation detector. **8**

OR

e) Discuss various type of energies possessed by the molecules. **8**

f) How Raman spectroscopy is useful in structure determination of simple molecules. **8**

2. Either

a) Explain spin-spin and spin-lattice relaxations. **8**

b) Explain NMR spectrometer working with a neat labelled diagram. **8**

OR

e) State few important applications of electronic spectroscopy. **8**

f) What is XPS spectroscopy? Explain it in brief. **8**

3. Either

a) Why microwave source and techniques have to be applied for the observation of EPR? **8**

b) Discuss normal and anomalous zeeman effect. **8**

OR

e) Explain chemical isomer shift and it's significance in analysis of Mossbauer spectrum. **8**

f) With a block diagram explain a Mossbauer spectrometer. **8**

4. Either

a) Briefly describe the process and instrumentation involved in the chemical and field desorption ionization technique used in mass spectrometer. **8**

b) Briefly explain why the ionization source of a time-of-flight mass spectrometer must be operated in a pulse mode not continuously. **8**

OR

e) What is the cost-effectiveness of using MALDI-MS for pathogen species identification? **8**

f) Via appropriate figures and text, briefly explain how electroscopy (MS) ionization sources function and explicitly state whether each is considered a 'hard' or 'soft' ionization method. **8**

5. a) Explain briefly vibrational spectra of a diatomic molecule. **4**

b) What is chemical shift? Explain it. **4**

c) Define Mossbauer effect. **4**

d) Explain isotope abundance. **4**

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