

**PSCPHYT16.1 - Foundation Course-II - Paper-XVI : Spectroscopic Applications**

P. Pages : 2

Time : Three Hours



**GUG/W/23/11419**

Max. Marks : 80

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- Notes : 1. All questions are compulsory.  
2. All questions carry equal marks.

**Either:**

1. a) Describe UV-Spectrophotometer. Give the advantages of double beam instruments. **8**  
b) Describe how Raman Spectroscopy is different from Infrared spectroscopy. **8**

**OR**

- e) Discuss various types of energies possessed by the molecules. **8**  
f) How Raman spectroscopy is useful in structure determination of simple molecules. **8**

**Either:**

2. a) Explain chemical shift with examples in NMR. **8**  
b) Discuss the fine structure of electronic vibrational transition. **8**

**OR**

- e) What is XPS spectroscopy? Explain it in brief. **8**  
f) Discuss the important applications of electronic spectroscopy. **8**

**Either:**

3. a) Explain how electron paramagnetic resources spectroscopy is successful in the study of inorganic components. **8**  
b) Discuss normal and anomalous Zeeman Effect. **8**

**OR**

- e) Explain magnetic hyperfine interaction and quadrupole interaction in Mossbauer spectroscopy. **8**  
f) With a block diagram explain a Mossbauer spectrometer. **8**

**Either:**

4. a) Discuss the different types of ionization techniques used in mass spectroscopy and their advantages & disadvantages. **8**
- b) What is isotope abundance? How is it used in mass spectroscopy to identify different Isotopes of an element? **8**

**OR**

- e) Provide an illustrative example of how mass spectroscopy is used in the study of Macromolecules and Supramolecules. **8**
- f) How is mass spectroscopy used to determine the molecular weight and structure of Compounds? **8**
5. All questions are compulsory-
- a) Giving an example explain the inorganic functional group identification through IR spectroscopy. **4**
- b) Explain the effect of magnetic field strength on sensitivity and resolution in Zeeman splitting. **4**
- c) Explain chemical isomer shift. **4**
- d) Explain in short ESI-MS and MALDI-MS. **4**

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