



**THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED**

**Q.1. Write short answers to the following questions. (15x2=30)**

- i. Write four applications of Raman spectroscopy
- ii. What is the role of chromophore in UV-Visible spectroscopy?
- iii. What is Raman shift in Raman Spectroscopy?
- iv. Write distribution order of various average molecular weights.
- v. Polyethylene is a thermoplastic polymer. Justify.
- vi. What is role of molecular polarizability in Raman Spectroscopy?
- vii. What is Frank-Condon principle?
- viii. What are the symmetric top molecules?
- ix. What is the origin of compound doublet spectrum in electronic spectroscopy?
- x. Why ethanol is a good solvent in ultraviolet?
- xi. What are forbidden transitions in UV-Visible spectroscopy?
- xii. Write two similarities between IR and Raman Spectra.
- xiii.  $N_2$ ,  $O_2$  and  $Cl_2$  are often found to Raman active but inactive in IR. Justify.
- xiv. Why anti-stokes lines are less intense than Stokes lines?
- xv. Define addition polymerization with one example.

**Q.2. Write detailed answers to the following questions.**

- i. Discuss classification of polymers on the basis of polarity and morphology. (10)
- ii. Write a detailed note on instrumentation involved in UV-Visible spectroscopy. (10)
- iii. Write note on the following; (5x2)
  - a. Spherical Top Molecule
  - b. Rotational Raman spectra of linear molecules