



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

**Q.1. Answer the following short questions. (15x2=30)**

- i. How Fourier transform (FT) - NMR is better than Continuous Wave (CW) - NMR?
- ii. Mass spectrometry is different from other spectroscopic methods. How?
- iii. How a mixture of substances can be analysed by using mass spectrometry?
- iv. How array detector works in mass spectrometry?
- v. What are metastable ions?
- vi. What is population inversion in laser?
- vii. What is the difference between single focusing and double focusing analyzer?
- viii. what is meant by chemical shift?
- ix. What is shielding and deshielding in NMR?
- x. Briefly, describe the applications of ruby laser.
- xi. Write down different parts of NMR Spectrometer?
- xii. Describe optical resonator as laser system component.
- xiii. What is spin-lattice relaxation process?
- xiv. Give some advantages of laser.
- xv. Why four laser system is better than three system?

**Answer the following questions. (3x10=30)**

**Q no 2:**

- (a) Discuss the quadrupole mass analyzer.
- (b) Describe the McLafferty Rearrangement with suitable example.

**Q no 3:**

- (a) Describe different factors affecting coupling constant.
- (b) Discuss the principle of NMR.

**Q no 4:**

- (a) Write down the construction, working and applications of dye laser.
- (b) Discuss the characteristics of laser light?