

GUJARAT TECHNOLOGICAL UNIVERSITY**M. Pharm - SEMESTER- I • EXAMINATION – SUMMER-2016****Subject Code: 910207****Date: 30/05/2015****Subject Name: Advanced Spectroscopic Techniques****Time: 10:30 AM to 01:30 PM****Total Marks: 80****Instructions:**

- 1. Attempt any five questions.**
- 2. Make suitable assumptions wherever necessary.**
- 3. Figures to the right indicate full marks.**

- Q.1** (a) What is LASER? Discuss mechanism of LASER formation. Give remarkable properties of LASER. **06**
- (b) Classify LASERS. Describe gas and dye laser briefly. **05**
- (c) Write a note on applications of laser. Discuss uses of lasers in spectroscopy. **05**
- Q.2** (a) What is Raman spectroscopy? Discuss principle of Raman spectroscopy. Write advantages, disadvantages of Raman Spectroscopy. **06**
- (b) Write a note on instrumentation of Raman spectroscopy. **05**
- (c) Write a comparative note on Raman spectroscopy and Infrared spectroscopy. **05**
- Q.3** (a) What is two dimensional NMR? Write a note on COSY technique using suitable illustrations. **06**
- (b) Discuss Nuclear Overhauser effect spectroscopy technique. **05**
- (c) Why shift reagents used in NMR spectroscopy? Discuss shift reagents used in NMR. **05**
- Q.4** (a) Write a note on: Instrumentation of Electron spin resonance spectrometer. **06**
- (b) Describe applications of ESR spectroscopy. **05**
- (c) Write a brief note on ESR transitions and hyperfine splitting. **05**
- Q.5** (a) Discuss effects of substitution on chemical shifts in ^{13}C NMR **06**
- (b) What are neutron activation methods? Write applications of neutron activation methods. **05**
- (c) Give brief account on proton decoupling technique used in ^{13}C NMR. **05**
- Q. 6** (a) Describe the instrumentation of chemiluminescence. **06**
- (b) Discuss applications of chemiluminescence. **05**
- (c) Discuss different types of luminescence. Write principle of chemiluminescence. **05**
- Q.7** (a) Write a note on light sources and detectors used in photoacoustic spectroscopy. **06**
- (b) Describe theory of photoacoustic spectroscopy. **05**
- (c) Write briefly on isotopic dilution analysis in radiochemical analysis. **05**
