Seat No.: _____ Enrolment No. _____

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 photoacaustic spectroscopy.	**06**
	(b)	Describe theory of photoacaustic spectroscopy.	**05**
	(c)	Write briefly on isotopic dilution analysis in radiochemical analysis.	**05**

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