Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III (NEW) - EXAMINATION – SUMMER 2017

Subject Code: 2133502 **Date: 02/06/2017**

Subject Name: Analytical Techniques

Time: 10:30 AM to 01:00 PM **Total Marks: 70**

Instructions:

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

			MARKS
Q.1		**Short Questions**	**14**
	1	What is Gradient Elution?	
	2	Define the term: Chromophore.	
	3	What is the range of UV radiations?	
	4	Define the term : Hypsochromic shift	
	5	Full form of TGA.	
	6	Define the term: Volumetric Estimation.	
	7	Give selection rule for IR.	
	8	Name the various types of stretching vibrations.	
	9	What is normal phase chromatography?	
	10	Define the term: Base peak.	
	11	What is Indeterminate error?	
	12	Which indicator is used in redox titration?	
	13	Which internal reference is used in NMR spectroscopy?	
	14	Define the term: spectroscopy	
Q.2	**(a)**	Explain various factors affecting Rf value in paper Chromatography.	**03**
	(b)	Explain any pump used in HPLC.	**04**
	(c)	Define various ways of expression of concentration and its importance in analytical techniques.	**07**
		OR	
	(c)	Derive Lambert-beer's laws of absorption with limitations.	**07**
Q.3	**(a)**	Enlist different types of errors.	**03**
	(b)	How samples are prepared in UV, IR and NMR spectroscopy?	**04**
	(c)	Discuss theory and instrumentation of Gas chromatography.	**07**
		OR	
Q.3	**(a)**	Explain the term 'spin-spin coupling' in NMR spectroscopy.	**03**
	(b)	Write a short note on Metal ion indicators.	**04**
	(c)	What is good laboratory practices? Explain in detail.	**07**
Q.4	**(a)**	Write a short note on guard column used in HPLC.	**03**
	(b)	Derivertisation is needed in GC - Justify the statement.	**04**
	(c)	Enlist various applications of IR spectroscopy.	**07**
		OR	
Q.4	**(a)**	Write a short note on column preparation.	**03**
	(b)	Explain EDTA titration with procedure and calculation.	**04**
	(c)	Analysis of sample gave following values of Fe content: 4.15, 4.13, 4.12, 4.10, 4.16 and 4.11.Calculate the mean, median, standard deviation, coefficient of variance and range.	**07**

Q.5	**(a)**	Write a note on FID used in GC.	**03**
	(b)	Write a short note on Nitrogen Rule.	**04**
	(c)	Define the term: post precipitation. Explain Gravimetric estimation of Ni.	**07**

OR

Q.5	**(a)**	Enlist method of preparation of TLC plates.	**03**
	(b)	Write a short note on Finger print region.	**04**
	(c)	An organic compound (molecular formula :C_4H_8O) exhibits the following spectral data: IR: 2941-2857 cm^{-1} (m), 1715 cm^{-1} (s), 1460 cm^{-1} (m) UV: λ_{max} at 275 nm NMR: 7.52 τ (2H, quartet), 7.88 τ (3H, singlet), 8.93 τ (3H, triplet). Deduce the structure of the compound.	**07**

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