Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–III • EXAMINATION – SUMMER 2015

Subject Code:133502 **Date:**29/**05/2015**

Subject Name:Analytical Techniques

Time: 02.30pm-05.00pm **Total Marks: 70**

Instructions:

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

Q.1	**(a)**	Define following terms: Electromagnetic spectrum, Red shift, Finger print region, Hook's law, Degree of freedom, Nitrogen rule, Chromophore.	**07**
	(b)	What is chromatography? Draw clean diagram of HPLC and explain its applications.	**02+02+03**
Q.2	**(a)**	Write classification of chromatography and elaborate it with Thin layer chromatography.	**03+04**
	(b)	Specify the practices used for sampling of solid and liquid.	**03+04**
		OR	
	(b)	Explain gravimetric analysis of iron.	**07**
Q.3	**(a)**	Give details of precipitation, co-precipitation, post precipitation and precipitation from homogenous solution.	**03+04**
	(b)	Define errors, also state their classification and statistical representation of data.	**02+02+03**
		OR	
Q.3	**(a)**	Define following terms: normality, stoichiometry, titration, oxidation, molarity, saturated solution, strength	**07**
	(b)	Write detailed note on TGA (thermo-gravimetric analysis) and validation of analytical methods.	**03+04**
Q.4	**(a)**	A sample of steel alloy is to be tested in the chemistry laboratory, which type of titration do you think will be useful for its analysis, write the details of the method with chemical reactions.	**02+05**
	(b)	Write detailed notes on QC (quality control) and TQM (total quality management).	**03+04**
		OR	
Q.4	**(a)**	Explain principle of UV spectroscopy. Also explain its instrumentation and application.	**03+04**
	(b)	What is retention factor, how it affects the separation also Elaborate factors affecting R_f.	**03+02+03**
Q.5	**(a)**	Define mean, median, standard deviation, standard error, range, variance & coefficient of variance.	**07**
	(b)	Write short note on: Mc Lafferty rearrangement, Principle of Mass Spectroscopy, Fragmentation pattern	**02+02+03**
		OR	
Q.5	**(a)**	Deduce the tentative structure of organic compound by using following data: i) UV=transparent above 210 nm ii) IR=3049-2624 cm^{-1}, 1445 cm^{-1} iii) Molecular mass =88 iv) NMR (δ)= singlet at 8.122 (5.9 squares), triplet at 4.22 (12.2 square), sextet at 1.77 (11.6 square), triplet at 1.33 (18.6 squares)	**07**
	(b)	Explain good laboratory practices.	**07**

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