Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII EXAMINATION – WINTER 2015

Subject Code: 173609 **Date:07/12/2015**

Subject Name: Analytical Methods for Dyestuff & Pigment Industry.

Time: 10:30am to 1:00pm **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)**	Describe the electromagnetic spectrum and absorption of radiation with the help of suitable diagrammatical representation.	**07**
	(b)	Explain the absorption and electronic shifts with the help of suitable diagram.	**07**
Q.2	**(a)**	Explain the Ultraviolet spectroscopy with the help of its principle and instrumentation in detail.	**07**
	(b)	Calculate the energy associated with a radiation energy having wavelength 2000 Å. Give answer in cm, Kcal/mole also in kilo joules/mole.	**07**
		OR	
	(b)	Calculate the absorption maximum in the ultra violet spectrum of 2, 5 Hexadiene.	**07**
Q.3	**(a)**	Define Infra-red spectroscopy. Describe the various molecular vibrations in the technique.	**07**
	(b)	Explain the following terms: (i) Chemical Shift (ii) Shielding of nucleus (iii) Deshielding of nucleus	**07**
		OR	
Q.3	**(a)**	Describe the NMR spectroscopy. What information can be obtained from the NMR absorption peaks?	**07**
	(b)	Explain the Infra-Red spectroscopy with the help of its principle and instrumentation in detail.	**07**
Q.4	**(a)**	Explain the important features in mass spectrometry in detail.	**07**
	(b)	How do you determine the molecular formula discuss it with the suitable example.	**07**
		OR	
Q.4	**(a)**	Explain the different types of bending vibrations with its diagram.	**07**
	(b)	Explain the following types of electronic transitions: (i) $\sigma \rightarrow \sigma^*$ (ii) $n \rightarrow \sigma^*$ (iii) $\prod \rightarrow \prod^*$	**07**
Q.5	**(a)**	Discuss the nitrogen rule useful for mass spectrometry.	**07**
	(b)	Calculate the chemical shift in ppm (đ) for a proton that has resonance at 126 Hz downfield from TMS on spectrometer that operates at 60 MHz.	**07**
		OR	
Q.5	**(a)**	Explain the NMR spectroscopy with the help of its principle and instrumentation in detail.	**07**
	(b)	Explain the applications of Infra-red spectroscopy.	**07**

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