

Seat No.: \_\_\_\_\_

Enrolment No. \_\_\_\_\_

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**BE - SEMESTER-VII • EXAMINATION – WINTER • 2014**

**Subject Code: 173609**

**Date: 04-12-2014**

**Subject Name: Analytical Methods for Dyestuff & Pigment Industry**

**Time: 10:30 am - 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.**

- Q.1 (a) Explain the importance of modern methods of instrumental analysis with conventional methods. 07
- (b) Define Electronic spectroscopy. What is its absorption range? Write the relationship between wavelength, frequency and wave number. 07
- Q.2 (a) Define Infra-red spectroscopy. Describe the various molecular vibrations in the technique. What is the major requirement for infrared absorption? 07
- (b) Write the brief note on the following: 07
- i) Chemical shift (ii) Spin-spin coupling
- (b) OR 07
- What is meant by Electromagnetic radiations? Write a note on Electromagnetic spectrum and the absorption of radiation.
- Q.3 (a) Explain the following terms of UV-visible spectroscopy: 07
- i) Bathochromic shift (ii) Hypsochromic shift (iii) Chromophore (iv) Hyper chromic effect. (v) Auxochrome
- (b) What do you understand by meta-stable ion or peaks? How these are recognized in the mass spectrum and what is their importance. 07
- Q.3 OR 07
- (a) Explain the various applications of NMR Spectroscopy in detail.
- (b) Explain the types of electronic transitions of UV-visible spectroscopy. 07
- Q.4 (a) Explain the various factors affecting on Vibration Frequencies. 07
- (b) Write down the important tips for the interpreting an NMR spectrum. Write a note on Nuclear Over Hauser Effect. 07
- Q.4 OR 07
- (a) Discuss the basic principle and instrumentation of mass spectroscopy.
- Q.4 (b) Explain the following terms: 07
- i) Define the problem (ii) Method modeling and plan (iii) Sample preparation
- Q.5 (a) Explain the absorption of Ultra-violet Spectroscopy in detail. 07
- (b) Explain the following terms of Infra-red spectroscopy: 07
- i) Infra-red region (ii) Infra-red spectrum (iii) Fundamental vibrations and overtone.
- OR 07
- Q.5 (a) Explain the following terms: 07
- i) Quality assurance (ii) Quantitative and Qualitative methods
- (b) Write the examples, shielding and deshielding effects of NMR spectroscopy. 07

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