

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-III • EXAMINATION – WINTER • 2014

Subject Code: 2133502**Date: 20/12/2014****Subject Name: Analytical Techniques****Time: 2:30 p.m. to 5:00 p.m.****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) What is Chromatography? Draw the schematic diagram of HPLC instrument. **07**
- (b) Explain volumetric estimation of steel alloy with procedure and calculation. **07**

- Q.2** (a) What are the characteristics should pumps have used in HPLC. Discuss any one in detail with diagram. **07**
- (b) Write a short note on TLC. **07**

OR

- (b) What is good laboratory practises (GLP)? Explain in detail. **07**
- Q.3** (a) What are titrations? Explain any complexometric titration in detail with procedure and calculation. **07**
- (b) Enlist different types of detector used in Gas Chromatography. Explain Flame ionisation detector in detail. **07**

OR

- Q.3** (a) Discuss various applications of IR Spectroscopy with example. **07**
- (b) Explain Lambert Beer's law of absorption. What are the limitations of it. **07**
- Q.4** (a) a) What is R_f value? Explain various factors affecting R_f value in paper Chromatography. **04**
- b) Enlist different methods for the preparation of column. **03**
- (b) Analysis of sample gave following values of Al content: 8.10, 8.13, 8.08, 8.11, 8.12 and 8.09. Calculate the mean, median, standard deviation, coefficient of variance, range and standard error. **07**

OR

- Q.4** (a) Describe in detail the instrumentation for scanning the mass spectrum of an organic compound. **07**

- (b) Write a short note on Finger print region. How will you distinguish cis 1,2-dichloro ethane and trans 1,2-dichloro ethane by IR spectrum? **07**
- Q.5** (a) Define Infra red Spectroscopy. Describe the various molecular vibrations in the techniques. What is the requirement for IR absorption? **07**
- (b) Define the term: Chemical shift, shielding, deshielding effect. Enlist unique properties of reference standard (TMS) used in NMR spectroscopy. **07**

OR

- Q.5** (a) Define the term: co-precipitation and post precipitation. Explain Gravimetric estimation of Cu. **07**
- (b) An organic compound (molecular formula :C₉H₁₀O₂) exhibits the following spectral data: **07**
 IR: 1745 cm⁻¹(s), 1225 cm⁻¹(br, s), 749 cm⁻¹ (s), 697 cm⁻¹ (s)
 UV: λ_{max} at 268 nm, 264 nm, 262 nm
 NMR: δ 1.96 (3H, Singlet), 5.00 (2H,singlet), 7.22 (5H,singlet)
 Deduce the structure of the compound.
