

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI (NEW) - EXAMINATION – SUMMER 2016****Subject Code:2163610****Date:09/05/2016****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.

- Q.1** (a) Define following terms: Spectroscopy, Red shift, Hook's law, Modes of vibrations, Nitrogen rule, Chromophore, TMS. **07**
- (b) Define Chromatography? Draw clean diagram of HPLC and explain its working in details. **02+02+03**
- Q.2** (a) Write classification of chromatography and elaborate it with Paper chromatography. **03+04**
- (b) How the samples are prepared for IR, UV, NMR and Mass Spectroscopy? What will happen if you add aniline in HCl (spectroscopically)? **03+04**
- OR**
- (b) Explain gravimetric analysis of Copper. **07**
- Q.3** (a) Give details of precipitation, co-precipitation and post precipitation. **02+02+03**
- (b) Analysis of iron sample gave following values of iron content: 7.08, 7.21, 7.12, 7.16, 7.09, 7.14, 7.07, 7.18, 7.11 and 7.14. Calculate the mean, standard deviation, coefficient of variance, range and standard error. **07**
- OR**
- Q.3** (a) Write short notes on: Lambert's Beer Law, quality assurance, fragmentation pattern. **02+02+03**
- (b) Write detailed note on Thermo-gravimetric analysis and validation of analytical methods. **03+04**
- Q.4** (a) A sample of brass 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) What is Total Quality Management, write in detail about it. **03+04**
- OR**
- Q.4** (a) Explain principle of IR spectroscopy. Also explain its instrumentation and application. **03+04**
- (b) Explain: How will you differentiate between hydrogen bonded and non hydrogen bonded compounds with the help of UV, IR and NMR Spectroscopy. Suggest Spectroscopic behavior of *p*-hydroxy benzoic acid. **03+04**
- Q.5** (a) Define errors state their classification and give importance of statistical representation of errors. **07**
- (b) Define various ways of expression of concentration and its importance in analytical Techniques. **07**
- OR**
- Q.5** (a) Deduce the tentative structure of organic compound by using following data: **07**
- i) UV= 274 nm
 - ii) IR=2941 cm⁻¹, 1755 cm⁻¹, 1460 cm⁻¹
 - iii) Molecular mass =72
 - iv) NMR=2.48 (quartet), 2.22 (singlet), 1.17 (triplet)

(b) What are the benefits of good laboratory practices, explain these in details.

07
