

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-III • EXAMINATION – WINTER • 2014****Subject Code: 133502****Date: 23-12-2014****Subject Name: Analytical Techniques****Time: 02.30 pm - 05.00 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: equivalent weight, normality, molarity, molality, strength, percentage purity, and stoichiometry. **07**
- (b) Define Spectroscopy and elaborate your answer with the help of Infra Red spectroscopy with special emphasis on principle and instrumentation. **07**
- Q.2** (a) What is chromatography? Write its classification and detailed note on column chromatography. **07**
- (b) Write note on good laboratory practices and sampling of liquid. **07**
- OR**
- (b) Explain gravimetric analysis of iron. **07**
- Q.3** (a) Give details of precipitation, co-precipitation, post precipitation and precipitation from homogenous solution. **07**
- (b) What is the principle of chromatography? Draw clean diagram of GC and explain its applications. **07**
- OR**
- Q.3** (a) Explain how errors are classified, also state the statistical representation of data. **07**
- (b) Write detailed note on TGA (thermo-gravimetric analysis) and validation of analytical methods. **07**
- Q.4** (a) A hard water sample 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. **07**
- (b) Write detailed notes on QA (quality assurance) and TQM (total quality management). **07**
- OR**
- Q.4** (a) Explain principle of NMR spectroscopy. Also explain following terms: spin-spin coupling, reference standard, chemical shift, NMR solvents. **07**
- (b) Write compare and contrast between retention factor and retention time? Elaborate factors affecting R_f . **07**
- Q.5** (a) Analysis of Iron sample gave following values of metal content: 7.08, 7.21, 7.12, 7.09, 7.16, 7.14, 7.07, 7.14, 7.18 and 7.11. Calculate the mean, standard deviation, range & coefficient of variance. **07**
- (b) Write short note on: Mc Lafferty rearrangement, Nitrogen rule, Fragmentation pattern **2+2+3**
- OR**
- Q.5** (a) Deduce the tentative structure of organic compound by using following data: **07**
1. UV=transparent above 210 nm
 2. IR=2941 cm^{-1} , 2273 cm^{-1} , 1458 cm^{-1}
 3. Molecular mass =69
 4. NMR (δ)= septet at 2.82 (4.2 squares), doublet at 1.33 (25.8 squares)
- (b) Explain various Acid Base titrations with suitable chemical reactions. **07**
