Seat No.: _____ Enrolment No._____

# GUJARAT TECHNOLOGICAL UNIVERSITY

**B. Pharm. – SEMESTER – VII • EXAMINATION – WINTER 2013**

**Subject Code: 270004 Date: 03-12-2013**

**Subject Name: Pharmaceutical Analysis-III**

**Time: 10.30 am - 01.30 pm Total Marks: 80**

**Instructions:**

1. **Attempt any five questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

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| **Q.1** | (a) | Explain: wave number, frequency, line spectra, band spectra, absorption spectra, emission spectra | **06** |
| | (b) | Explain different types of electronic transition in spectroscopy. Predict the type of electronic transition in dimethyl amine, methanol. | **05** |
| | (c) | (1) A standard $3.5x10^{-3}$M solution of a compound was prepared and placed in a cell with 3 cm thickness. The percentage transmittance of the solution at 368 nm is 65.6. Determine specific absorbance of the compound (Mol wt.: 200).<br>(2) Convert 5.4 µm into wave number in $cm^{-1}$. | **05** |
| **Q.2** | (a) | State Beer's law. What is deviation from Beer's law, enlist various types of deviation and explain any one in detail. | **06** |
| | (b) | Define: auxochrome, bathochromic shift. Draw a neat labeled diagram of double beam UV -Visible spectrophotometer and also explain the function of each part of the instrument. | **05** |
| | (c) | Explain analysis of binary mixtures of absorbing substances by simultaneous equation method. | **05** |
| **Q.3** | (a) | Explain the effect of vibrational coupling, H-bonding and electronic effects on vibrational frequency in IR spectroscopy. | **06** |
| | (b) | Explain the principle, working and advantages of FTIR. | **05** |
| | (c) | Wrtie a brief note on sample handling in IR spectroscopy. | **05** |
| **Q.4** | (a) | What is chemical shift? Explain various factors that are responsible for affecting the magnitude of chemical shift. | **06** |
| | (b) | Explain spin spin coupling in detail. Predict the numbers of peaks in H-NMR for following: $CH_3CHO$, $CH_3CH_2OH$, $CH_3CH_2CH_2Cl$ | **05** |
| | (c) | Explain in brief theory and principle of NMR spectroscopy. | **05** |
| **Q.5** | (a) | Define: quenching and heavy atom effect. Explain various structural factors that influence fluorescence intensity. | **06** |
| | (b) | Explain the fundamental difference between absorption and fluorescence method? Derive an expression relating fluorescence intensity and concentration. | **05** |
| | (c) | Differentiate: (1) fluorescence and phosphorescence<br>(2) hard source and soft source | **05** |

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| **Q. 6** | (a) | Describe the basic principle of Mass Spectrometry and draw a labeled diagram of magnetic deflection mass spectrometer. What is the function of each part of instrument, and explain in brief double focusing analyzer. | **06** |
| | (b) | Explain in brief various fragmentation rules in MS. | **05** |
| | (c) | Explain: mass spectrum, base peak, metastable ion and write a brief note on Chemical ionization ionic source. | **05** |
| **Q. 7** | (a) | Explain in brief various types of interferences in flame photometry and various correction methods applied for it. | **06** |
| | (b) | Explain in detail flame and nebulizer burner system in flame photometry. | **05** |
| | (c) | Explain the principle, instrumentation and applications of ICP-AES. | **05** |

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