

M. Tech. First Semester (Membrane & Separation Tech.) (Full Time)

13025 : Chemical Engineering Analysis

1 MST 3

P. Pages : 2

Time : Three Hours



AV - 3377

Max. Marks : 80

- Notes :
1. All question carry equal marks.
 2. Answer **any six** questions.
 3. Due credit will be given to neatness and adequate dimensions.
 4. Assume suitable data wherever necessary.
 5. Diagrams and chemical equations should be given wherever necessary.
 6. Illustrate your answer necessary with the help of neat sketches.
 7. Use of pen Blue/Black ink/refill only for writing the answer book.

1. a) Draw a brief outline of a typical visible spectrophotometer bringing out the various components and its function. 7
b) Give an account of the various types of adsorbents in column chromatography. 7
2. a) Describe the construction of a typical Mass Spectrograph? 5
b) What are various types of Mass spectrometers in used. 5
c) How are the fragmentation detected in mass spectrometry? 4
3. a) Explain the techniques employed to obtain NMR spectra? 7
b) What do you understand by chemical shift and spin spin coupling in NMR spectroscopy? 6
4. a) Explain the difference between liquid chromatography? 5
b) Explain Ion exchange chromatography? 4
c) How does the size of the adsorbent play a role in separation in column chromatography? 4
5. a) Discuss the origin of electronic spectra outline the essential difference between a photoelectric colorimeter and a spectrophotometer. 8
b) What are the various types of radiation sources used in Spectrophotometers. 5
6. a) Bring out clearly the essential details of the following : 6
i) Flame ionization Detector.
ii) Thermal conductivity Detector.
b) Why it is necessary to have a carrier gas in gas chromatography? 4
c) How does temperature programming help in Gas Chromatography? 3

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| 7. | a) | Describe the schematic diagram of HPLC and describe the functioning of each component? | 5 |
| | b) | What is the role of stationary and mobile phase in partition chromatography? | 4 |
| | c) | Give an account of fingerprint region and functional group region of IR Spectrum? | 4 |
| 8. | a) | What is the principle of colorimetric analysis and what are its application? | 8 |
| | b) | Discuss the principle of an Atomic absorption Spectrophotometer? | 5 |
| 9. | a) | Describe various components of a typical 60 megacycle/sec. for NMR spectrometer? | 6 |
| | b) | What do you understand by the term "FARADAY"? | 4 |
| | c) | How can computer play a significant role in analysis of samples? | 3 |
| 10. | a) | Outline the essential differences between a barrier layer photocell any a vacuum tube photocell? | 5 |
| | b) | Explain constant current coulometry. | 4 |
| | c) | Give brief note on Electrodialysis. | 4 |
