Printed Pages : 3

EIC033

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 132853

Roll No.

B. Tech.

(SEM. VIII) THEORY EXAMINATION, 2014-15

ANALYTICAL INSTRUMENTATION

Time : **3** Hours] [Total Marks : **100**

Note : All questions are compulsory.

1 Attempt any two parts of the following : **10×2=20**

(a) State how UV absorption spectroscopy can be used for quantitative analysis of different samples? Describe the working of the dual beam type UV spectrophotometer with a neat sketch.

(b) What are the different sources of error involved in spectrophotometric measurements? List various components involved in infrared spectroscopic measurement.

(c) Define Beer Lambert Law and state deviation from Beer Lambert Law. And Compare absorption filter with interference filter on the basis of their suitability.

2 Attempt any two parts of the following : **10×2=20**

(a) Draw and describe the operation of a non dispersive dual channel absorption type IR spectrometer.

(b) Why IR spectroscopy is called vibrational spectroscopy? Show that molecular electronics excitation, vibratioal excitation and rotational excitation take place in UV-Visible, NIR, FIR regimes of electromagnetic wave spectrum respectively.

(c) Explain the principle of operation and constructional details of Flame Photometry.

3 Attempt any two parts of the following : **10×2=20**

(a) Find the expression for the resolution of a chromatography column separating a gas mixture of two components A and B.

(b) Draw and describe the operation of a Flame Ionization Detector (FID).

(c) Draw a typical polarograph and mention some applications. Also describe the atomization process with block diagram.

4 Attempt any two parts of the following : **10×2=20**

(a) Mention various components of a mass spectrometer in correct sequence and explain each component in detail.

(b) Derive the expression of 'r', radius of curvature of the trajectory for Magnetic deflection mass spectrometer. Also explain the working of Nier 60° sector mass spectrometer.

(c) What types of columns are integrated in Gas chromatographs for analysis of the sample material?

5 Attempt any two parts of the following : **10×2=20**

(a) Why is RF source necessary for NMR spectroscopy? Describe NMR spectroscopy with schematic diagram.

(b) What is the principle used in Electronic Spin Resource? Mention two application of ESR Spectroscopy in details.

(e) What are the advantages of a Fourier transform NMR measurement over the continuous wave measurement? Write short notes on G60A NMR Spectrometer.