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SB-3489

M. Sc. (Sem. II) (Part-I) (Self Finance) Examination

March / April – 2011

Instrumental Methods : Paper-IV

Time : **3** Hours] [Total Marks : **70**

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ **M. SC. (SEM. II) (PART-I) (SELF FINANCE)**

Name of the Subject :

☛ **INSTRUMENTAL METHODS : PAPER-IV**

☛ Subject Code No. : **3 4 8 9** ☛ Section No. (1, 2,.....) : **Nil**

Seat No. :

Student's Signature

1 Write any three from the following : **6x3=18**

(a) How Thine Layer Chromatography (TLC) is superior to other chromatographic techniques ?

(b) State the principle of ion-exchange chromatography. Give the types and properties of ion-exchangers.

(c) What is solvent extraction ? Explain the principle of solvent extraction. Give the classification and mechanism of solvent extractions.

(d) What is HPLC ? How it is superior to other techniques ? Explain the flow control and programming in HPLC.

(e) List the types of detectors used in HPLC. Discuss Refractive Index (RI) dector used in HPLC.

2 Answer any three from the following : **6x3=18**

(a) Describe the basic principle of polarizing microscope. Explain in brief by showing different components of polarizing microscope.

(b) Give the different methods used for determination of internal structure of a crystal. Explain Lave photographic method in detail.

(c) Describe the experimental set up for dynamic light scattering (DLS). How will you determine the particle size by the help of DLS ?

(d) Describe the basic principle of small angle neutron scattering (SANS). Give the applications of the technique and explain one of them.

(e) How polarized microscope is used in Industry ? Explain medical and biological application of polarized optical microscope (POM).

3 Write any three answers from the following : **6x3=18**

(a) What are thermal methods of analysis ? Describe working of Thermogravimetric analysis. State its different applications.

(b) Give the difference between TGA and DTA Explain the principle of DTA. How DTA can be used in polymer chemistry ?

(c) What is the difference in thermal behaviour of oxalates of calcium and magnesium ?

(d) State the principle of Differential Scanning Calorimetry (DSC). How DSC is different from DTA ? Which reference material is used in DSC ?

(e) (i) Explain the terms :

(a) Ohrmic potential

(b) Polarization

(c) Overvoltage

(ii) Write short notes on diffusion current.

4 Write any four from the following : **4x4=16**

(a) Explain the boundary potential in glass electrode.

(b) State the principle of thermometric titration. Give the schematic diagram for thermometric titration apparatus and describe the technique of thermometric titrations.

(c) Explain principle of D.C. polarography with polarogram.

(d) What is cyclic voltametry ? Explain $K_4[Fe(CN)_6]$ Voltamogram.

(e) List the various electrodes used in potentiometry. Describe with schematic diagram for ion-selective liquid membrane electrode.

(f) Define the following :

(i) Half wave potential

(ii) Depolarisers

(iii) DME

(iv) Diffusion Current
