This question paper contains 3 printed pages]

Roll No. | | | | | | | | | | |

S. No. of Question Paper : **1849**

Unique Paper Code : **217663** **E**

Name of the Paper : **Instrumental Methods of Analysis [ICPT-606]**

Name of the Course : **B.Sc. (Prog.) Applied Physical Sc./Industrial Chemistry**

Semester : **VI**

Duration : **3 Hours** Maximum Marks : **75**

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt *six* questions in all.

Question No. **1** is compulsory.

1. (*i*) Why do we use TMS as reference compound in Nuclear Magnetic Resonance (NMR) spectroscopy ? 3

(*ii*) Distinguish between Hypsochromic shift and Bathochormic shift in UV spectroscopy ? 3

(*iii*) Give an account for the qualitative estimation of halogens (Cl^-, Br^-, I^-). 3

(*iv*) How Differential Thermal Analysis (DTA) technique is used in polymer industry ? 3

(*v*) What are the factors which affect the viscosity of liquid ? 3

P.T.O.

2. (*i*) List the factors affecting separation in Gas Chromatography (GC). 4

(*ii*) What is the principle of Differential Scanning Calorimetry (DSC) ? Explain the schematic representation of DSC instrument. 4

(*iii*) What are the different modes of vibrations in Infra Red (IR) spectroscopy ? 4

3. (*i*) What are advantages of Induced Couple Plasma Spectroscopy over Flame Spectroscopy ? 4

(*ii*) Define R_f value in chromatography. What factors affect the R_f value. 4

(*iii*) What is the effect of polar solvents in the shifts of absorption bands in UV-visible spectroscopy ? 4

4. (*i*) Define crystallisation. Explain the importance of solvent selection in crystallisation. 4

(*ii*) Discuss the principle of Coulometric Analysis. What types of coulometric methods are used for the analysis ? 4

(*iii*) Describe standards (any *two*) : 2×2

(*a*) ISO

(*b*) BTS

(*c*) EURO.

5. Write short notes on :

(*i*) Ion Exchange chromatography

(*ii*) Rheological properties

(*iii*) Solvent extraction. 3×4

6. (*i*) What is the role of carrier gas in Gas Liquid Chromatography (GLC) ? 3

(*ii*) Write short notes on :

(*a*) Chemical shifts

(*b*) Atomic fluorescence spectroscopy

(*c*) Fingerprint region in Infra Red spectroscopy. 3×3

7. (*i*) Discuss the principle involved in High Performance Liquid Chromatography (HPLC) technique. 4

(*ii*) Explain the basic concept of conductometric analysis. With the help of a suitable diagram describe the instrumental design. 4

(*iii*) Differentiate between Flame Emission Spectroscopy and Atomic Absorption Spectroscopy. 4