

- (b) Explain the principle involved in the Differential Scanning Calorimetric analysis (DSC). Giving a well labelled diagram, discuss instrumentation of the technique. 6

Roll No. ....

Total Pages : 04

**LMDQ/M-24**

**7516**

INORGANIC CHEMISTRY SPECIAL-III  
CHEM-401

Time : Three Hours]

[Maximum Marks : 60

**Note :** Attempt *Five* questions in all, selecting at least *one* question from each Section. All questions carry equal marks.

**Section A**

1. (a) Give the sources of determinate, indeterminate and gross errors. 4
- (b) Show by taking suitable example that precise values may not be necessarily accurate. 4
- (c) What is *t*-Test ? Give its significance in the statistical evaluation of analytical data. 4
2. (a) What is the principle of turbidimetric analysis ? Compare it with nephelometry and also discuss the factors affecting turbidimetric analysis. 5
- (b) Write down the procedure involved in the turbidimetric analysis of sulphate ion present in a given sample. 4

- (c) Write notes on the following : **3**  
(i) Tyndall Effect  
(ii) Reyleigh Scattering.

### Section B

3. (a) Differentiate domestic sewage from industrial sewage, also give the various steps involved in domestic sewage treatment. **5**  
(b) Describe the methods employed for the analysis of oxides of nitrogen and oxides of sulphur. **4**  
(c) Give a brief account on the biochemical effects of Cd and Hg. **3**
4. (a) Discuss the theory of molecular fluorescence. What is the relationship between Excitation spectra and Fluorescent spectra ? **5**  
(b) Explain the effect of structural rigidity and temperature on fluorescence. **4**  
(c) Describe briefly the applications of fluorimetry and phosphorometry. **3**

### Section C

5. Explain briefly the principle, technique and applications of the following : **12**  
(i) Partition chromatograpy

- (ii) Vapour phase chromatography  
(iii) Thin layer chromatography.

6. (a) Account for the factors which affect the exchange of ions between ion exchanger and the solution. **4**  
(b) Distinguish between distribution coefficient and distribution ration. Explain, how the extraction of a solute from its solution can be made more efficient. **4**  
(c) Write notes on the following : **4**  
(i) Counter current extraction  
(ii) Retention volume.

### Section D

7. (a) Give the basic instrumentation setup for the sensing of gas sensing electrode and also give their uses and limitation. **8**  
(b) Describe the principle involved in the measurement with ion selective electrodes. **4**
8. (a) What is Thermogravimetric Analysis ? What information is obtained from a TG curve ? Discuss various factors affecting the TG curves. **6**