

M.Sc. (Previous) (Applied Chemistry) Examination, Aug./Sept. 2010  
(Directorate of Distance Education)  
DEC. APP. CHEM. – 1.01 : ANALYTICAL AND SPECTROSCOPIC  
TECHNIQUES

Time : 3 Hours

Max. Marks : 85

- Note :* 1) Answer any **ELEVEN** subdivisions from Part – A,  
any **THREE** questions from Part – B and any **THREE**  
questions from Part – C.  
2) Marks are indicated at the **right** side.

PART – A

Answer any **ELEVEN** questions :

(11×2=22)

1. a) What is spectroscopy ?
- b) What is meant by hollow cathode lamp ?
- c) Distinguish between fluorescence and phosphorescence.
- d) What is absorbance ?
- e) Explain  $\lambda_{\max}$ .
- f) What is an internal standard used in flame photometry ? Give an example.
- g) How do you differentiate an ester from a ketone by using IR Spectra ?
- h) What are the types of chromatography ?
- i) Explain Hooke's law.
- j) What is the importance of carrier gas ?
- k) What is degeneracy ?
- l) What are the differences between NMR and ESR ?
- m) Explain zero field splitting.
- n) What are the differences between TGA and DTA ?
- o) What is the internal standard used in NMR ?



PART – B

Answer any **THREE** questions :

(3×8=24)

2. Discuss the interferences and applications of flame photometry.
3. Explain theory, instrumentation and applications of NMR.
4. Discuss about HPLC.
5. Explain Beer-Lambert's law and its applications.
6. Explain theory and applications of Mass Spectrometry.

PART – C

Answer any **THREE** questions :

7. a) Explain theory and the applications of atomic absorption spectroscopy.  
b) Discuss theory, instrumentation and applications of ESR. (5+8=13)
8. a) Discuss about ion exchange chromatography.  
b) Explain theory, instrumentation and applications of TGA. (5+8=13)
9. a) Write a note Woodward-Fieser rules.  
b) Discuss Paper and Thin Layer Chromatography. (5+8=13)
10. a) Discuss theory, instrumentation and applications of TGC.  
b) Explain theory and instrumentation of Gas Chromatography. (5+8=13)
11. a) Discuss with block diagram ultraviolet double beam spectrophotometer and mention its advantages with single beam spectrophotometer.  
b) Discuss the hyperfine splitting pattern of methyl free radical. (5+8=13)