ASTU 4-12-13 (Reg)

M. Ph. 1st Sem.

Total No. of printed pages = 4

PY134101

Roll No. of candidate | | | | | | | | | | |

2013

(Odd Semester)

MODERN ANALYTICAL TECHNIQUE

Full Marks–100 Pass Marks–35 Time–Three hours

The figures in the margin indicate full marks for the questions.

Answer *eight* questions taking *four* from each Section. Question. Nos. 1 and 6 are compulsory.

SECTION – A

1. Answer the following questions : 7×2=14

   (a) What is the effect of hydrogen bonding on ultraviolet absorption ?

   (b) Why methanol is a good solvent for UV but not for IR spectroscopy ?

   (c) What is the problem of using Nujol as mulling agent and how this can be solved ?

   (d) Define the term Flipping and Relaxation process in NMR.

[Turn over

(e) Explain the splitting pattern in the NMR spectrum of 2-Chloropropane.

(f) Define coupling constant with example.

(g) Explain the various peaks in the mass spectrum of n-heptane.

2. Explain different types of absorption and intensity shifts of UV Spectroscopy. Discuss the differences between single beam and double beam UV spectrophotometer. Write the features of photomultiplier tube detector. 5+5+2=12

3. Describe the various molecular vibrations in the IR Spectroscopy. Give a detail account on the sample preparation technique in IR spectroscopy ? What is finger print region ? 5+5+2=12

4. Write short notes on : 3+4+5=12

(i) Mc Lafferty Rearrangement

(ii) MALDI

(iii) Spin-spin coupling

5. Write note on Supercritical Fluid Chromatography. 12

SECTION – B

6. Answer the following questions : 7×2=14

(a) What do you mean by metastable ion in mass spectroscopy ?

(b) Why is it necessary to degas the mobile phase in HPLC ?

(c) What is the basic principle of ion exchange chromatography and give an example of ion exchange resins used in it ?

(d) What is XRD ? How can you prepare the sample for powder X-ray diffraction ?

(e) Write down the mechanism of weight changes in TGA.

(f) Classify various columns of GC according to their shape.

(g) What is the basic principle involved in DSC ?

7. Explain the theory and instrumentation of mass spectroscopy. Write down the rules for predicting prominent peak in mass spectroscopy. 6+6=12

8. Define the term chemical shift. Explain the factors influencing the chemical shift.

With suitable example explain nuclear magnetic double resonance. Give NMR spectral interpretation of 7+3+2=12

(i) Cyclohexane

(ii) Styrene.

9. What is ITC ? Write down the instrumentation of ITC and explain its application in drug discovery. 2+5+5=12

10. Write short note on : 6+6=12

(a) Gel Electrophoresis

(b) Size Exclusion chromatography.