Roll No. | | | | | | | | | | | | | **Total No. of Pages : 02**

Total No. of Questions : 11

M.Sc. Chemistry (Sem.-3)

ADVANCED CHARACTERIZATION TECHNIQUES

Subject Code : CHL-504-18

M.Code : 76681

Date of Examination : 19-12-22

Time : 3 Hrs. **Max. Marks : 70**

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains EIGHT questions carrying FIVE marks each and students have to attempt any SIX questions.**
3. **SECTION-C will comprise of two compulsory questions with internal choice in both these questions. Each question carries TEN marks.**

SECTION-A

1. Answer Briefly :

a) Differentiate between secondary electrons and backscattered electrons.

b) Why vaccum is required for scanning electron microscope?

c) Write down Bragg's equation with meaning of the used parameters.

d) What is the difference between unit cell and primitive unit cell?

e) Mention two differences between TGA and DSC.

f) Write down two applications used in SEM analysis.

g) Why sample coating is necessary in SEM and not in TEM?

h) Write down the differences between stationary phase and mobile please.

i) Mention two examples of carrier gas used in GC.

j) What do you mean by isocratic elution and gradient elution in HPLC technique?

SECTION-B

2. Determine the crystal structure and lattice constant of an element showed diffraction peaks at the following 26 angle: 38.116, 44.277, 64.426, and 77.472. Wavelength of incoming radiation is 0.154 nm. What are the Miller indices corresponding to each diffraction plane?

3. Draw and explain the nature of the TGA graph of calcium oxalate monohydrate.

4. What do you mean by charging of sample in SEM? How it can be minimized?

5. '*TEM is operated at very high operating voltage while SEM is operated at low voltage*.' Explain.

6. What is the retention factor in chromatography? Express in terms of time domains.

7. Draw a well-labelled schematic diagram of the components of a gas chromatograph.

8. Write a short note on Gel permeation chromatography.

9. Discuss the basic properties which are required to select an anode material for X-ray production.

SECTION-C

10. Differentiate the working principle between DSC and DTA with suitable diagrams.

OR

Briefly discuss the working principle of GC-MS with suitable diagram.

11. Briefly discuss about electrophoresis, electrochromatography and partition coefficient

OR

Differentiate between SEM and TEM based on working principle with suitable diagram.

NOTE : Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.