647510 **MSC3AnaC301x** **Seat No :_____**

M.Sc.(Chem.) Semester - 3 (*CBCS*) Examination
Nov/Dec-2023 (NEW COURSE)
Instrumental Methods of Analysis (Core(New))

Time: 2:30 Hours **Marks: 70**

Instructions:

1. All questions are compulsory.
2. Figures to the right indicate marks.

Que.1(A) Answer the following question. (04)

1. Define the terms with diagram: (i) Unit cell (ii) Crystlline solid (iii) Poly crystalline solid (iv) Amorphous solid.

Que.1(B) Answer any two questions out of three. (10)

1. "Why XRD requires incident radiation wavelength $\lambda \leq 6$ Å"? Demonstrate this statement from Bragg's law.
2. Write a note on single crystal XRD method with their representative diagram.
3. Answer the following:
   (A) Requirements and limitations of Laue's method for X-Ray Diffraction,
   (B) Thomson scattering.

Que.2(A) Answer the following question. (04)

1. Define isotope, explain relative abundance.
2. Briefly explain static and dynamic magnetism.

Que.2(B) Answer any two questions out of three. (10)

1. State the principle of magnetic resonance imaging (MRI) and explain why MRI is dependent on water molecules present in body.
2. Discuss Pre-scan, Excitation and Relaxation in MRI.
3. Discuss the effect of external magnetic field on hydrogen nuclei.

Que.3(A) Answer the following question. (04)

1. Briefly introduced thermo gravimetry analysis.
2. Calculate theoretical stochiometric percentage weight loss after each decomposition in calcium oxalate monohydrate.

Que.3(B) Answer any two questions out of three. (10)

1. Discuss various transitions involved in DSC curve.
2. Give the principle of DSC and explain the generation of DSC curve.
3. Discuss various factors that affects TGA curve.

Que.4(A) Answer the following question. (04)

1. Give the principle of atomic absorption spectroscopy.
2. Discuss absorption of radiant energy by atoms.

Que.4(B) Answer any two questions out of three. (10)

1. Write a note on electrothermal atomization.
2. Discuss interferences in Atomic Absorption Spectroscopy.
3. Draw the schematic diagram of atomic absorption spectroscopy enlist its major components and explain any one in detail.

Que.5(A) Answer the following question. (04)

1. Give the principle of flame photometer with short introduction.
2. Give the example of various oxidants and fuels for flame photometry.

Que.5(B) Answer any two questions out of three. (10)

1. Draw the schematic diagram and working procedure of flame photometer.
2. Explain in detail: Calibration of flame photometer.
3. Answer the following:
   (A) Interferences of flame photometry.
   (B) Advantages and disadvantages of flame photometry.

****