

M.Sc.(Chem.) Semester - 3 (CBCS) Examination**Oct/Nov-2022 (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.

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- Q.1 (a) Answer the following question** **04**
- (1) Define Crystal and Lattice
 - (2) Explain Thompson scattering in brief.
- Q.1 (b) Answer any two questions out of three.** **10**
- (1) Derive Laue's equation for path difference.
 - (2) Explain instrumentation of Laue's photographic plate method.
 - (3) State Bragg's law and derive Bragg's equation for path difference.
- Q.2 (a) Answer the following question** **04**
- (1) Define Relative abundance and Isotope
 - (2) Write T1 and T2 relaxation time for water, ice and fat.
- Q.2 (b) Answer any two questions out of three.** **10**
- (1) Explain T₁ and T₂ relaxation with figure.
 - (2) Give brief introductions and applications of MRI.
 - (3) Why MRI is dependent on water available in the human body?
- Q.3 (a) Answer the following question** **04**
- (1) Briefly explain the generation of DSC curve with graph.
- Q.3 (b) Answer any two questions out of three.** **10**
- (1) Discuss various factors that affects Thermogravimetry analysis.
 - (2) Write a note on calibration of DSC instrument.
 - (3) Explain the sequential decomposition reactions of calcium oxalate monohydrate (CaC₂O₄·H₂O).
- Q.4 (a) Answer the following question** **04**
- (1) Give the principle of atomic emission spectroscopy.
 - (2) Name any five elements which are suitable for AAS and not suitable for AAS technique.
- Q.4 (b) Answer any two questions out of three.** **10**
- (1) Discuss the interferences in atomic absorption spectroscopy.
 - (2) Name the different atomization techniques for atomic absorption spectroscopy and explain any one in detail.
 - (3) Discuss advantages and disadvantages of atomic absorption spectroscopy over flame emission photometry.
- Q.5 (a) Answer the following question** **04**
- (1) Prepare a table indicating various alkali metals, emitted wavelength and flame colour.
 - (2) Explain the role of flame in flame photometer.
- Q.5 (b) Answer any two questions out of three** **10**
- (1) Explain desolvation, vaporization, atomization, excitation and emission associated to flame photometry.
 - (2) Draw schematic diagram and working procedure of flame photometer.
 - (3) Name various types of burners for flame photometry and explain functioning of total consumption burner with figure.
