

M.Sc.(Chem.) Semester - 3 (CBCS) Examination
OCT/NOV-2025 (AS PER SYLLABUS YEAR JUNE-2019)
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) Differentiate between single-crystal and powder XRD.
(2) Write any two applications of XRD.
- Q.1 (B) Answer any two questions out of three. (10)**
(1) Discuss generation of x-rays for XRD technique.
(2) Derive Laue's equation for path difference.
(3) Introduce Bravais and Lattice with figure.
- Q.2 (A) Answer the following question (04)**
(1) Explain static and dynamic magnetic field.
(2) What is net magnetic vector?
- Q.2 (B) Answer any two questions out of three. (10)**
(1) Discuss sequential process associated in MR imaging.
(2) Write principle, introductions and applications of MRI.
(3) What is relative abundance? 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) Discuss instrumentation of DSC with labeled diagram.
(3) Explain eendothermic and exothermic process, crystallization, melting and curing in brief
- Q.4 (A) Answer the following question (04)**
(1) Give the principle of atomic absorption spectroscopy.
(2) State any four limitations of atomic absorption spectroscopy.
- 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) Describe the principle, parts, and function of a hollow cathode lamp used in AAS.
- Q.5 (A) Answer the following question (04)**
(1) Write the advantages and limitations of flame photometry (any two points).
(2) Explain why flame photometry is less sensitive than AAS.
- Q.5 (B) Answer any two questions out of three (10)**
(1) Name the sequential processes associated in flame photometry and explain each in short.
(2) Draw schematic diagram and discuss working of flame photometer.
(3) Name various types of burners for flame photometry and explain functioning of total consumption burner with figure.
