

M.Sc.(Chem.) Semester - 3 (CBCS) Examination
Oct/Nov-2021 (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.

- Q.1 (A) Answer the following question (4)**
 (1) Discuss the differences between single crystal XRD and powder XRD. 4
- Q.1 (B) Answer any two questions out of three. (10)**
 (1) Explain generation of X-rays in details with diagram. 5
 (2) What is Bragg's law? derive Bragg's equation for path difference. 5
 (3) Explain instrumentation of Laue's photographic plate method. 5
- Q.2 (A) Answer the following question (4)**
 (1) What is net magnetic vector? 2
 (2) What is precession? give equation to calculate precession frequency. 2
- Q.2 (B) Answer any two questions out of three. (10)**
 (1) Explain T_1 relaxation with graphical representation 5
 (2) Explain sequential process associated in MR imaging. 5
 (3) What is Relative abundance? Why MRI is at most dependent on water available in the body? 5
- Q.3 (A) Answer the following question (4)**
 (1) Briefly explain the calculation ΔH and ΔS integration? 4
- Q.3 (B) Answer any two questions out of three. (10)**
 (1) Explain following terms 5
 (a) Glass transition temperature (T_g)
 (b) Exothermic and Endothermic process
 (2) Explain the sequential decomposition reactions of copper sulphate pentahydrate. 5
 (3) Give the principle of Differential thermal analysis and write the factors that affects the DTA curve. 5
- Q.4 (A) Answer the following question (4)**
 (1) Discuss the fundamental difference between atomic emission and absorption spectroscopy? 2
 (2) Give the names of various excitation sources utilized in atomic emission spectroscopy. 2
- Q.4 (B) Answer any two questions out of three. (10)**
 (1) Draw and explain Hollow cathode lamp in detail. 5
 (2) Explain monochromator and detector used in AAS. 5
 (3) Give the working principle of ICP-AES and explain ICP Torch with diagram. 5
- Q.5 (A) Answer the following question (4)**
 (1) Name various fuels and oxidants utilized in flame photometry. 2
 (2) Give the principle and brief introduction of flame photometer. 2
- Q.5 (B) Answer any two questions out of three (10)**
 (1) Discuss advantages and disadvantages of flame photometer and explain why atomic absorption spectroscopy is more superior to flame photometry? 5
 (2) Draw schematic diagram of flame photometer and explain the role of flame in flame photometry. 5
 (3) Write note on total consumption burner. 5
