


RAN-2303080101040003
M.Sc. (Sem. I) Examination November - 2025
Physics
PH-414 - Elective-2 : Crystal Growth and Characterization
સૂચના : / Instructions

- (1) ઉપરોક્ત દર્શાવેલ વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fill up strictly the above details on your answer book
- (2) Figures to the extreme right side indicate full marks of question.
- (3) Symbols have their usual meaning.
- (4) Assume data if required.

Seat No.:

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Student's Signature

Q-1. Write the Answer ANY TWO of the following (18)

- a. (i) What do you mean by single crystal?
(ii) Write the applications of single crystal.
- b. (i) Why are growing Crystal?
(ii) Give the Information about Historical Development of Crystal Growth.
- c. (i) Define solubility and Super solubility. Give its merits and demerits over solution methods.
(ii) Write the types of gel, which crystals are grown by gel method? Why?

Q-2. Write the Answer ANY TWO of the following (18)

- a. (i) What do you mean by Nuclei ?
(ii) Explain any one theory of crystal growth.
- b. (i) Define Nucleation.
(ii) Give concepts of Homogenous and Heterogeneous nucleation
- c. Write the short note on Cap-shaped and disc shaped Nucleus.

Q-3. Write the Answer ANY TWO of the following (18)

- a. (i) Write the types of Thermal Analysis.
(ii) How to calculate the activation energy for grown crystal from Thermal Gravimetric Analysis (TGA).
- b. (i) Describe the performance of Infra-Red Optical absorption spectrometer.
(ii) Discuss on fluorescence spectroscopy
- c. (i) Elaborate Raman spectrometer using Schematic diagram,
(ii) Write the basic components of IR spectroscopy.

Q-4. Write the Answer ANY TWO of the following (16)

- a. Explain the term TEM and AFM.
- b. (i) Introduce the concept of Thermogravimetry Analysis (TGA).
(ii) How to calculate the activation energy for grown crystal from Thermal Gravimetric Analysis (TGA)?
- d. Illustrate and Explain the Schematic of SEM.