MPH34A — CRYSTAL GROWTH AND THIN FILMS

Time : Three hours   Maximum : 75 marks

SECTION A — (5 × 6 = 30 marks)

Answer ALL the questions.

1. (a) Explain the basic principles involved in the formation of critical nucleus.

Or

   (b) Describe the growth kinetics of thin films.

2. (a) Discuss Mier's TC diagram and derive the expression for super saturation.

Or

   (b) Describe about seed preparation and mounting.

3. (a) Explain the design of various crucibles for melt growth technique.

Or

   (b) Describe in detail the zone melting technique of crystal growth.

4. (a) Describe the steps involved in physical vapour deposition with diagram.

Or

(b) Explain the principle and working of spray pyrolysis.

5. (a) Describe how composite proportion can be determined using elemental analysis.

Or

(b) Describe the interpretation of UV-visible spectroscopy with a specific example.

SECTION B — (3 × 15 = 45 marks)

Answer any THREE questions.

6. Discuss in detail the classical theory of nucleation and derive the expression for metastable zone width.

7. Explain the following :

(a) Various types and structure of gel.

(b) Single and double diffusion method of gel growth.

8. Discuss the construction of apparatus and process of crystal growth using Bridgman technique.

9. Describe the process of sputtering. DC reactive sputtering and RF sputtering.

10. Describe the principle, instrumentation and interpretation of results by FTIR spectoscopy.

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