

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MSc DEGREE EXAMINATION MAY 2024
(Fourth Semester)

Branch – PHYSICS

CRYSTAL GROWTH, THIN FILMS AND PLASMA PHYSICS

Time: Three Hours

Maximum: 50 Marks

SECTION-A (5 Marks)

Answer ALL questions

ALL questions carry EQUAL marks (5 x 1 = 5)

- 1 Disadvantage associated with utilizing a solution growth method for crystal growth.
(i) Rapid growth rates (ii) Slow growth rates
(iii) Simple apparatus (iv) Isothermal conditions
- 2 The method that involves the transport of material from a hot region to a cooler region where the solution is supersaturated and results in crystal growth is called
(i) Slow cooling method (ii) Temperature gradient method
(iii) Slow evaporation method (iv) All the above
- 3 Which of the following is mentioned as a potential source of contamination for the source material?
(i) Heater (ii) Support materials
(iii) Crucible (iv) All the above
- 4 EDX can detect elements with
(i) $Z > 11$ (ii) $Z = 11$
(iii) $Z < 11$ (iv) $Z > 21$
- 5 In a star, the plasma is bound together by
(i) Electromagnetic forces (ii) Gravitational forces
(iii) Convective current (iv) None of the above

SECTION - B (15 Marks)

Answer ALL Questions

ALL Questions Carry EQUAL Marks (5 x 3 = 15)

- 6 a Compare single crystals and poly crystals.
OR
b Discuss the growth rate anisotropy and morphology of the grown single crystals.
- 7 a Explain the crystal growth from solvent evaporation.
OR
b Illustrate the importance of supersaturation with a solubility diagram.
- 8 a State the factors which affect the film purity.
OR
b Explain CVD materials issues and safety.
- 9 a Write about the powder X-ray diffraction characterization of thin films.
OR
b Discuss the grain growth of thin film.

Cont...

- 10 a Discuss the natural plasma.
OR
b Discuss the applications of glow discharge.

SECTION -C (30 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks

(5 x 6 = 30)

- 11 a Describe in detail the nucleation phenomenon in crystal growth.
OR
b Explain the crystal growth from the solution.
- 12 a Discuss the structure of gel formation.
OR
b Explain the preparation of gel growth in detail.
- 13 a Discuss low pressure CVD with neat sketch.
OR
b Illustrate the plasma enhanced and laser enhanced CVD processes.
- 14 a Describe the mechanical testing and strength of thin films.
OR
b Explain the chemical characterization of thin films.
- 15 a Define plasma state and discuss the different types of plasmas.
OR
b Explain thermal plasma sources and discuss their field of applications.

Z-Z-Z

END