QP CODE: 25022308

25022308

Reg No : .....

Name : .....

M.Sc DEGREE (CSS) SPECIAL REAPPEARANCE EXAMINATION, APRIL 2025

Third Semester

M.Sc PHYSICS(MATERIAL SCIENCE)

ELECTIVE - PH840301 - THIN FILM SCIENCE AND CRYSTAL GROWTH TECHNIQUES

2019 ADMISSION ONWARDS

7250D5F8

Time: 3 Hours Weightage: 30

Part A (Short Answer Questions)

*Answer any **eight** questions.*

*Weight **1** each.*

1. Draw the stages of liquid like coalescence model of thin film growth.
2. Why is it required to have very high vacuum of the order of 10-5 Torr for by thermal evaporation.
3. Distinguish between Pirani gauge and Penning gauge.
4. Mention the merits of thin film batteries.
5. What are the controlling parameters in crystal pulling method?
6. What is the importance of Rayleigh number to determine the fluid flow patterns?
7. Write a short note on solution, solubility and super solubility.
8. How graphene sheets are formed using exploding wire technique.
9. Write different methods in electro plating mechanism.
10. Explain different types of pulse laser deposition mechanism.

(8×1=8 weightage)

Part B (Short Essay/Problems)

*Answer any **six** questions.*

*Weight **2** each.*

11. Briefly explain the atomistic theory of nucleation.
12. Explain the working of piezoelectric thickness monitor arrangement.
13. Discuss the electrical properties of semiconductor thin films.
14. Describe the crystal growth technique from the melt.
15. Describe the principle of crystal growth by zone melting method.

16. With necessary diagram, explain the resistive heating mechanism in thinfilm deposition.

17. With necessary example, explain the growth of polymer thin films using chemical method.

18. How pressure and substrate temperature can affect the sputtering process in planar thin film growth.

(6×2=12 weightage)

Part C (Essay Type Questions)

*Answer any **two** questions.*

*Weight **5** each.*

19. Describe the structural and morphological properties of thin films.

20. Explain (a) solution growth method (b) solubility diagram (c) methods of crystallization in low-temperature solution growth

21. With a schematic diagram explain AC magnetron sputtering.

22. Explain the sol-gel route for synthesis of nano materials.

(2×5=10 weightage)