QP CODE: 25022302

25022302

Reg No : .....

Name : .....

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

Third Semester

M.Sc PHYSICS

ELECTIVE - PH810301 - SOLID STATE PHYSICS FOR MATERIALS

2019 ADMISSION ONWARDS

A6AB5813

Time: 3 Hours Weightage: 30

Part A (Short Answer Questions)

*Answer any **eight** questions.*

*Weight **1** each.*

1. Write a short note on different types of point defects in solids.
2. Explain stacking faults.
3. Calculate the percentage of void in a body centered cubic crystal.
4. Define Fick's second law.
5. Briefly explain the experimental procedure of the determination of Kirkendaal effect.
6. Define Madelung potential.
7. What are covalent crystals?
8. Explain the microstructure of Pearlite.
9. Obtain the relation between plasma frequency and dielectric function.
10. What are magnons?

(8×1=8 weightage)

Part B (Short Essay/Problems)

*Answer any **six** questions.*

*Weight **2** each.*

11. What are Frenkel and Schottky defects?
12. What is meant by critical resolved shear stress? Explain its importance in crystal dislocations.
13. Briefly explain dislocation reaction?
14. Explain diffusion in alkali halides.
15. With the help of the force distance curve explain the relation between interatomic spacing and interatomic force in a solid.

16. State and derive lever rule.

17. Explain the properties of plasmaons.

18. Derive the Kramer's- Kronning relations for the optical reflectance.

(6×2=12 weightage)

Part C (Essay Type Questions)

*Answer any **two** questions.*

*Weight **5** each.*

19. Write detailed notes on the following
(a)Allotropy, (b)Polymorphism, (c)Polytypism

20. Define the term: repulsive interaction, cohesive energy and equilibrium lattice constant.

21. Describe different types of phase diagrams.

22. (a) Explain electron-phonon interaction and (b) explain the term polarons.

(2×5=10 weightage)