**QP CODE: 25047329**

25047329

**Reg No :** .....

**Name :** .....

## M.Sc DEGREE (CSS) EXAMINATION, NOVEMBER 2025

### Third Semester

M Sc PHYSICS

### ELECTIVE - PH810301 - SOLID STATE PHYSICS FOR MATERIALS

2019 ADMISSION ONWARDS

0A21C656

Time: 3 Hours Weightage: 30

**Part A (Short Answer Questions)**

*Answer any **eight** questions.*

*Weight **1** each.*

1. What are Schottky defects?
2. Illustrate the creation of step by slip process.
3. Explain polymorphism with the help of an example.
4. Define Fick's first law.
5. What do you mean by ring diffusion?
6. What do you understand by equilibrium lattice constant?
7. Define the term Madelung energy.
8. Distinguish between a compound and an alloy.
9. Define plasmons.
10. How polarons are created?

(8×1=8 weightage)

**Part B (Short Essay/Problems)**

*Answer any **six** questions.*

*Weight **2** each.*

11. Define point defects, surface defects, grain boundaries and dislocations in crystals.
12. Describe the creation of stacking faults in fcc and hcp crystals.
13. Calculate the percentage of voids in cubic crystal systems.
14. Explain the experimental procedure of the determination of Kirkendaal effect.
15. Explain the formation of bonds in inert gases.

16. Explain the structure of a covalent crystal by the help of an example.

17. Differentiate between longitudinal and transverse plasma oscillations.

18. Derive the theory of optical reflectance.

(6×2=12 weightage)

**Part C (Essay Type Questions)**

*Answer any **two** questions.*

*Weight **5** each.*

19. What is meant by line defects in crystal lattice? With the help of a neat diagram explain different dislocation types.

20. (a) Explain the formation of hydrogen bonds. (b) Write a note on Born-harber cycle.

21. What is a phase diagram? Explain any four uses of phase diagram.

22. Explain the behaviour of magnons in a ferromagnet and derive the dispersion relation.

(2×5=10 weightage)