



QP CODE: 26019121



26019121

Reg No :

Name :

M.Sc DEGREE (CSS) EXAMINATION, MARCH 2026

Fourth Semester

M Sc PHYSICS

ELECTIVE - PH810402 - SCIENCE OF ADVANCED MATERIALS

2019 Admission Onwards

31F34CD0

Time: 3 Hours

Weightage: 30

Part A (Short Answer Questions)

*Answer any **eight** questions.*

Weight 1 each.

1. What is portland cement? Why is it termed as hydraulic cement?
2. What are the basic steps in the fracture of polymers?
3. List the essential characteristics of polymeric materials to be used as films.
4. What are composites? List any two applications of composite materials.
5. What is the significance of Rayleigh range in Gaussian beam?
6. Write a short note on collision broadening.
7. Draw the band diagram of a solar cell in dark and under illumination.
8. Differentiate between nematic and cholesteric liquid crystals.
9. Discuss the origin of energy gap in a superconductor.
10. What are the typical steps involved in a thin film deposition process?

(8×1=8 weightage)

Part B (Short Essay/Problems)

*Answer any **six** questions.*

Weight 2 each.

11. Explain the brittle fracture of ceramics.
12. Explain the macroscopic and viscoelastic deformation in polymers.
13. Discuss the various methods of colour centre generation.





14. Differentiate between the two radiative recombination processes namely, (i) interband transition, (ii) impurity centre recombination.
15. Write a short note on materials used in different colour LEDs.
16. Explain the optical properties of metamaterials.
17. Explain the theory of DC Josephson effect.
18. What are the main components of a Czochralski method?

(6×2=12 weightage)

Part C (Essay Type Questions)

*Answer any **two** questions.*

Weight 5 each.

19. Explain the mechanism of deformation in semicrystalline polymers, illustrating the different stages involved.
20. Derive the expression for maximum power output that can be derived from Q-switched laser.
21. What is meant by electro-optic effect? Differentiate between Kerr effect and Pockels effect .
22. (i) What is Meissner effect?
(ii) Show that superconductors exhibit perfect diamagnetic behaviour.
(iii) Discuss the BCS theory of superconductivity.

(2×5=10 weightage)

