LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.Sc. DEGREE EXAMINATION – PHYSICS

FOURTH SEMESTER – APRIL 2017

PH 4806- SOLID STATE PHYSICS - II

Date: 28-04-2017   Dept. No.   Max. : 100 Marks
01:00-04:00

SECTION – A

Answer all the questions   **10 x 2 = 20**

1. Explain how a direct band gap semiconductor is different from an indirect band gap semiconductor.

2. Write the equation for the mobility of an electron and a hole.

3. Distinguish between the polar and non-polar molecules.

4. State the laws of photoelectric effect.

5. Explain the various types of colour centers.

6. Mention the uses of ferrites.

7. Define dielectric constant.

8. Give examples for high Tc superconductors.

9. Classify materials according to susceptibility.

10. What are domains? How are they useful?

SECTION - B

Answer any four questions   **4 X 7.5 = 30**

11. Explain the photo conductive mechanism.

12. Discuss the classical theory for electronic polarizability.

13. With neat sketch discuss the construction and working of MASER.

14. Derive an expression for London penetration depth.

15. Explain the Meissner effect.

16. With neat diagrams discuss the mechanism of optical absorption.

SECTION - C

Answer any four questions   **4 X 12.5 = 50**

17. Discuss the AC and DC Josephson's effects with necessary diagrams.

18. Explain the principle, construction and working of a three level laser.

19. Derive an expression for the susceptibility of a dia – magnetic material.

20. Derive an expression for the frequency dependence of dielectric constant and hence discuss the complex nature of the refractive index of a dielectric material.

21. With neat diagram explain the Hall Effect. Derive expressions for 1) Hall Resistance and 2) Hall coefficient.

22. Derive the Clausius – Mossotti equation.

$$$$$$$$$$