LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc.DEGREE EXAMINATION – **PHYSICS**

SIXTH SEMESTER – **APRIL 2019**

16UPH6MC03– SOLID STATE PHYSICS

Date: 10-04-2019   Dept. No.   Max. : 100 Marks
Time: 09:00-12:00

PART-A

Answer all the questions: **(10x2=20 Marks)**

1. Define primitive and unit cell of a crystal.

2. What is a Bravais lattice? What is the maximum number of Bravais lattices possible?

3. What are called phonons?

4. Distinguish between acoustic and optical phonon.

5. State Law of Mass Action.

6. Mention a few applications of insulating materials.

7. Explain Magnetic Domains.

8. What is curie law of paramagnetism?

9. Explain Meissner Effect?

10. What is a cooper pair?

PART- B

Answer any four of the following: **(4x7.5=30 Marks)**

11. Derive Bragg's law for X-ray diffraction by crystals.

12. Discuss the Einstein's theory of specific heat of solids.

13. Distinguish between direct and indirect band gap semiconductors.

14. Explain Weiss theory of ferromagnetism.

15. Write a short note on hysteresis and energy loss.

16. Explain DC Josephson Effect in a superconductor.

PART- C

Answer any three questions: **(4x12.5=50 Marks)**

17. Describe how crystal structure is determined using powder crystal method. Discuss the merits and demerits.

18. State Debye T^3 Law. Derive Debye expression for lattice heat capacity.

19. Write an essay about P-type and N-type semiconductors and derive an expression for electrical conductivity.

20. Discuss classical theory of paramagnetism.

21. Explain: (a) isotope effect.   (b) BCS theory of superconductivity.

22. Derive London's equation and obtain an expression for penetration depth of a superconductor.

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