LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.Sc. DEGREE EXAMINATION – **PHYSICS**

FOURTH SEMESTER – **NOVEMBER 2016**

PH 4806 – SOLID STATE PHYSICS - II

Date: 10-11-2016 Dept. No. Max. : 100 Marks

Time: 01:00-04:00

SECTION- A

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

1. Define mobility of a charge carrier.
2. Locate the Fermi level in the case of an n-type and a p-type semiconductor.
3. What is meant by anomalous dispersion?
4. Explain the terms anti-ferro electricity and ferri-electricity.
5. State any two laws of photoelectric effect.
6. What is meant by exciton absorption?
7. What are ferrites? Mention any two uses of them.
8. Mention the different sources of permanent magnetic moment in atoms.
9. List any two High-T_c materials and their advantage.
10. What are cooper pairs?

SECTION- B

Answer any **four** questions. **4 x 7.5 = 30 Marks**

11. Explain Hall effect and derive an expression for Hall coefficient for a semiconductor based on two band model of charge carriers.
12. Outline the classical theory of electronic polarisability.
13. Write short notes on different types of excitons.
14. Discuss the domain theory of ferromagnetism
15. Write a note on(a) Meissner effect (b) type I and type II superconductors (c) Isotope effect?

SECTION- C

Answer any **four** questions. **4 x 12.5 = 50 Marks**

16. Discuss with necessary theory and diagrams the (i) metal-metal junction and (ii) metal-semiconductor junction. .
17. Derive an expression for frequency dependent dielectric constant and hence explain anomalous dispersion.
18. Outline the principle, construction and working of ammonia maser. .
19. Establish Curie law from quantum theory of paramagnetism.
20. With necessary theory explain (i) DC Josephson effect (ii) AC Josephson effect

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