



Avinashilingam Institute for Home Science and Higher Education for Women
(Deemed to be University under Category 'A' by MHRD, Estd. u/s 3 of UGC Act 1956)
Re-accredited with A++ Grade by NAAC. Recognised by UGC Under Section 12B
Coimbatore - 641 043, Tamil Nadu, India

Continuous Internal Assessment Test II October 2025
V Semester

Class : III UG
Major : Physics

Time: 2 hours
Max. Marks: 60

23BPHC10 Solid State Physics

Course Learning Outcomes:

1. Distinguish between Amorphous and Crystalline solids.
2. Explain thermal, acoustic and optical properties of solids.
3. Explain symmetry elements, Brillouin zone and comment on elementary lattice dynamics.
4. Distinguish magnetic material with relevant theories.
5. Explain semiconductors based Band theory

Part A

6x1=6

Choose the correct answer

1. Magnetic susceptibility χ is CO4K1
 - a. dipole moment per unit volume
 - b. torque per unit area
 - c. magnetization per unit magnetic field intensity
 - d. magnetic flux density
2. The magnetic material in which permanent magnetic dipoles (due to electron spin) are already aligned due to bonding forces are known as CO4K1
 - a. paramagnetic material
 - b. ferromagnetic material
 - c. diamagnetic material
 - d. ferri magnetic material
3. The relation of flux density with the electric field is CO4K1
 - a. $D = \epsilon + E$
 - b. $D = \epsilon - E$
 - c. $D = \frac{\epsilon}{E}$
 - d. $D = \epsilon E$
4. The electronic polarizability α_e of a monoatomic gas atom is (R is the radius of the atom) CO4K1
 - a. $4\pi\epsilon_0$
 - b. $4\pi\epsilon_0 R$
 - c. $4\pi\epsilon_0 R^3$
 - d. $4\pi\epsilon_0 R^2$
5. The unit of Hall coefficient is CO5 K1
 - a. $Vm^3A^{-1}Wb^{-1}$
 - b. Vm^2AWb^{-1}
 - c. Vm^3AWb^{-1}
 - d. $Vm^2A^{-2}Wb$
6. For silicon to become a n type semiconductor, the valency of the impurity has to be CO5K1
 - a. 2
 - b. 3
 - c. 4
 - d. 5

Part B

3x6=18

Each answer should not exceed 200 words or one page

- 7a. Explain the origin of diamagnetism in a free atom. CO4K2
(OR)
- 7b. What is gyromagnetic ratio? Discuss about the electron spin and magnetic moment. CO4K1
- 8a. Distinguish between Polar and Non-Polar substances. CO4K1
(OR)
- 8b. Deduce an expression for the orientational polarization in dielectrics. CO4K3

9a. Distinguish between intrinsic and extrinsic semiconductor. CO5K1

(OR)

9b .Write a note on the origin of a band gap. CO5K2

Part C

3x12 = 36

Answer ALL the questions.

Each answer should not exceed 600 words or three pages

10a.Describe Langevin's theory for a paramagnetic gas and its limitation. CO4K1

(OR)

10b.Discuss the domain structure in ferromagnetic materials. CO4K2

11a. Explain the different types of polarization mechanisms in dielectrics and sketch their dependence on the frequency of the applied electric field. CO4K2

(OR)

11b. What is meant by local field in a dielectric and how is it calculated for a cubic structure? Deduce Clausius-Mossotti relation and explain its use in predicting the dielectric constant of a solid. CO4K2

12a. Describe in detail the Kronig-Penny Model and differentiate between free electron, intermediate and tightly binded electrons. CO5K2

(OR)

12b. Explain Hall effect. How do you determine Hall coefficient. What are the applications of Hall effect. CO5K2

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