

Subject Code: R10203/R10

Set No - 1

I B.Tech II Semester Supplementary Examinations Dec. - 2016
ENGINEERING PHYSICS-II
(Common to All Branches)

Time: 3 hours

Max. Marks: 75

Answer any FIVE Questions
All Questions carry equal marks

1. (a) Derive Schrodinger's time dependent and time independent wave equations.
(b) Discuss the physical significance of wave function. [10+5]
2. (a) Obtain the expression for electric resistivity in terms of well known microscopic quantities.
Discuss its dependence on temperature.
(b) Discuss classical free electron theory of metals. [10+5]
3. (a) Explain the Kronig-Penney model of solids.
(b) Discuss Bloch theorem qualitatively. [10+5]
4. (a) Discuss the origin of magnetic moment and derive an expression for it.
(b) Briefly discuss the Weiss molecular field theory of ferromagnetism. [10+5]
5. (a) What are Cooper pairs? Give an outline of BCS theory of superconductivity.
(b) Why is a superconductor termed as a perfect diamagnetic? [10+5]
6. (a) Obtain clausius-Mossotti relation in dielectrics .
(b) A solid contains 5×10^{28} identical atoms per m^3 , each with a polarizability of $2 \times 10^{-40} \text{ Fm}^2$.
Assuming that internal field is given by the Lorentz relation, calculate the ratio of internal field to the applied field. Given $\epsilon_0 = 8.854 \times 10^{-12} \text{ Fm}^{-1}$. [10+5]
7. (a) Derive an expression for Fermi level in an extrinsic p-type semiconductor.
(b) Explain and discuss the properties of Hall effect in semiconductors. [8+7]
8. (a) What are nanoparticles? Explain at least two techniques for producing nanoparticles.
(b) Elucidate the use of ultrasonics in non-destructive testing of materials. [10+5]

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