

B.Tech I Year I Semester (R15) Supplementary Examinations June 2016

ENGINEERING PHYSICS
(Common to CE, EEE and CSE)

Time: 3 hours

Max. Marks: 70

PART – A
(Compulsory Question)

- 1 Answer the following: (10 X 02 = 20 Marks)
- Explain why Newton's rings appear as circular rings.
 - What principle behind the functioning of an optical fiber? And write the formula for critical angle.
 - Define Piezoelectric effect.
 - Identify whether unit cells of SC, BCC, and FCC lattices are primitive or not. Explain with reason.
 - Give the physical significance of wave function related to quantum mechanics.
 - Write the drawbacks of classical free electron theory.
 - Explain Fermi level in intrinsic semiconductors at 0K.
 - What are Ferro magnetic materials? Why do they exhibit spontaneous magnetization?
 - Write any two applications of nano-materials.
 - Explain Meissner effect.

PART – B
(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

- 2 Determine the radius of curvature of Plano-convex lens using Newton's rings method.

OR

- 3 With the help of suitable diagrams, explain the principle, construction of a He-Ne laser.

UNIT – II

- 4 Show that FCC is the most closely packed of three cubic structures.

OR

- 5 (a) Monochromatic X- rays of Wavelength $1.5 \text{ \AA}$ are incident on a crystal face having an interplanar spacing of $1.6 \text{ \AA}$. Find the highest order for which Bragg's reflection maximum can be seen.
(b) Derive the expression for inter planar spacing between two adjacent planes of miller indices (h k l) in a cubic lattice of edge length 'a'.

UNIT – III

- 6 (a) Calculate the wavelength associated with an electron with energy 2000eV.
(b) Show that the energies of a particle in a potential box are quantized.

OR

- 7 Discuss the formation of allowed and forbidden energy bands on the basis of the Kronig-Penney model.

UNIT – IV

- 8 (a) Explain the Hall Effect? Derive expression for hall coefficient and its importance.
(b) Write a note on Direct and Indirect Band gap semiconductors.

OR

- 9 Define magnetic moment. Explain the origin of magnetic moment at the atomic level.

UNIT – V

- 10 (a) Describe the BCS theory of superconductivity.
(b) A super conducting tin has a critical temperature of 3.7 K at zero magnetic field and a critical field of 0.0306 Tesla at 0K. Find the critical field at 2K.

OR

- 11 (a) Discuss various physical properties of nanomaterials.
(b) Discuss briefly about chemical vapour deposition method of nanomaterials preparation.