PVP 14

Code: ME1T3, EE1T3, EC1T3, AE1T3

I B. Tech - I Semester – Regular/Supplementary Examinations
November - 2018

ENGINEERING PHYSICS
(Common for AE, ME, EEE, ECE)

Duration: 3 hours Max. Marks: 70

PART – A

Answer ***all*** the questions. All questions carry equal marks

11x 2 = 22 M

1.

a) What is Fermi energy?
b) State de Broglie hypothesis.
c) What are the differences between crystalline and amorphous materials?
d) What are Miller indices?
e) Explain the Bloch theorem.
f) What is dielectric constant?
g) What is an intrinsic semiconductor?
h) Write any two applications of magnetic materials.
i) What did you understand about acceptance angle in optical fibers?
j) What are SWNT and MWNT?
k) Write any two applications of nanomaterials.

PART – B

Answer any ***THREE*** questions. All questions carry equal marks.
3 x 16 = 48 M

2. a) Derive Schrodinger's Time- Dependent wave equation. 6 M

   b) Explain G.P. Thomson experiment. 6 M

   c) Calculate the wavelength (λ) associated with an electron with energy 2000eV. 4 M

3. a) Show that FCC is the most closely packed of all the three cubic structures by finding the packing factor. 8 M

   b) Derive Bragg's law of X-ray diffraction using crystals. 8 M

4. a) Discuss the Kronig-Penny model for the motion of an electron in a periodic potential. 8 M

   b) Explain briefly the quantum free electron theory of metals. 4 M

   c) Derive Clausius - Mossotti equation. 4 M

5. a) Derive an expression for the number of electrons per unit volume in the conduction band of intrinsic semiconductor. 8 M

b) Distinguish between direct and indirect bandgap semiconductors. 4 M

c) Explain the hysteresis curve. 4 M

6. a) Describe the construction and working of a semiconductor laser. 6 M

b) What do you mean by a laser? Explain the characteristics of lasers. 4 M

c) Obtain the mathematical expression for acceptance angle and numerical aperture. 6 M