PVP 14

Code: ME1T3, EE1T3, EC1T3, AE1T3

I B. Tech - I Semester – Regular/Supplementary Examinations
December 2016

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) Write the Plank's Black body radiation formula and explain the terms.
b) Write the limitations of wave function.
c) What is meant by a Space group of a crystal and mention its significance?
d) Why the X-rays only be used to observe the diffraction in crystals?
e) Mention the important failures of Classical free electron Theory.
f) What is meant by orientational polarization?
g) Explain the concept on the origin of Magnetic Moment.
h) Write the Fermi-Dirac distribution function and mention its importance.
i) Write any two important applications of Lasers in detail.
j) An optical fiber acceptance angle 26.80^{o}, then calculate its numerical aperture.
k) Why nanomaterials are different from bulk, explain?

PART – B

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

2. a) Give an account of Heisenberg's uncertainty principle. 4 M

   b) Write down the Schrodinger time independent wave equation for matter waves. Calculate energy levels of a particle confined in an infinite potential well. 12 M

3. a) Explain the principle, procedure and advantage of Powder method of X-ray diffraction. 12 M

   b) A beam of X-rays is incident on a Nacl crystal with lattice spacing 0.282 nm. Calculate the wavelength of X- rays if the first order Bragg reflection takes place at a glancing angle of $8^{o}\ 35'$. 4 M

4. a) Discuss the Kronig-Penny model for the motion of an electron in a periodic potential. 10 M

   b) Derive the Classius Mossotti relation. 6 M

5. a) Distinguish between intrinsic and extrinsic semiconductor. 4 M

b) Derive a expression for the carrier concentration of an n- type semiconductor. 8 M

c) Discuss the variation of Fermi level with temperature in p-type semiconductors. 4 M

6. a) Write a short note on Population inversion. 4 M

b) Write Applications of Lasers. 4 M

c) Describe the construction and working of semiconducting Laser. 8 M