

Code: CE2T3, CS2T3, IT2T3

I B.Tech - II Semester – Regular Examinations – JULY 2015

ENGINEERING PHYSICS
(Common for CE, CSE & IT)

Duration: 3 hours

Max. Marks: 70

PART – A

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

11 x 2 = 22 M

1. a) What are the properties of matter waves?
- b) Write an expression for plank's law of black body radiation and explain the terms?
- c) What are Eigen values?
- d) Define i) Unit cell ii) Space lattice
- e) Write notes on Bravais lattice and non-Bravais lattice?
- f) What do you mean by population inversion?
- g) What is Fermi Dirac distribution functions?
- h) What are different polarizations in dielectric materials?
- i) Define
 - i) Magnetic Flux density
 - ii) Magnetic Susceptibility
- j) What is indirect band gap in semiconductors and explain?
- k) Define Fermi energy level.

PART – B

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

2. a) Describe G. P. Thomson experiment setup and results, which gave the proof for existence Matter waves? 12 M
- b) In Davisson and Germer experiment, the second order diffraction set up in a constructive interference was observed at an angle of 40° with respect to electron beam direction for the wave length of electron waves 2.5\AA . Calculate the inter planer distance of the experimental crystal. 4 M
3. a) State and derive the Bragg's law. 4 M
- b) Explain how Laue method can be use to determine the inner planar spaces. 8 M
- c) The minimum order of Bragg's reflection occurred at an angle of 20° in the plane [212]. Find the wavelength of x-ray if lattice constant is 3.615\AA .
($d_{(212)}=1.205 \text{\AA}$) 4 M
4. a) Derive the expression local uniform field of a dielectric material. Hence, obtain the expression of Clausius-Mossotti's equation. 9 M

- b) Explain different types of polarization mechanisms. 7 M
5. a) Explain about the intrinsic Semiconductors. 4 M
- b) Derive the expression for fermi energy level with concentration of holes and electrons in the conductive and valence band for intrinsic semiconductor. 10 M
- c) For an intrinsic semiconductor gap width $E_g=0.7\text{eV}$ calculate the Fermi level intrinsic semiconductor at 300 K ($m_r^* = m_e^* = m_0$) 2 M
6. a) Write the principle of semi conductor laser. 4 M
- b) Describe the construction and working of Semi conductor laser. 8 M
- c) Write a note on application of lasers. 4 M