

Code No. : 3314/N

FACULTY OF ENGINEERING & INFORMATICS
B.E. I Year(New) (Common to all Branches) (Main) Examination, June 2011
ENGINEERING PHYSICS

Time : 3 Hours

Max. Marks : 75

Note : Answer all questions^t from Part — A. Answer any five _questions from Part B.

PART A

(Marks : 25)

1. A soap film ($n = 1.33$) in air is 320 nm thick. If it is illuminated with white light at normal incidence, what colour will it appear to be in reflected light ? 3
2. Two Nicol's have parallel polarizing directions ..so that the intensity of transmitted light is maximum. Through what angle must either Nicol be turned if intensity is to drop by one-fourth of its maximum value ? 2
3. Compare and contrast between Bose-Einstein and Fermi-Dirac Statistics. 3
4. Calculate the value of Poynting vector at the surface of the sun if the power radiated by the sun is 3.8×10^{26} W and its radius is 7×10^8 m. 2
5. The first order diffraction is found at a glancing angle θ . Calculate the wavelength of X-rays and the glancing angle for second order diffraction if spacing between the adjacent planes is 2.51 \AA .
6. For an intrinsic semiconductor having band gap $E_g = 0.7 \text{ eV}$, calculate the density of holes and electrons at room temperature (27°C). Given $k = 1.38 \times 10^{-23} \text{ J/K}$ and $h = 6.62 \times 10^{-34} \text{ J.s}$.
7. Draw the nature of Magnetic dipole moments and variation of susceptibility with temperature graphs in ferro-ferri-and anti-ferromagnetic materials. 3
8. Explain the isotopic effect in superconductors. 2
9. Write few applications of nano materials. 2
10. Explain how X-diffraction is used in characterizing the nano materials.

PART — B

(Marks : 50)

11. (a) Obtain an expression for the Intensity of diffraction pattern in case of Fraunhofer diffraction at single slit, and obtain the condition for minima of different orders. 8
- (b) Explain the construction of quarter wave plate. 2

(This paper contains 2 pages)

1

• P.T.O.

Code N 3314/N

12. (a) Discuss the properties of wavefunction, 2
(b) Using Schrodinger time independent wave equation, discuss the nature of a particle moving across the potential barrier and define quantum tunnelling.
13. (a) Discuss the free electron theory of metals. 5
(b) Explain, how, Kronig-Penny model of solids lead to energy band formation. 5
14. (a) Explain the phenomenon of ferroelectricity and discuss how dielectric constant of Barium titanate changes as its temperature is decreased. 7
(b) Write few applications of ferroelectrics. 3
15. (a) What are thin films ? Describe the chemical vapour deposition Method of preparation of thin films. 5
(b) Write a note on solar-cells. 5
16. (a) Explain the construction and working of Ruby-laser. 5
(b) Using Bose-Einstein distribution; law obtain the Planck's law of black-body radiation. 5
17. Write & note On :
(a) Concept of fermi level in semiconductors.. 2
(b) Write a note on solar-cells. 4
(c) Write a note on TEM. 4