1013

B.Tech. Examination, 2016
(Second Semester)
(ME & EC Branch)

Paper - I
ENGINEERING PHYSICS

Time Allowed : Three Hours

Maximum Marks : 100

Note : Attempt any two parts of all five questions.

Q. 1. (a) What is a biprism. $10 \times 2 = 20$

A transparent sheet of thickness 7.2×10^{-4} cm is introduced in the path of one of the interfering beams, the central fringe shifts to a position occupied by the sixth fringe. If $\lambda = 6000 \, A°$, find the refractive index of the sheet.

(b) Newton's rings are formed with reflected light of wavelength $5895 \, A°$ with a liquid between the plane and curved surface. The diameter of 5th dark ring is 0.3 cm and the radius of curved surface is 100 cm. Calculate the refractive index of the liquid. Also explain Grating.

(c) Find the intensity and discuss the condition of maxima and minima in a single slit diffraction.

Q. 2. (a) What is a Nicol prism. What will be the percentage reduction in intensity of the incident light when analyser is rotated through $60°$ from the maximum intensity position. $10 \times 2 = 20$

(b) Give the construction and working of He-Ne laser.

(c) Write in brief :

   (i) Population inversion

   (ii) Optical fibre

Q. 3. (a) Find the energy values for a particle in one dim. box. **10×2=20**

(b) Derive Schrodinger's time independent wave equation.

(c) A photon is compton scattered by an electron through 90°. Find the energy of scattered photon for incident photon energies.

   (i) 10 KeV

   (ii) 0.511 MeV

Q. 4. (a) Discuss Hysteresis curve and its uses. **10×2=20**

(b) What are the dielectric materials. Derive Claussius Mossotti equation.

(c) Explain Type I and Type II super conductors.

Q. 5. (a) Derive Maxwell's Ist equation and find the electromag. wave equation in free space. **10×2=20**

(b) Find the expression for length contraction and time dilation.

(c) Give the Einstein's postulates for relativity.

The proper life of π mesons is found to be 3×10^{-8} sec. Calculate the velocity of these π mesons if their observed mean life is 5×10^{-7} sec.

Physical constants :

$h = 6.6 \times 10^{-34}$ J sec

$m_e = 9.1 \times 10^{-31}$ kg

$c = 3 \times 10^8$ m/sec