BTI-1/DX: 8005

PSY-101E Physics-I

Time : 3 Hours]   [Maximum Marks : 100

Note: Attempt five questions in all selecting at least one question from each part.

UNIT-I

QI   (a)   Explain affect of introducing a thin palate of mica in the path of one of the interfering beams of Fresnel's biprism. Deduce expression for displacement.   10

(b)   Discuss the formation of Newton's rings? Derive the expression for radius of nth dark ring in reflected light   10

QII   (a)   Derive an expression for resolving power and the dispersive power of grating.

(b)   What is double refraction? How Nicol Prism Polarises and analyse the light.   10

QIII   a)   Explain the terms stimulated emission of radiation as optical pumping? How lasers can be produced by He-Ne gas? How it is superior to a Ruby Laser?   12

        b)   Discuss the propagation of light in fibres. Explain the different types of optical fibres. Write applications of optical fibres   8

QIV   a)   Explain the concept of directionality and monochromacity as applied to laser. Explain the main features of the semiconductor laser.   12

        b)   A glass clad fibre is made with core glass of refractive index 1.5 as the cladding is doped to give a fractional index differences of 0.0005. Find (a) cladding index (b) the critical internal reflection angle (c) the external critical acceptance angle(d)the numeric aperture   8

UNIT-III

QV   a)   Obtain an expression for the propagation of plane electromagnetic waves in free space. Show that the electric and magnetic field vectors are perpendicular to each other and also perpendicular to the direction of propagation of the wave.   12

b) Discuss the significant of displacement current.

8

Q.VI a) State and prove Gauss theorem in dielectrics. How Gauss's Law is applied to find the electric field due to a infinite line charge. 12

b) Deduce an expression for energy stored in dielectric? 8

UNIT-IV

QVII a) Describe an expression for variation of mass with velocity. Discuss it with reference to special theory of relativity. 14

b) The rest mass of the proton is 1.67×10^{-27} kg. If it starts moving with a speed of 0.8C, then what will be its energy? 6

QVIII a) Distinguish between

i) Cloud Chamber and bubble chamber.

ii) Ionization chamber and G. M. counter. 16

b) Write note on nuclear reactor. 4