2007-PUNJAB UNIVERSITY

B.TECH II SEMESTER DEGREE EXAMINATION

ENGINEERING PHYSICS

TIME-3HOUR
MARKS-100

PART A[10*2=20 MARKS]

Q1) a) State Ampere's circuital law and discuss what it was modified to include the displacement current?
b) What is meant by polarization in dielectric materials?

c) What ferries materials?
d) What are spontaneous and stimulated emissions?

e) Distinguish between a step-index fibre and graded-index fibre.
f) Explain simultaneity in relativity.

g) Write Lorentz'transformation equations.
h) State Moseley's law.

i) What do you mean by matter waves?
j) Write the formula for variation of magnetic field intensity with temperature.

PART B[10*8=80 MARKS]

Q2) State and prove Gauss's law. Find electric field due to an infinetly long charged cylinder at an external point. Also show the variation of electric field intensity with distance.

Q3) Discuss Dia magnetism and write their properties.

Q4) Establish the relation between Einstein's coefficients. Explain the energy level diagram for ruby and He-Ne lasers.

Q5)(a) What is optical fibre cable? Explain the basic theory of propagation of light in fibre.

(b) An optical fibre has a Numerical Aperture of 0.20 and a cladding refractive index of 1.59. Determine the acceptance angle for the fibre in water which has a refractive index 1.33

Q6)(a) If T is the relativistic Kinetic Energy of a particle of rest mass m0 then show that: T2 + 2m0c2 T = p2c2

(b) A particle of mass M disintegrates while at rest into parts having masses of M/2 and M/4. Show that the relativistic Kinetic Energies of the parts are 3Mc2/32 and 5Mc2/32, respectively.

Q7)(a) State the derive Bragg's law.Write its applications in crystallography.

(b) The mass absorption coefficient for aluminum for X-rays having wave length 0.32 A is 0.6 cm2/gm. If the density of aluminum is 2.7 gm/cm2, find the thickness of the absorber needed to cut down the intensity of the beam to 1/20 of the initial value.

Q8)Discuss harmonic oscillator in quantum mechanics. Define energy eign values for it.Does it explain the tunneling phenomena for a particle in a box?

Q9)What is superconductivity? What are the differences between Type 1 and type 2 superconductors? A type 1 superconductor with Tc=7K has slope (dBc/dY=-25mT/K) at Tc. Estimate its critical field at 6K.