B. Tech. Degree I & II Semester (Combined) Examination June 2013

IT/CS/EC/CE/ME/SE/EE/EI/EB/FT 1102 ENGINEERING PHYSICS
(2012 Scheme)

Time : 3 Hours   Maximum Marks : 100

PART A

(Answer *ALL* questions)

(8 x 5 = 40)

I. (a) Distinguish between spontaneous emission and stimulated emission. Write their expression in terms of Einstein's co-efficients.

(b) Derive the expression for the numerical aperture of an optical fibre.

(c) Define packing factor. Obtain the expressions for the packing factors of SC, BCC and FCC lattices.

(d) What is meant by a shape memory alloy? Explain pseudoelasticity with an example.

(e) Write any five technological applications of nano materials.

(f) Calculate the length of a rod of length 20m in a frame of reference which is moving with a velocity 0.8C. The length of the rod is making an angle 45° with the direction motion.

(g) Define a perfect black body. Write brief notes on any two basic laws of black body radiation.

(h) Explain the terms reverberation and loudness. Write any two remedial measures each.

PART B

(4 x 15 = 60)

II. With the help of a suitable diagram explain the principle, construction and working of a Helium – Neon laser.

OR

III. Explain the recording and reconstruction of hologram with the help of diagrams.

IV. (a) Define Miller indices. Write the procedure for finding Miller indices.

(b) Derive the expression for inter planar spacing in terms of Miller indices.

(c) The lattice constant for a unit cell is 6.2 A°. What is the separation between planes with Miller indices (110) plane?

(d) Draw the planes (110) and (222).

OR

V. (a) Define metallic glasses.

(b) What are the different types of metallic glasses?

(c) Discuss any three major properties of metallic glasses.

(d) Write any five major applications of metallic glasses.

VI.   (a)   Explain Meissner effect with the help of diagram.

      (b)   Distintuish between type I and type II super conductors.

      (c)   Explain AC and DC Josephson effects.

OR

VII.   (a)   Derive the expression for the relativistic mass variation with velocity.

      (b)   The rest mass of proton is 1.67×10^{-27} Kg. At what speed will its mass be double its rest mass?

VIII.   Derive the time dependent and time independent Schrodinger equations.

OR

IX.   (a)   With a neat diagram explain the method of production of ultrasonic waves using Piezo electric crystal.

      (b)   Discuss different conditions to optimize good acoustics. (6 conditions minimum).

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