

Roll No. ....

Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech (Sem-1, 2)**  
**ENGINEERING PHYSICS**  
**Subject Code : PH-101 (2004-2010 Batch)**  
**Paper ID : [A0122]**

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTION TO CANDIDATES :**

1. **Question No. 1 is compulsory.**
2. **Candidates are required to attempt 5 questions from SECTIONS A and B, taking at least TWO questions from each section.**

1. a) Define Faraday's laws of electromagnetic induction.
- b) What do you mean by susceptibility ?
- c) What do you understand by magnetostriction effect?
- d) What is spontaneous emission?
- e) What do you mean by splicer?
- f) What is twin paradox?
- g) What do you mean by inertial frame of reference?
- h) Give important properties of X-rays
- i) Define Compton effect
- j) What is superconductivity? **(10 × 2 = 20 Marks)**

**SECTION-A****(8 Marks each)**

2. a) A cylinder of radius R is immersed in a uniform electric field E with its axis parallel to the field. Estimate electric flux passing through the cylinder.
- b) Deduce Maxwell equation using modified Ampere's law and discuss its importance in reference to em propagation. (4,4)
3. a) Differentiate between soft and hard magnetic materials by taking suitable example(s).
- b) Elaborate the concept of magnetic domains. (4,4)

4. a) Distinguish between temporal and spatial coherence by taking suitable example(s).
- b) Elaborate construction and working of semiconductor laser. (4,4)
5. a) Discuss comparative contribution of pulse dispersion in case of a step index and graded index fibre.
- b) A fibre is made with core of refractive index 1.48 and the cladding is doped to give a refractive index difference of  $4 \times 10^{-4}$ . Find cladding refractive index and critical angle. (4,4)

**SECTION-B****(8 Marks each)**

6. a) Two particles come towards each other with a speed of  $0.9c$  with respect to the laboratory. What is their respective speed.
- b) Deduce mass energy relationship of Einstein. (3,5)
7. a) The wavelength of the Mo-K radiation is  $0.7083 \times 10^{-10} \text{m}$ . The glancing angle in the 3<sup>rd</sup> order for (1 0 0) planes of rock salt is  $22^\circ$ . Calculate the lattice constant.
- b) Suggest a method used for production of X-rays. (4,4)
8. a) State and derive time independent Schrodinger equation.
- b) What do you mean by orthogonalization of a wave function? (5,3)
9. a) What do you understand by thermodynamics of superconductors? Comment on present status.
- b) Differentiate between type I and type II superconductors. (5,3)