

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 4×10^{-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 3rd order for (1 0 0) planes of rock salt is 22° . 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)