

MAY 2013

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech. (Sem.-1 & 2)

ENGINEERING PHYSICS

Subject Code : PH-101 (2005-2010 Batches)

Paper ID : [A0122]

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTION TO CANDIDATES :

- SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
- SECTION - B & C have FOUR questions each.
- Attempt any FIVE questions from SECTION B & C carrying EIGHT marks each.
- Select atleast TWO questions from SECTION - B & C.

SECTION-A**1. Answer briefly :**

- What do you mean by displacement current?
- Define retentivity and coercivity.
- What is the fundamental principle of a hologram?
- What do you mean by index profile of a fibre?
- What are postulates of special theory of relativity?
- An electron ($m_0 = 0.511 \text{ MeV}/c^2$) have momentum of $2 \text{ MeV}/c$. Find its total energy in terms of MeV.
- An X-ray tube operates at 13.6 kV. Find the maximum speed of electron striking the target.
- What is de-Broglie hypothesis?
- What is the difference between phase and group velocities?
- What is isotopic effect in superconductors?

SECTION-B

- What is meant by dielectric polarization? Define the electric field vectors **E**, **D** and **P**. Show how they are related for an isotropic dielectric?
 - State and Prove Gauss's law in electrostatics. (5,3)
- Explain magnetic flux density **B**, magnetic flux intensity **H**, and magnetization **M**. How are they related to each other?
 - What is magnetic anisotropy? How anisotropy can be induced by magnetic annealing? (4,4)
- What are Einstein's coefficients? Derive relation between them.
 - Draw a neat diagram of He-Ne laser and describe the method of its working. (4,4)
- Explain the difference between a step-index fibre and graded index fibre.
 - What is meant by modes? Compare a single mode and multimode fibre. (4,4)

SECTION-C

- A stationary body explodes into two fragment each of rest mass 1 Kg that move apart at speeds of $0.6c$ relative to the original body. Find the mass of the original body.
 - Calculate the percentage contraction of a rod moving with a velocity $0.8c$ in a direction inclined at 60° to its own length. (3,5)
- What is X-ray diffraction? Deduce Bragg's Law for the diffraction of X-ray in a crystal. What are Bragg's conditions for X-ray diffraction?
 - Distinguish between continuous X-rays spectrum and characteristic X-rays spectrum. (5,3)
- Derive time-dependent Schrodinger wave equation. Give a physical interpretation of the wave function.
 - An electron is bound in one dimensional box size $4 \times 10^{-10} \text{ m}$. What will be the minimum energy? (6,2)
- Derive London equation and discuss how they explain Meissner effect and flux penetration.
 - What do you mean by critical field in superconductivity? (6,2)

