Roll No. ⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚   **Total No. of Pages : 02**

Total No. of Questions : 09

B.Tech.(2008 - 2010 Batches) (Sem.–1,2)
# ENGINEERING PHYSICS
Subject Code : PH-101
Paper ID : [A0122]

Time : 3 Hrs.   **Max. Marks : 60**

INSTRUCTIONS TO CANDIDATES :
1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION - B & C. have FOUR questions each.**
3. **Attempt any FIVE questions from SECTION B & C carrying EIGHT marks each.**
4. **Select ATLEAST TWO questions from SECTION - B & C.**

SECTION-A

1. **Write briefly :**

   a) Why no Compton effect can be observed with radiowaves?

   b) What are the conduction and displacement currents?

   c) What is Isotope effect?

   d) What is the physical phenomenon underlying the generation of x-rays?

   e) What is stimulation emission and give the factors on which its rate depends?

   f) What is acceptance angle of an optical fiber?

   g) What do you understand by simultaneity of an event in the special theory of relativity?

   h) There exists no rest frame for a photon. Why?

   i) Using time-energy uncertainty principle show that no excited state in any atom can be mono-energetic in nature.

   j) What do you understand by magnetostriction?

SECTION-B

2. a) Applying Maxwell's equations, obtain the continuity conditions for electric and magnetic fields at the interface of two media. (4)

    b) Derive the equation of electromagnetic waves propagating in the conducting medium. (4)

3. a) Discuss the origin of diamagnetism on the basis of atomic structure. (4)

    b) What are ferrite materials? Discuss their atomic origin and give certain applications of ferrites. (4)

4. a) Discuss the principle and working of CO_2 laser. (5)

    b) Why is the output of ruby laser spiked? Give the wavelength of output radiation. (3)

5. a) Discuss various attenuations and losses of signal in optical fibers. (5)

    b) Discuss some applications of optical fibers used as sensors. (3)

SECTION-C

6. a) Show that the quantity $E^2-p^2c^2$ is a Lorentz invariant for a relativistic particle. (6)

    b) Why was concept of ether introduced and what properties were assigned to it? (2)

7   a) Discuss various processes through which x-rays suffer attenuation in its intensity while propagating through a medium. (4)

    b) What is Bragg's law and derive its expression for diffraction of x-rays? What are limitations of this law in determination of crystal structure? (4)

8. a) Discuss using Heisenberg's uncertainty principle that electrons cannot be the constituents of a nucleus. (2)

    b) A particle of mass m is trapped in one dimensional harmonic oscillator potential well. Using steady state Schrodinger's equation, obtain wave functions and quantized energies for this particle. (6)

9. a) Give a brief account of superconductivity while throwing light on magnetic and thermodynamic properties. (4)

    b) Write down London's equations and give their physical significance. (4)