Roll No. | | | | | | | | | | | | | Total No. of Pages :02

Total No. of Questions : 09

B.Tech. (2007-2010 Batches) (Sem.–1,2)

ENGINEERING PHYSICS

Subject Code :PH-101

Paper ID : [A0122]

Time : 3 Hrs. Max. Marks : 60

INSTRUCTION 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 atleastTWO questions from SECTION - B &C.**

SECTION-A

1. Write briefly :

(a) Why no Compton effect is observed with visible light?

(b) What is the origin of displacement current?

(c) What is Meissner effect?

(d) What are the origins of characteristic and continuous x-rays?

(e) What is population inversion and give its significance in lasing action?

(f) What is acceptance angle of an optical fiber?

(g) What were the postulates of special theory of relativity?

(h) Justify why a photon can't be brought to rest in any frame of reference.

(i) Why a particle trapped in a box can't be at rest?

(j) What are hard and soft magnetic materials?

SECTION-B

2. (a) Using Maxwell's equations, obtain the equations of electric and magnetic waves propagating in free space.

   (b) Discuss various polarizations induced in the dielectric when it is subjected to external electric field. (4,4)

3. (a) Write a short note on ferrites and their applications.

   (b) Give a brief account of Type I and II superconductors. (4,4)

4. (a) Discuss the principle and working of semiconductor lasers.

   (b) What is the role of Helium gas in lasing action in He-Ne laser. Give the wavelength of output radiation. (5,3)

5. (a) Discuss pulse and material dispersion observed in optical fibers. How is pulse dispersion minimized?

   (b) Write a note on the applications of optical fibers. (5,3)

SECTION-C

6. (a) Derive the expression for variation of mass with velocity for a relativistic particle.

   (b) Why was concept of ether introduced and what properties were assigned to it? (6,2)

7. (a) When x-rays propagate through a medium, discuss various processes through which it suffers attenuation in its intensity.

   (b) Derive Bragg's law and discuss its applications in crystallography. (4,4)

8. (a) Discuss the Born's interpretation of wave function.

   (b) A particle of mass m is trapped in one dimensional potential well of infinite depth. Find its normalised wave functions and quantized energies. (4,4)

9. (a) Write a note on superconductivity with emphasis on magnetic and thermodynamic properties.

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