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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

K.CO'

## **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?

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#### **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.

### 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)

(5,3)

- (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)