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Total No. of Questions: 09

Total No. of Pages: 02

B. Tech. (Sem. 1, 2)
ENGG. PHYSICS
Subject Code: PH-101
Paper ID: A0122

Time: 3 Hrs.

Max. Marks: 60

INSTRUCTIONS TO CANDIDATES:

1. Attempt all sub-questions from Question 1 (2 Marks each)
2. Attempt any FIVE questions from Sections A and B, selecting at least 2 from each Section (8 Marks each)

SECTION A

1.
 - (a) State Gauss's law in electrostatics.
 - (b) State Ampere's circuital law in electromagnetism.
 - (c) Define the term 'magnetostriction'.
 - (d) Define the term ferromagnetism'.
 - (e) Define the term 'optical pumping'.
 - (f) What are the characteristics of laser light?
 - (g) Write the Einstein's postulates of special theory of relativity.
 - (h) State Moseley's law.
 - (i) Describe 'Uncertainty principle'.
 - (j) Define the term 'superconductivity'.

SECTION B

2.
 - (a) What do you mean by dielectric and dielectric polarization? Define D, E and P and establish relation between them.
 - (b) Write Maxwell's four equations of electromagnetic theory and briefly interpret each of them.
3.
 - (a) Discuss the complete classification of magnetic materials. What are the differences between soft and hard magnetic materials?
 - (b) Explain the term 'ferrites' Discuss various applications of ferrites.
4.
 - (a) Explain the terms, spontaneous and stimulated emission. Describe the working of Ruby laser.
 - (b) Describe the working of He-Ne laser with proper energy level diagram .

5. (a) Derive the expression for numerical aperture of an optical fiber. Discuss the relation numerical aperture and acceptance angle
(b) Describe the various models of an optical fiber

SECTION C

6. (a) Describe the terms 'length contraction' and 'time dilation'.
(b) Derive the relativistic relation for variation of mass with velocity.
7. (a) Describe Bragg's law and give its importance in crystallography.
(b) What do you mean by X-ray spectra? Describe the production of characteristic x-rays.
8. (a) Derive the expression for time independent Schrodinger's equation.
(b) Write down Schrodinger's wave equation for a particle in a box. Solve it to obtain eigen functions and show that the eigen functions are discrete.
9. (a) What do you mean by Meissner effect? Discuss Type I and Type II Superconductors.
(b) Give a quantitative explanation of BCS theory of superconductors. How does this theory explain major characteristics of superconductors?