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Total No. of Questions: 09

Total No. of Pages: 02

B. Tech. (Sem.1, 2)
ENGINEERING PHYSICS
Subject Code : BTPH 101
Paper ID : A1102

Time: 3 Hrs.

Max. Marks: 60

INSTRUCTIONS TO CANDIDATES:

1. Section A is **COMPULSORY** consisting of **TEN** questions carrying **TWO** marks each.
2. Candidates are required to attempt **FIVE** questions from Sections B & C, taking at least **TWO** questions from each section. Each carrying **EIGHT** marks each.

SECTION A

1.

- a) Differentiate between dielectrics and conductors by taking suitable example(s).
- b) Define Poynting vector.
- c) Suggest some method to detect Ultrasonic waves
- d) What is meant by stimulated emission?
- e) What is meant by space lattice?
- f) What do you mean by pulse broadening?
- g) What is the outcome of Michelson Morley Experiment?
- h) Where do we use Lorentz transformations, and why.
- i) What do you understand by eigen functions.
- j) Explain electron confinement.

SECTION B

2.
 - a) What do you understand by displacement current . Suggest a method to calculate it.
 - b) Solve Maxwell's equations in time varying fields.
3.
 - a) A magnetizing field of 1400 Am^{-1} produces a magnetic flux of 3×10^{-5} weber in an iron bar of cross sectional area 0.3 cm^2 . Calculate permeability and susceptibility of the bar.
 - b) What do you understand by ferrites? Discuss their main applications.
4.
 - a. Find the maximum frequency present in the radiation from an X-ray tube whose accelerating potential is $5 \times 10^4 \text{ V}$.
 - b. Discuss working principle and construction of Braggs spectrometer .
5.
 - a) Using appropriate energy level diagram, discuss the working of He-Ne laser.
 - b) Discuss relevance of Einstein's coefficients in context of Lasing mechanism.

SECTION C

6. a) A glass fibre has a core material of refractive index 1.50 and cladding material of refractive index 1.45. If it is surrounded by air, compute the critical angle
(i) at core-cladding boundary and (ii) at cladding -air boundary.
- b) Discuss merits and demerits of multi mode optical fibres.
7. a) The mass of a moving electron is 8 times its rest mass. Find its kinetic energy and momentum.
- b) What do you understand by simultaneity in relativity.
8. a) Derive time independent Schrodinger wave equation and discuss its significance in today's context.
- b) What is the significance of quantum mechanics for macroscopic bodies.
9. a) Explain the concept of Super-paramagnetism in view of nano synthesis.
- b) Discuss some important application(s) of nano particles.