Roll No. ....

Total No. of Questions : 09]   [Total No. of Pages : 02

Paper ID [A0113]

(Please fill this Paper ID in OMR Sheet)

B.Tech. (Sem.- 1st/2nd)
ENGINEERING PHYSICS (PH-101)

Time : 03 Hours   Maximum Marks :60

Instruction to Candidates:

1) Section - A is **Compulsory.**

2) Attempt any **Five** questions from Section - B&C.

3) Select at least **Two** questions from Section - B&C.

Section - A

Q1)   *(Marks: 2each)*

a) What is the cause of producing displacement current?

b) What do you mean by the term 'Field penetration' in super conductors?

c) What do you mean by coherence length, write down the expression for it?

d) Define photo-electric effect?

e) What are the outcomes of Michelson-Morley experiment?

f) Define bending losses in OFC's?

g) Define Holography?

h) What do you mean by Spatial and Temporal coherence?

i) Define the term Hysteresis? Draw the Hysteresis curves for soft iron and steel.

j) Derive the relation between dielectric constant and electric susceptibility?

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Section - B

(Marks: 8 each)

Q2) a) Give the physical significance of Maxwell's equations.
   b) Calculate the expression for magnetic field inside a toroidal solenoid.

Q3) a) Explain the terms magnetostriction effect, hard magnetic materials, hysteresis loss.
   b) Explain the terms permeability and susceptibility and drive the relation between them.

Q4) a) Explain the construction, working and principle of Ruby Laser.
   b) Define Einstein coefficients for lasers and explain their significance.

Q5) a) The light gathering capacity of an optical fibre is 0.479. If relative corecladding index difference is 0.0005, calculate the refractive index of cladding, if outside medium is air.
   b) What is splicing? Define its types. Explain optical couplers.

Section - C

(Marks: 8 each)

Q6) Derive Lorentz's transformation equations and apply them to explain

   a) Length Contraction.

   b) Time Dilation.

Q7) a) Show that the production of X-Rays is based on inverse photo-electric effect and differentiate between characteristic and continuous X-Rays.

   b) Calculate the wavelength of K_α line for an atom having atomic number $Z = 90$. Given that Rydberg constant $R = 1.1 \times 10^7$ m^{-1}.

Q8) Give the significance of Compton Effect. Find expression for:
   a) Compton Shift.
   b) K.E. of recoil electron.

Q9) a) Define Levitation effect and explain the various factors that can destroy superconductivity.
   b) Explain the BCS theory of superconductivity.

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