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

B. Tech (Sem.-1st & 2nd)
ENGINEERING PHYSICS
Subject Code: PH-101
Paper ID: [A0122]

Time: 3 Hrs.   Max. Marks: 60

INSTRUCTIONS TO CANDIDATE:

1. **Question 1 is Compulsory.**

2. **Attempt five questions from Part A and part B with two questions from each part A and part B.**

Q.1.   **(10x2=20)**

   a) Write Maxwell's equations in differential form and give their physical significance

   b) What is the physical significance of pointing vector?

   c) How do you understand by the phenomenon of diamagnetism?

   d) Why the lasing action is easier in four level laser systems?

   e) Why do we observe spiked output of ruby laser?

   f) What is the basic principle of guiding the light wave through an optical fiber?

   g) What were the results of Michelson-Morley Experiment?

   h) Why an electron can't be accelerated in a cyclotron?

   i) What is Mosley's law and how it is useful classification of elements in periodic table.

   j) What is a cooper pair and how it is formed

PART-A

Q.2.(a) Show using Maxwell's equations that electromagnetic waves are transverse in nature.   (4)

   (b) Obtain the equation of electromagnetic waves in conducting medium and give the significance

   of skin effect.   (4)

Q.3.(a) Give brief account of various kinds of magnetic materials.   (4)

   (b) What are magnetic domains? What are various factors which play role in their formation   (4)

Q.4.(a) Discuss the construction and working of a ruby laser.   (4)

   (b) Give a qualitative idea formation and reconstruction of hologram.   (4)

Q.5.(a) What are different kinds of optical fibers? Discuss various kinds of dispersions observed when light propagates through on optical fibre. (5)

(b) Give three applications of optical fibers. (3)

PART-B

Q.6. (a) How are x-rays produced? Further discuss the origin of characteristic and continuous X-rays. (4)

(b) Give a brief account of various non-destructive techniques. (4)

Q.7.(a) Derive an expressions of Compton shift obtained when a photon is scattered by a nearly free electron at rest. (4)

(b) Obtain time independent Schrodinger's equation. Argue qualitatively that energy quantization is embedded in this equation. (4)

Q.8 .(a) Derive the expression for length contraction of a relativistically moving body (5)

(b) The mean life of a muon, when it is at rest is 2.2µs. Calculate the average distance it will travel in vacuum before it decays, if it has velocity of 0.9c (3)

Q.9. (a) Obtain London's equation and give their significance as regards to superconductivity. (4)

(b) Give a brief account of BCS theory of superconductivity emphasizing of formation of cooper pairs. (4)

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