Total No. of printed pages = 2

PH 101

Roll No. of candidate | | | | | | | | | | |

2020

B.E. 1st Semester (Compartmental) Examination

ENGINEERING PHYSICS – I

(GU Regulation)

Full Marks – 100 Time – Three hours

The figures in the margin indicate full marks for the questions.

1. Answer any *ten* of the following : (10 × 2 = 20)

   (a) Define Poission's Ratio.
   (b) What is Shearing strain?
   (c) What do you mean by achromatic doublet?
   (d) What is meant by Coherent sources of light?
   (e) Define magnetic levitation.
   (f) What are polar dielectrics?
   (g) State the Amperes circuits law.
   (h) Write the expression for natural frequency of LCR circuit.
   (i) What is Curie-Weiss Law?
   (j) What do you mean by divergence of vector field?
   (k) Write the expression for length contraction in special theory of relativity.
   (l) What is SONAR?

2. Answer any *five* of the following in short : (5 × 4 = 20)

   (a) Distinguish between interference and diffraction.
   (b) Write the postulates of special theory of relativity.
   (c) Find the condition of achromatism of two lenses in contacts.
   (d) Explain the phenomenon of time dilation.
   (e) Discuss the growth of Current in an LR circuit with a source of constant emf.
   (f) Explain the classification of dielectric materials.

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3. Answer any *five* from the following : $(5 \times 8 = 40)$

(a) Establish the relation for Bulk modulus (k) and Rigidity modulus (n) in terms of Poission's ratio.

(b) Using Lorentz transformation equations derive the relation between proper length and observed length of an object.

(c) Derive an expression for the internal field in a dielectric and hence obtain the Claussius-Mossotti equation.

(d) What do you mean by gradient of a scalar field? Explain it's physical significance.

(e) Explain the formation of Newton's Rings.

(f) Prove that the energy dissipated per cycle per unit volume of a specimen for magetization is equal to the area of the B-H curve.

4. Answer any *four* questions from the following : $(4 \times 5 = 20)$

(a) A uniform rod of length 1m is clamped horizontally at one end. A weight of 0.1 kg is attached at the free end. If the diameter of the rod is 0.02 m, calculate the depression of the free end of the rod.

Given the Young's modulus of the rod is 1×10^{10} N/m^2.

(b) The objective glass of a telescope is an achromatic with a focal length 90 cm. If the magnitudes of the dispersive powers of the two lenses are 0.024 and 0.036, calculate their focal lengths.

(c) In an oscillator circuit L = 0.1 H, C = 0.25 microF. What is the maximum value of resistance for the circuit to be oscillator?

(d) A certain process requires 10^6 sec to occur in an atom at rest in laboratory. How much time will this process require to an observer in the laboratory, when the atom is moving with a speed of 5×10^7 m/s.

(e) A solenoid consisting of 500 turns and carrying 5 Amperes is 0.05 m long. Calculate magneto-motive force and total flux if the area of cross section is 0.0004 m^2.