Total No. of printed pages = 2

PH 171101

Roll No. of candidate

17/37   2022

B.Tech. 1st Semester (Odd Semester) End-Term Examination

ENGINEERING PHYSICS – I

New Regulation & New Syllabus (w.e.f. 2017-18)

Full Marks – 70   Time – Three hours

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

1. Fill in the blanks : $(10 \times 1 = 10)$

   (i)   The dimensional formula of strain is ⸺⸺

   (ii) The limiting value of Poisson's ratio is ⸺⸺

   (iii) 1 Bel = ⸺⸺ decibel.

   (iv) Sabine's formula relates -volume of a hall, its total absorption and ⸺⸺ of reverberation.

   (v)   If the centres of positive and negative charges in a molecule coincide with each other, the molecule is said to be ⸺⸺

   (vi) O_2 is a ⸺⸺ molecule.

   (vii) For diamagnetic substances, the value of permeability, μ is ⸺⸺ than 1.

   (viii) In B-H curve, the total area of the loop formed gives ⸺⸺ loss per unit volume per cycle of magnetization.

   (ix) The concept of matter waves was formulated by scientist, ⸺⸺

   (x)   From the theory of potential well, we find that energy values are ⸺⸺

[Turn over

2. Answer any *four* questions :

(a) State Hooke's law. Define Young's modulus, bulk modulus and rigidity modulus. In case of longitudinal strain, prove that strain energy per unit volume= $\frac{1}{2}x$ stress x strain. Calculate Young's modulus of elasticity for a material if Poisson's ratio for it is 0.379 and rigidity modulus is 2.87×10^{10} Nm^{-2}. $(2 + 6 + 4 + 3 = 15)$

(b) Explain in brief about loudness and intensity and write the relation between them. Define reverberation time. What are the various factors and how they influence architectural acoustic? $(5 + 2 + 8 = 15)$

(c) Write few applications of ultrasonic waves. Explain a method for the production of ultrasonic waves. $(5 + 10 = 15)$

(d) Explain briefly about different types of dielectric polarisation. Deduce Clausius-Mossotti equation. $(8 + 7 = 15)$

(e) Mention a few differences between soft and hard magnetic materials. What is hysteresis loss? Explain B-H curve. Define retentivity and coercivity. $(4 + 2 + 5 + 4 = 15)$

(f) State Heisenberg's Uncertainty principle. Prove that electron cannot reside within the nucleus. Write in brief about the properties of nanomaterials. What is a quantum well and how it explains the discrete energy values? $(2 + 4 + 3 + 6 = 15)$