I B. Tech I Semester Supplementary Examinations, July/August - 2021
ENGINEERING PHYSICS
(Com. to CE, ME, Agri E)

Time: 3 hours   Max. Marks: 75

Answer any five Questions one Question from Each Unit
All Questions Carry Equal Marks
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1. a) What is conservative force? Show that for a conservative force $F = -\text{grad } V$ (7M)

   b) What are the forced oscillations? Establish differential equation for it and write the general solution of this differential equation.   (8M)

Or

2. a) Using the equation of motion of the damped forced harmonic oscillator, derive an expression for its amplitude in the steady-state.   (8M)

   b) Explain the basic laws and properties of vectors and scalars.   (7M)

3. a) What is the piezoelectric effect? With a neat diagram explain how ultrasonic waves are produced by the piezoelectric oscillator.   (8M)

   b) What is the principle of ultrasonic testing? Discuss the use of ultrasonic's for non-destructive testing.   (7M)

Or

4. a) Obtain Sabine's formula using growth and decay method.   (9M)

   b) What is the principle used for finding the velocity of ultrasonics using acoustical grating?   (6M)

5. a) What is a cantilever? Obtain an expression for the depression produced at its free end when the weight of the beam is negligible.   (8M)

   b) Derive the relation between different moduli of elasticity.   (7M)

Or

6. a) What is bending moment? Derive the expression for internal binding moment.   (8M)

   b) Draw and explain Stress-Strain curve for ductile material.   (7M)

7. a) Write a short note on Piezoelectric and magnetostrictive sensors.   (6M)

   b) Derive the relationship between Einstein's coefficients and explain their physical significance.   (9M)

Or

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8. a) Explain the Construction and working of Ruby laser.   (8M)

   b) Describe the principle of operation of a bimetallic strip.   (7M)

9. a) Explain electronic polarization and show that electronic polarizability is directly   (8M)
      proportional to the volume of the atom.

   b) Explain the B-H curve of ferromagnetic material on the basis of domain theory.   (7M)

Or

10. a) Classify magnetic materials on the basis of permanent dipole moment.   (8M)

    b) Explain the frequency dependence of polarization in the dielectric material.   (7M)

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