

I B. Tech I Semester Supplementary Examinations, April - 2022
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

UNIT I

1. a) What are inertial and non- inertial frames of reference? Give one example for each. Obtain an expression for the pseudo force acting on a particle in a linearly accelerated frame of reference. (10M)
 - b) Show that for a conservative force $F = -\text{grad } U$ (5M)
- Or
2. a) What are Damped oscillations? Derive the equation of motion of damped oscillator and find its solution. (10M)
 - b) A damped oscillator starting from rest reaches a first amplitude of 500mm. It reduces to 50mm after 100 oscillations. The periodic time is 2.3 sec. Find the damping constant and relaxation time. (5M)

UNIT II

3. a) Explain how the reverberation time of a hall is affected by (i) its size, (ii) nature of its wall surfaces and (iii) audience. (10M)
- Derive expression for growth and decay of sound energy inside a hall.
- b) Define 'Absorption Coefficient' of a material and describe a method for its determination. (5M)
- Or
4. a) State Inverse Piezoelectric effect. Draw the Piezoelectric ultrasonic generator circuit and explain its working. (10M)
 - b) What are the advantages and disadvantages of ultrasonic testing? (5M)

UNIT III

5. a) If one end of a bar is fixed and a load is applied to the other end, calculate the depression at the free end. (9M)
 - b) State Hooke's law? Explain Stress versus Strain curve. (6M)
- Or
6. a) Explain the terms Stress, Strain, Elastic limit, Yield point and Poisson's ratio. (6M)
 - b) Define three moduli of elasticity and obtain the relation between them. (9M)



UNIT IV

7. a) Distinguish between Spontaneous and Stimulated emissions. (5M)
b) Describe the construction and working of He-Ne laser with the help of energy level diagram. (10M)

Or

8. a) Derive the relation between the probabilities of spontaneous and stimulated emission in terms of Einstein's coefficients. (8M)
b) What is a sensor? Write a note on temperature sensors. (7M)

UNIT V

9. a) Explain the classification of magnetic materials. Distinguish between dia, para and ferromagnetic materials. (10M)
b) A paramagnetic material has a magnetic field intensity of 10^4 A/m. If the susceptibility of the material at room temperature is 3.7×10^{-3} , calculate the magnetization and flux density in the material. (5M)

Or

- 10 a) What do you understand by dielectric constant? Define dielectric susceptibility. Derive the relation between dielectric constant and dielectric susceptibility. (6M)
b) Explain electronic polarisability and show that electronic polarisability for a mono atomic gas increases as the size of the atom becomes larger. (9M)

