TED (15/19) 1003
(Revision-2015/19)

A24 - 7249

Reg.No.....
Signature.....

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/ COMMERCIAL PRACTICE, APRIL - 2024

ENGINEERING PHYSICS - I

[Maximum marks: 100] [Time: 3 Hours]

PART – A
Maximum marks: 10

I. (Answer ***all*** the questions in one or two sentences. Each question carries **2** marks)

1. State Newton's Second law of motion.
2. State Lamis theorem.
3. State Hooke's law.
4. Define simple harmonic motion.
5. What is meant by Resonance? (5 x 2 = 10)

PART – B
Maximum marks: 30

II. (Answer any ***five*** of the following questions. Each question carries **6** marks)

1. A. Write the equations of motion of a body moving under uniform acceleration.
   B. Give the advantages of SI system over other unit systems.
2. State and prove law of conservation of momentum.
3. Explain like and unlike parallel forces. State conditions of equilibrium of body under the action of coplanar parallel forces.
4. With equations explain the energies associated with liquid flow. State Bernoulli's theorem.
5. Define stress and strain in elasticity. Explain elastic fatigue.
6. What are ultrasonic waves? Give four applications of ultrasonic waves.
7. State equation of continuity. Water is flowing through a tapered pipe having diameter 0.2m to 0.1m. If inlet velocity is 3m/s calculate outlet velocity.

(5 x 6= 30)

PART – C

Maximum marks: 60

(Answer ***one full*** question from each unit**.** Each full question carries **15** marks)

UNIT – I

III. (a) Write the seven fundamental quantities with their units in SI system. (3)

(b) Derive the formula $Sn = u + a (n – ½)$. (6)

(c) A body travels 20m during 7^{th} second 24m during 9^{th} second. Find out the distance travelled during 15^{th} second. (6)

OR

IV. (a) Define impulse of force and write the formula. (3)

(b) Explain the recoiling of gun according to principle of conservation of linear momentum and derive the equation for recoil velocity. (6)

(c) A car of mass 1000kg travelling at 10m/s brought to rest over a distance 20m. Find breaking force. (6)

UNIT – II

V. (a) Explain moment of a force. (3)

(b) Define couple of forces. Derive the equation for work done by the couple of forces. (6)

(c) Calculate the power developed by a couple of 50 Nm acting on a shaft imparts the rotation of 1200 rpm. (6)

OR

VI. (a) State parallelogram law of forces. (3)

(b) Derive the expression for resultant of two forces acting at a point in magnitude and direction, using Parallelogram law of forces. (6)

(c) Two forces 20 N and 10 N acts at a point at an angle 60°. Find their resultant in magnitude and direction. (6)

UNIT – III

VII. (a) Define coefficient of viscosity. (3)

(b) With diagram explain Stokes experiment to find coefficient of viscosity of highly viscous liquid. (6)

(c) Calculate mass of water flowing out in 5 minutes through a capillary tube of length 0.3m and radius 0.5mm. The surface of water is 0.9m above the axis of tube. Density of water is 1000 kg/m^3. η coefficient of viscosity of water is 8.9×10^{-4} kg/ms. (6)

OR

VIII. (a) Explain Bulk modulus in elasticity and write the formula. (3)

(b) Describe method of determination of Young's modulus by stretching Searle's experiment. (6)

(c) A copper wire of 3m long having diameter 1mm is fixed at its one end. Calculate the extension produced if 10 kg is attached at other end. Y of copper is 12.5×10^{10} N/m^2. (6)

UNIT – IV

IX. (a) Derive the formula $v = f \lambda$ (3)

(b) Describe resonance column experiment to determine velocity of sound in air. (6)

(c) Calculate fundamental frequency, third harmonics or first overtone from a closed pipe of length 40cm. Velocity of sound in air is 340m/s. (6)

OR

X. (a) Describe any one production method of ultrasonic wave. (3)

(b) With diagram derive the expression for fundamental frequency, first and second harmonics from an open pipe. (6)

(c) Velocity of sound in air at 30°c is 348 m/s. Find velocity at 60°c. (6)
