

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/  
MANAGEMENT/COMMERCIAL PRACTICE, NOVEMBER – 2025**

**ENGINEERING PHYSICS-I**

(Maximum Marks:100)

(Time: 3 Hours)

**PART - A**

( Maximum Marks : 10 )

**Marks**

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

1. Distinguish between distance and displacement?
2. State triangular law of vector addition.
3. Define stress and strain.
4. Define frequency and wavelength of a wave.
5. State Newton's second law of motion.

( 5 x 2 = 10 )

**PART - B**

( Maximum Marks: 30 )

II Answer **any five** questions from the following. Each question carries 6 marks.

1. Explain fundamental and derived units with example.
2. A body describes vertically up went 98m and reached the ground. How much time was it in air?
3. Explain the term couple. Obtain the expression for work done by a couple.
4. State Hooke's law. Find the elongation of a steel rod of length 3 m and radius 2 cm when subjected to an axial load of 4000 Kg. Young's modulus of steel is  $20 \times 10^{10} \text{ N/m}^2$ .
5. State Bernoulli's theorem. What is an aerofoil?
6. What are stationary waves? Mention any three characteristics of stationary waves.
7. Distinguish between free vibration and forced vibration. What is resonance?

( 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) What are the advantages of SI system over all other unit systems? (3)
- (b) Write down the equations of motion. Derive the formula for the distance travelled by a particle during  $n$ th second of its motion. (6)
- (c) A body moving with velocity 30 m/s is brought to rest in 10s. Find the retardation. Find also the distance travelled in that time. (6)

**OR**

- IV (a) State Newton's first law of motion. A person standing in a bus falls backwards when bus suddenly starts. Why? (3)
- (b) State the law of Conservation of Momentum and prove the law by considering collision of two bodies moving in a straight line. (6)
- (c) Explain recoil velocity of a gun. A bullet of mass 15 gm is fired from a gun of mass 3Kg with a speed of 400 m/s. Calculate the recoil velocity of the gun. (6)

**UNIT – II**

- V (a) Using Parallelogram law of vector addition find out the magnitude and direction of two forces acting at an angle  $\theta$ . (6)
- (b) What are concurrent forces? (3)
- (c) Define the term resultant and equilibrant. State Lami's theorem. (6)

**OR**

- VI (a) A body is acted upon by two forces 3N and 10N. The angle between the forces is  $60^\circ$ . Find out the magnitude and direction of the force to be applied to keep the body in equilibrium. (6)
- (b) Define moment of a force. What is its unit? (3)
- (c) A couple 100Nm acts on the shaft of a motor and rotates it at a speed 7 revolutions per second. Calculate the power developed. (2)
- (d) One of the rectangular components of a force 50N is 30N. Find the other component. (4)

### UNIT – III

- VII (a) The radius of a water pipe decreases from 2.5 cm to 1.9 cm. If the velocity of water in the wider portion is 2 m/s. Calculate the velocity in the narrow portion. (3)
- (b) Define stress. Explain various types of strain possible for a solid and the three types of modulus of elasticity. (6)
- (c) Two wires of the same material are stretched by equal forces. The lengths of the wires are in the ratio 1:2 and their radii are in the ratio 1:3. Find the ratio of their elongations. (6)

**OR**

- VIII (a) Define coefficient of viscosity and describe Poiseuille's method to determine coefficient of viscosity of water. (6)
- (b) Explain Stoke's formula and derive an expression for terminal velocity of a sphere falling through a viscous fluid. (6)
- (c) The volume of water flowing per minute through a capillary tube of length 30 cm and radius 1mm is 80cc. Calculate the coefficient of viscosity of water if the pressure head is 9.75 cm of water. (3)

### UNIT – IV

- IX (a) Define Simple Harmonic motion. Write its differential equation. The frequency of a simple harmonic oscillator is 0.4 Hz. Find its period. (6)
- (b) Discuss the resonance column experiment to find the velocity of sound in air. (6)
- (c) Calculate the wavelength of sound excited by a tuning fork of frequency 512 Hz. Velocity of sound in air is 350 m/s. (3)

**OR**

- X (a) Discuss different modes of vibration of air column in an open pipe. (6)
- (b) At what temperature velocity of sound in air be double its value at 0°C. (3)
- (c) What are ultrasonic waves? Explain any one method for production of ultra-sonic waves. Give any two applications of ultrasonic waves. (6)

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