



End Term (Odd) Semester Examination November 2025

Roll No:.....

Name of the Course and Semester: Diploma and Sem-I

Name of the Paper: Applied Physics-I

Paper Code: DTPH-102

Time: 3.0 hour

Maximum Marks: 100

Note:

- (i). All the questions are compulsory.
- (ii). Answer any two sub questions from a, b and c in each main question.
- (iii). Total marks for each question is 20 (twenty)
- (iv). Each sub-question carries 10 marks.

Q1.

($2 \times 10 = 20$ Marks, CO1)

- a. Explain dimension and dimensional formula of a physical quantity. Show that the dimensional formula of angular momentum and Planck's constant (\hbar) are identical.
- b. Explain the parallelogram law of vector addition. Determine the angle between two equal concurrent forces P and P' if magnitude of their resultant is $P/2$.
- c. Define static and kinetic friction. A block of mass 2 kg resting on a horizontal plane. Coefficient of static friction is 0.4 between block and surface. A horizontal force of 2.5 Newton acts on the block. Find the force of friction between block and surface.

Q2.

($2 \times 10 = 20$ Marks, CO2)

- a. What is angular acceleration? Derive the relation between linear acceleration and angular acceleration.
- b. Explain the Newton's second law of force in detail and establish the relation between newton and dyne.
- c. Define the term horizontal range and time of flight in projectile motion. The maximum range of a projectile fired with some initial velocity is found to be 1000 meter. Calculate the maximum height (H) reached by this projectile.

Q3.

($2 \times 10 = 20$ Marks, CO3)

- a. Define moment of inertia of a rigid body. A disc of mass 5 kg and radius 20 rotating about its diameter at 6 revolutions per minute. Find its rotational kinetic energy.
- b. Explain the Newton's law of gravitation in detail. Write the SI unit and dimensional formula of gravitational constant (G).
- c. State the Kepler's third law of planetary motion. If the average distances between two planets from Sun are 10^{11} m and 10^{13} m respectively. Calculate the ratio of their time periods of revolution around the Sun.

Q4.

($2 \times 10 = 20$ Marks, CO4)

- a. Define the term kinetic energy with its SI units and dimensional formula. A bag of wheat weighs 200 kg. To what height should it be raised so that its potential energy may be 9800 Joules.
- b. A man drops a 10 kg of rock from the top of 5m high ladder. Calculate:
 - (1) The speed of rock just before it hits the ground.
 - (2) Kinetic energy when the rock just reaches the ground. where $g = 10 \text{ m/s}^2$.



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c. State and prove the principle of conservation of mechanical energy for a freely falling object .

Q5.

($2 \times 10 = 20$ Marks, CO5)

a. State and explain Hooks law. A wire is fixed at one end and is subjected to increasing load at other end. Draw a curve between stress and strain.

b. Explain surface tension on the basis of molecular theory.

C. Discuss the effect of temperature on viscosity. A plate of metal 100 cm^2 in area rest on a layer of coster oil 2 mm thick, whose coefficient of viscosity is 15.5 poise. Calculate the horizontal force required to move the plate with uniform speed of 3 cm/s ,