



Graphic Era

HILL UNIVERSITY

Established by an Act of the State Legislature of Uttarakhand (Adhiniyam Sankhya 12 of 2011)
University under section 2(f) of UGC Act, 1956

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:

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

Q1. (2 × 10 = 20 Marks, CO1)

- Explain dimension and dimensional formula of a physical quantity. Show that the dimensional formula of angular momentum and Plancks constant (h) are identical.
- Explain the parallelogram law of vector addition. Determine the angle between two equal concurrent forces P and P' if magnitude of their resultant is $P/\sqrt{2}$.
- 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 × 10 = 20 Marks, CO2)

- What is angular acceleration? Derive the relation between linear acceleration and angular acceleration.
- Explain the Newtons second law of force in detail and establish the relation between newton and dyne.
- 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 × 10 = 20 Marks, CO3)

- 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.
- Explain the Newton's law of gravitation in detail. Write the SI unit and dimensional formula of gravitational constant (G).
- 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 × 10 = 20 Marks, CO4)

- 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.
- A man drops a 10 kg of rock from the top of 5m high ladder. Calculate:
 - The speed of rock just before it hits the ground.
 - 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 × 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 ,