

KATHMANDU UNIVERSITY  
End Semester Examination  
March/April, 2025

Marks Scored:

Level : B.E./B.Sc.

Year : I

Exam Roll No. :

Time: 30 mins.

Registration No.:

Course : PHYS 101

Semester : I

F. M. : 15

Date 01 APR 2025

SECTION "A"

[15Q.  $\times$  1 = 15 marks]

*Choose and encircle the most appropriate answer. The symbols, unless mentioned otherwise, have their usual meanings.*

- A highly elastic material is one that
  - stretches a lot and does not return to its original shape
  - returns to its original shape quickly after deformation
  - breaks easily under stress
  - deforms permanently under stress
- Poisson's ratio is defined as the ratio of
  - lateral strain to longitudinal strain
  - longitudinal strain to lateral strain
  - stress to strain
  - Shear stress to shear strain
- Which of the following quantities is conserved in a perfectly inelastic collision?
  - kinetic energy
  - total momentum
  - potential energy
  - internal energy
- Which of the following is NOT true about the center of mass of a system of particles?
  - it is the weighted average of the positions of all particles
  - it always lies inside the system
  - the motion of the center of mass obeys Newton's laws
  - the velocity of the center of mass depends on the total mass of the system
- Which of the following factors does not affect the moment of inertia of a rotating object?
  - the mass of the object
  - the radius of the object
  - the angular velocity of the object
  - the axis about which the object rotates
- If the angular velocity of a rotating object increases at a constant rate, then the object's angular acceleration is
  - zero
  - decreasing
  - increasing
  - constant
- Which of the following is a characteristic of a damped harmonic oscillator?
  - the amplitude of oscillation increases with time
  - the energy of the system remains constant
  - the frequency of oscillation increases with time
  - the amplitude of oscillation decreases with time
- A wave with a frequency of 50 Hz has a period of
  - 0.02 s
  - 0.5 s
  - 2 s
  - 0.05 s

9. Which of the following factors does **NOT** affect the viscosity of a fluid?
- a. temperature
  - b. pressure
  - c. density of the fluid
  - d. the velocity gradient
10. For a fluid to exhibit laminar flow, which of the following must be true?
- a. the fluid must have low viscosity
  - b. the flow rate must be high
  - c. the Reynolds number must be less than 2,000
  - d. the Reynolds number must be greater than 2,000

*Fill in the blanks with most appropriate answer. The symbols, unless mentioned otherwise, have their usual meanings.*

11. When two waves interfere in phase, they produce \_\_\_\_\_.
12. A helium-neon laser ( $\lambda = 632.8 \text{ nm}$ ) is used to calibrate a diffraction grating. If the first-order maximum occurs at  $20.5^\circ$ . Then the spacing between adjacent grooves in the grating is equal to \_\_\_\_\_.
13. The specific rotation if the plane of polarization is turned through  $26.4^\circ$ , traversing 20 cm length 20% sugar solution is given by \_\_\_\_\_.
14. The energy of a photon emitted by a laser is directly proportional to \_\_\_\_\_.
15. The heat transfer by the process of boiling water is an example of \_\_\_\_\_.