

(6 pages)

Reg. No. :

Code No. : 20033 E Sub. Code : CMPH 11

B.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2025.

First Semester

Physics — Core

PROPERTIES OF MATTER AND MECHANICS

(For those who joined in July 2021 and 2022 only)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. Modulus of elasticity depends upon
 - (a) Stress
 - (b) Strain
 - (c) Applied force
 - (d) None of these

2. If a 5 m long steel wire extends by 2.5 mm then the strain in it is _____.
 - (a) 0.0005
 - (b) 0.005
 - (c) 0.0002
 - (d) 0.002
3. Which of the machine component is designed under bending stress?
 - (a) Shaft
 - (b) Arm of a lever
 - (c) Key
 - (d) Belts and ropes
4. Specific gravity of water is _____.
 - (a) 0.8
 - (b) 1
 - (c) 1.2
 - (d) 1.5
5. The surface of the water in contact with the glass wall is
 - (a) Plane
 - (b) Concave
 - (c) Convex
 - (d) Both (a) and (b)
6. Surface tension is due to
 - (a) Cohesive molecular force
 - (b) Gravitational force
 - (c) Nuclear force
 - (d) Electrical force

7. The time period of a simple pendulum is independent of its _____ :
- (a) Length
 - (b) Mass
 - (c) Location of the earth
 - (d) Amplitude of vibration
8. For a simple pendulum, the graph between L and T will be
- (a) hyperbola
 - (b) parabola
 - (c) straight line
 - (d) curved line
9. 1 torr _____
- (a) 1 inch of Hg
 - (b) 133 Pa
 - (c) 1 bar
 - (d) 14.6 PSi
10. What is the thrust on unit area called?
- (a) Volume
 - (b) Surface area
 - (c) Density
 - (d) Pressure

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Explain about the Hooke's law.
Or
(b) Explain about the short note on Poisson's ratio.
12. (a) Write a short note on uniform bending.
Or
(b) Calculate the load that must be suspended from a steel wire 1 mm in diameter to produce an elongation of 0.02% of its original length ($E = 2 \times 10^{11}$ pascal)
13. (a) Illustrate the phenomenon of surface tension.
Or
(b) Write a short note on rate of flow of liquid.
14. (a) Give a short note on Newton's 2nd law of rotation.
Or
(b) Give a short note on angular momentum.

15. (a) Write a short note on pressure and thrust.
Or
(b) Write five applications of Bernoulli's theorem.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Explain about the modulus of elasticity.
Or
(b) Determination of elastic constants E , n , σ by Selin's method.
17. (a) Explain an expression for bending moment.
Or
(b) Explain the determination of Young's modulus by non-uniform bending using microscope.
18. (a) Explain about the synclastic curved surface inside pressure.
Or
(b) Explain about the Quinches drop methods to determine the angle of contact and surface tension of mercury.

19. (a) Explain about the angular impulse.
Or
(b) Moment of inertia and radius of gyration — Explain it.
20. (a) Explain about the center of pressure on a rectangular lamina.
Or
(b) Explain about the Bernoulli's theorem.