(6 pages) **Reg. No. :** .....

Code No. : 30450 E **Sub. Code : CMPH 11**

B.Sc. (CBCS) DEGREE EXAMINATION, NOVEMBER 2024.

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. The dimensional formula of Hooke's constant is
   (a) MLT (b) $ML^{-1}T^{-2}$
   (c) $ML^{-1}T$ (d) MLT^{-2}

2. The ratio of Longitudinal stress to longitudinal strain
   (a) Young's modulus (b) Bulk modulus
   (c) Strain (d) Bulk stress

3. When beam is subjected to bending neutral axis is _____.
   (a) shortened
   (b) elongated
   (c) either shortened or elongated
   (d) twisted

4. In cantilever beam the deflection occurs at
   (a) free end (b) point of loading
   (c) through out (d) fixed end

5. The capillary action happens due to
   (a) Surface Tension (b) Force
   (c) Pressure (d) Viscosity

6. With rise of temperature the viscosity of liquid
   (a) increases
   (b) decreases
   (c) remain unchanged
   (d) may increase or decrease depending on nature of liquid

7. Change in momentum is called

(a) Force

(b) Momentum

(c) Impulse

(d) Impulsive force

8. The length of a simple pendulum is increased then the time period will

(a) decrease (b) increase

(c) remain same (d) can't predict

9. Bernoulli's equation is applicable only for

(a) incompressible flow

(b) irrotational flow

(c) compressible flow

(d) viscous flow

10. Due to Variation of Venturimeter constant, venturimeters are not suitable for

(a) Low velocity (b) High velocity

(c) Low pressure (d) High pressure

PART B — ($5 \times 5 = 25$ marks)

Answer ALL questions, choosing either (a) or (b).
Each answer should not exceed 250 words.

11. (a) Describe stress strain diagram.

Or

(b) Derive expression for workdone in twisting a wire.

12. (a) Explain the term :

(i) Neutral axis

(ii) Plane of bending.

Or

(b) Write the comparison of uniform bending and nonuniform bending.

13. (a) Explain the term :

(i) Surface tension with unit and dimensions

(ii) Angle of contact.

Or

(b) Write a note on Lubricants.

14. (a) Derive an expression for Kinetic energy of a rotating body.

Or

(b) Outline the theory of equivalent simple pendulum.

15. (a) Define Thrust. Describe thrust on a plane surface immersed in a liquid at rest.

Or

(b) Write the differences of steady and streamline flow.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b)
Each answer should not exceed 600 words.

16. (a) Obtain an expression for twisting couple on a cylinder.

Or

(b) Define : Stress, Strain, Poisson's ratio and Modulus of elasticity.

17. (a) Bring out the expression for the depression of loaded end of a cantilever.

Or

(b) Explain the experimental method to find Young's Modulus using Pin and Microscope by uniform bending.

18. (a) Find the surface tension of a liquid by Jaegar's experiment.

Or

(b) Derive the Poiseuille's formula to obtain the rate of flow of a liquid through a capillary tube.

19. (a) Explain the period of oscillation of a compound pendulum.

Or

(b) Explain rotational kinetic energy. Obtain expression for power during rotation.

20. (a) Explain centre of pressure on a triangular lamina.

Or

(b) Derive Equation of Continuity.

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