Reg. No. : _____

Code No. : 20442 E   Sub. Code : CMPH 11

B.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2023.

First Semester

Physics — Core

PROPERTIES OF MATTER AND MECHANICS

(For those who joined in July 2021–2022 onwards)

Time : Three hours   Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer.

1. From among the given options, Poissons ratio is the highest for

    (a) wood   (b) rubber

    (c) iron   (d) copper

2. The Poisson's ratio for ion

    (a) 0.21 – 0.29   (b) 0.31 – 0.35

    (c) 0.30 – 0.31   (d) 0.5 – 0.2

3. Moment of inertia of a section is _____

    (a) $\int y^n 2dA$ (b) $\int ydA$

    (c) $\int xydA$ (d) $\int x^n 2y^n 2dA$

4. Specific weight of water of 4°C is _____ N/m³

    (a) 9810   (b) 9760

    (c) 9950   (d) 9865

5. What are the dimensions of surface tension?

    (a) $M^1L^1T^{-2}$ (b) $M^1L^1T^{-2}$

    (c) $M^{-1}L^2T^{-1}$ (d) $M^{-1}L^2T^{-2}$

6. What is the unit of viscosity

    (a) Candela   (b) Poiseiulle

    (c) Newtons/m   (d) No units

7. What is the length of the simple pendulum?

    (a) LP   (b) L

    (c) SP   (d) LSP

8. A second pendulum executes _____

    (a) 0.5 beet per second

    (b) 1.0 beet per second

    (c) 1.5 beet per second

    (d) 2.0 beet per second

9. 1 bar is equal to _____ Pascal.

    (a) 10   (b) 10,000

    (c) 1,000   (d) 1,00,000

10. The air craft fly based on which principle?

    (a) Newton's third law

    (b) Conservation of mass

    (c) Bernoulli's principle

    (d) Gravity

PART B — (5 × 5 = 25 marks)

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

Each answer should not exceed 250 words.

11. (a) Write about the short note on stress and strain diagram.

Or

(b) Calculate the work done in twisting a steel wire of radius 1×10^{-3} m and length 0.25 m through an angle of 45°. Given rigidity modulus $n = 8 \times 10^{10}$ N/m²

12. (a) Explain about cantilever.

Or

(b) Write a short note on Cantilever oscillation.

13. (a) Explain excess of pressure over anticlastic surface.

Or

(b) Write a short note on variation of viscosity with temperature.

14. (a) Explain about the translational and rotational motion.

Or

(b) Write a short note on moment of inertia of a solid disc and solid cyclinder.

15. (a) Write a short note on trust in a plane surface immersed, in a liquid at rest.

Or

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 work done per unit volume in deforming a body.

Or

(b) Explain about the determination of Poission's ratio rubber.

17. (a) Write a expression for elevation of the middle in uniform bending.

Or

(b) Write a experiment to determine young's modulus by cantilever oscillation methods.

18. (a) Explain about the Jaeger's method to study the variation of surface tension with temperature.

Or

(b) Explain about the Poiseuille's formula for volume liquid flowing per second through a horizontal capillary tube.

19. (a) Write a short easy on processional motion.

Or

(b) Explain about the expression for rotational kinetic energy of rotational body.

20. (a) Explain about the centre of pressure of a vertical triangular lamina.

Or

(b) Explain about the determination of meta centric height of a ship.

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