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Reg. No. :

Code No. : 20346 E Sub. Code : EMPH 11

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

First Semester

Physics – Core

PROPERTIES OF MATTER AND ACOUSTICS

(For those who joined in July 2023 only)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL the questions.

Choose the correct answer :

1. Minimum values of poisson's ratio in practice is:
(a) 0 (b) -0.5
(c) -2 (d) 0.5
2. The rigidity modulus of a body depends upon _____ strain.
(a) linear (b) shearing
(c) bulk (d) none of these

3. _____ modulus of elasticity can be determined using bending experiment.
(a) rigidity (b) bulk
(c) young's (d) none of these
4. In a non-uniform bending the radius of curvature of different segments.
(a) remains constant (b) will be infinity
(c) zero (d) will be changing
5. Dimensional formula for surface tension is:
(a) MT^2 (b) MLT^2
(c) MT^{-2} (d) MLT^{-2}
6. The unit of coefficient of viscosity is:
(a) N/M (b) NS/m^2
(c) N/s (d) NMS^2
7. A SHM is represented by $y=5 \sin(t+4)$. Its amplitude and period are
(a) 5,1 (b) 5, 2
(c) 5,4 (d) 1, 4

8. When the prongs of tuning fork are loaded, its frequency

- (a) decreases (b) increases
(c) does not change (d) none of these

9. The desirable reverberation time for music is:

- (a) 6.3 seconds (b) 4.3 seconds
(c) 2.3 seconds (d) 2.6 seconds

10. The unit of absorption is:

- (a) Poise (b) Newton
(c) Coulomb (d) Sabin

PART B — (5 × 5 = 25 marks)

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

Each answer should not exceed 250 words.

11. (a) State and explain Hooke's Law.

Or

(b) Obtain an expression for period of oscillation of torsion pendulum.

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12. (a) Obtain an expression for bending moment.

Or

(b) Describe the experiment to determine Young's modulus by uniform bending method.

13. (a) What is meant by surface tension? Illustrate with two examples.

Or

(b) Define the term coefficient of viscosity. Give unit and dimensions.

14. (a) Define the term simple harmonic motion. Give two examples for SHM.

Or

(b) State and explain the laws of transverse vibration of strings.

15. (a) What is meant by acoustics? List its branches.

Or

(b) What are the sources of noises in a hall?

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[P.T.O.]

PART C — (5 × 8 = 40 marks)

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

Each answer should not exceed 600 words.

16. (a) Arrive at the relationship between elastic constants.

Or

- (b) Obtain an expression for couple per unit twist for a cylindrical wire. Also calculate the work done in twisting.

17. (a) Obtain an expression for depression produced at the center of the bar subjected to non-uniform bending. Also describe the experiment to determine Young's Modulus of the material of the bar.

Or

- (b) Describe the theory of cantilever oscillations. Discuss the experiment to determine Young's modulus.

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18. (a) Describe Jaeger's experiment to determine variation of surface tension with temperature.

Or

- (b) Derive Stoke's formula for coefficient of viscosity.

19. (a) Describe the theory for the formation of Lissajous figures for frequency ratio 1:1.

Or

- (b) With a neat sketch and relevant theory describe how will you determine the frequency of AC mains using sonometer.

20. (a) State the requisites of a good auditorium? Describe they are achieved?

Or

- (b) Derive Sabine's formula for reverberation time.

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