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Reg. No. :

Code No. : 40556 E Sub. Code : SMPH 12

B.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2019.

First Semester

Physics — Main

PROPERTIES OF MATTER AND ACOUSTICS

(For those who joined in July 2017 onwards)

Time : Three hours

Maximum : 75 marks

PART A — ($10 \times 1 = 10$ marks)

Answer ALL questions.

Choose the correct answer :

1. The expression for stress is _____.
(F-Force, A-Area of cross section)
- (a) F/A (b) A/F
(c) FA (d) None

2. Young's modulus (Y) is the ratio between _____ and _____.
(a) linear stress and linear strain
(b) volume stress and volume strain
(c) tangential stress and shearing strain
(d) none
3. The bending moment produced in a beam is _____ to young's modulus.
(a) directly proportional
(b) inversely proportional
(c) equal
(d) none
4. In uniform bending the elevation (y) is related to young's modulus (q) by the relation
(a) $y \propto q$ (b) $y \propto q^2$
(c) $y \propto \frac{1}{q}$ (d) none
5. Soap bubble is spherical due to _____.
(a) viscosity (b) elasticity
(c) surface tension (d) none
6. The unit for coefficient of viscosity is _____.
(a) Nsm^{-2} (b) Nsm^{-1}
(c) Nsm^2 (d) None

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7. The second law of transverse vibrations of strings state that, the frequency is directly proportional to _____ of tension. (when/and m are constant).

(a) Square (b) Square root
(c) Cube (d) None

8. The distance between two successive anti-nodes is _____.

(a) λ (b) $\lambda/4$
(c) $\lambda/2$ (d) 0

9. The loudness of sound is measured in _____.

(a) decibel (b) pascal
(c) coulomb (d) none

10. The frequency range of audible sound waves is _____.

(a) below 20 Hz
(b) above 20000 Hz
(c) 20 Hz to 20000 Hz
(d) none

PART B — ($5 \times 5 = 25$ marks)

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

Each answer should not exceed 250 words.

11. (a) Define the three elastic moduli.

Or

- (b) Write short note on I-section girders.

12. (a) Derive the expression for the bending moment of beam.

Or

- (b) Derive the expression for the depression of a cantilever.

13. (a) Explain the variation of viscosity of a liquid with temperature.

Or

- (b) Write short note on lubricants.

14. (a) What are free and damped vibrations? Give examples for each case.

Or

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



15. (a) What are ultrasonic waves? Give any three properties of them.

Or

- (b) Explain any two applications of ultrasonic waves.

PART C — ($5 \times 8 = 40$ marks)

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

Each answer should not exceed 600 words.

16. (a) Derive the expression for Poisson's ratio in terms of elastic constants.

Or

- (b) Explain the determination of rigidity modulus using torsion pendulum.

17. (a) Describe an experiment to determine the young's modulus of the material of a beam by uniform bending method, using pin and microscope.

Or

- (b) Describe an experiment to determine the young's modulus of the material of a beam by non-uniform bending method, using pin and microscope.

18. (a) Explain the Jaeger's method of studying the effect of temperature on surface tension.

Or

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

19. (a) Explain the determination of A.C frequency using sonometer.

Or

- (b) Explain Melde's string method of determining the frequency of a tuning fork by longitudinal mode.

20. (a) Explain the production of ultrasonic waves by piezo-electric method.

Or

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

