

B.Sc. DEGREE EXAMINATION NOVEMBER 2022  
BRANCH III - PHYSICS  
FIRST SEMESTER

COURSE : MAJOR – CORE

PAPER : PROPERTIES OF MATTER AND SOUND

TIME : 3 HOURS

MAX. MARKS : 100

SECTION – A

ANSWER ALL QUESTIONS: (25 MARKS)

I. CHOOSE THE CORRECT ANSWERS: (10 X 1 = 10)

- Which of the following represents Hook's law
  - Stress = E x Strain<sup>2</sup>
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  - Stress<sup>2</sup> = E x Strain
  - $E = \sqrt{\frac{\text{Stress}}{\text{Strain}}}$
- The Poisson's ratio of a material is 0.3 and Young's modulus is 200 GPa. Its Rigidity modulus is
  - 77 GPa
  - 51 GPa
  - 125 GPa
  - 333 GPa
- On increasing the temperature, the surface tension of the liquid
  - Increases
  - Decreases
  - Remains the same
  - None of the above
- Interfacial tension are invariably \_\_\_\_\_ surface tension
  - Less than
  - Equal to
  - More than
  - Double than
- Dimensional formula for the co-efficient of viscosity is
  - $M^1L^1T^{-2}$
  - $M^1L^{-1}T^{-2}$
  - $M^1L^{-1}T^{-1}$
  - $M^1L^{-2}T^{-1}$
- The critical velocity is
  - Maximum attainable velocity
  - Terminal velocity
  - Velocity when hydraulic jump occurs
  - Velocity above which the flow ceases to be streamlined
- The waves in which particle of the medium vibrate at a right angle to the direction of waves motion is known as
  - Electromagnetic waves
  - Longitudinal waves
  - Transverse waves
  - Compressional waves



25. A hall with dimensions 16 x 10 x 10 cubic meter is found to have reverberation time 4 seconds. What is the total absorbing power of all the surfaces in the hall?
26. Derive an expression for bending moment of a beam.
27. Explain piezo-electric method of producing ultrasonic waves.

### SECTION – C

**ANSWER ANY THREE QUESTIONS:**

**(3 X 15 = 45)**

28. Elucidate the theory and experimental method for determining the rigidity modulus of a wire using torsional pendulum.
29. Describe Jaegar's method of studying the variation of surface tension of water with temperature and discuss its advantages and disadvantages.
30. (a) Derive an expression for critical velocity of a liquid  
(b) Define viscosity and obtain an expression for Poiseuille's formula for the rate of flow of liquid through a capillary tube.
31. Derive the general differential equation of SHM and sketch the graphical representation of SHM for displacement, velocity and acceleration.
32. Define reverberation. Deduce Sabine's formula for reverberation time and hence determine the absorption coefficient.

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