

**PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)**

**BSc DEGREE EXAMINATION DECEMBER 2019
(First Semester)**

Branch-**PHYSICS**

PROPERTIES OF MATTER AND SOUND

Time: Three Hours

Maximum: 75 Marks

SECTION-A (10 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** marks (10x1 = 10)

- 1 The dimensional formula for stress is ____
 (i) $ML^{-1}T^2$ (ii) MV
 (iii) ML^2 (iv) M^L^1
- 2 Find the following, which is said to be more elastic?
 (i) Rubber (ii) Gold
 (iii) Wood (iv) Steel
- 3 The dimensional formula for co-efficient of viscosity is
 (i) ML (ii) ML^1
 (iii) ML^1V (iv) MLV
- 4 The viscosity of liquids _____ with temperature
 (i) Increases (ii) Decreases
 (iii) Constant (iv) None
- 5 The unit of surface tension is _____
 (i) N/m (ii) NM^1
 (iii) N/m (iv) $N^{-1}M^{-1}$
- 6 Force of attraction between molecules of the same substance is called ____
 (i) Adhesive force (ii) cohesive force
 (iii) Atomic force (iv) Nuclear force
- 7 The waves, in which the particles of the medium vibrate in a direction perpendicular to the direction of wave motion is known as _____ waves
 (i) Transverse (ii) Longitudinal
 (iii) Propagated (iv) Magnetic
- 8 In Doppler effect, change in frequency depends on _____
 (i) Distance between the source and listener
 (ii) Speeds of source and listener
 (iii) Density of air
 (iv) Half distance between source and listener
- 9 Sound of frequency higher than 20,000 Hz, which are inaudible to normal human ear are called _____
 (i) Noise (ii) Frequency
 (iii) Amplitude (iv) Ultrasonics
- 10 Devices used to detect ultrasonic waves are
 (i) Converters (ii) Transducers
 (iii) Rectifiers (iv) Transformer

Cont...

SECTION - B (35 Marks)Answer **ALL** Questions**ALL** Questions Carry **EQUAL** Marks (5 x 7 = 35)

- 11 a Calculate the work done in twisting a steel wire of length 0.25m and radius 10^{-3} m through an angle of 45° . Rigidity modulus of steel = 8×10^{10} N/M²,

OR

- b A wire of 300cm long and 0.625sq.cm in cross section is found to stretch 0.3cm under a tension of 1,200kg. What is the Young's modulus of the material of the wire?

- 12 a Outline co-efficient of viscosity. Derive Meyer's formula for viscosity of gas.

OR

- b Explain the experimental determination of osmosis pressure.

- 13 a Define surface energy. Explain the pressure difference across a liquid surface.

OR

- b Describe the expression for excess of pressure inside a liquid drop and air bubbles.

- 14 a Define progressive waves. Derive an equation for a plane progressive wave.

OR

- b Summarise superposition of waves.

- 15 a Bring out the important applications of ultrasonic waves.

OR

- b Explain the working of a magnetostriction oscillator.

SECTION - C (30 Marks)Answer any **THREE** Questions**ALL** Questions Carry **EQUAL** Marks (3 x 10 = 30)

- 16 Discuss the method of determining the rigidity modulus of a material of a wire using the torsional pendulum.
- 17 Describe Oswald's viscometer and explain how it can be used to compare the viscosities of two liquids.
- 18 Explain Jaeger's method of determining the surface tension of a liquid.
- 19 Explain organ pipes. What are beats?
- 20 What is Piezo-electric effect? Describe the function of a piezo-electric generator.

Z-Z-Z

END