

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 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

(10 x 1 = 10)

- 1 In automobiles driving shafts are made from
 - (i) solid rods
 - (ii) hollow tubes
 - (iii) plastic rods
 - (iv) plastic tubes
- 2 The geometrical moment of circular cross section is
 - (i) $\frac{bd^3}{12}$
 - (ii) $\frac{\pi r^2}{2}$
 - (iii) $\frac{\pi r^4}{4}$
 - (iv) $\frac{bd^2}{12}$
- 3 According to Stoke's law the resultant force acting on the ball becomes zero, if it moves with
 - (i) terminal velocity
 - (ii) velocity of sound
 - (iii) velocity of light
 - (iv) velocity of air
- 4 The angle of contact depends upon the
 - (i) nature of liquid
 - (ii) nature of solid
 - (iii) angle of inclination
 - (iv) both (i) & (ii)
- 5 The excess of pressure on a soap bubble is
 - (i) $\frac{2T}{R}$
 - (ii) $\frac{T}{R}$
 - (iii) $\frac{4T}{R}$
 - (iv) $\frac{3T}{R}$
- 6 The osmotic pressure of electrolytes is _____ than that of non-electrolytes under same temperature and concentration.
 - (i) lesser
 - (ii) higher
 - (iii) much higher
 - (iv) equal to
- 7 The natural frequency of a stretched string is
 - (i) $n = \frac{1}{2l} \sqrt{\frac{m}{T}}$
 - (ii) $n = \frac{1}{2l} \sqrt{\frac{T}{m}}$
 - (iii) $n = \frac{1}{2\pi} \sqrt{\frac{g}{l}}$
 - (iv) $n = \frac{1}{2\pi} \sqrt{\frac{l}{g}}$
- 8 In Doppler effect, when the course and observer move away from each other than apparent pitch is
 - (i) $\left(\frac{V-b}{V-a}\right)^n$
 - (ii) $\left(\frac{V+b}{V+a}\right)^n$
 - (iii) $\left(\frac{V-b}{V+a}\right)^n$
 - (iv) $\left(\frac{V+b}{V-a}\right)^n$

- 9 The frequency of ultrasonic waves produced by magnetostriction oscillator depends on _____ of the material of the bar.
 (i) length (ii) density
 (iii) elasticity (iv) all the above
- 10 Which of the following materials has lowest absorption coefficient with a source of frequency 512 Hz?
 (i) Concrete (ii) Asbestos
 (iii) Marble (iv) Glass

SECTION - B (35 Marks)

Answer **ALL** Questions

ALL Questions Carry **EQUAL** Marks (5 x 7 = 35)

- 11 a A steel bar is suspended in a horizontal position by a vertical wire attached to its centre. A horizontal torque of moment 5 Nm twists the bar horizontally through an angle of 12° when the bar is released, it oscillates as a torsion pendulum with a period of $\frac{1}{2}$ s. Determine the moment of Inertia.
 OR
 b Describe Koenig's method of determining Young's modulus of the material of a beam.
- 12 a Derive the Meyer's formula for viscosity of gas.
 OR
 b State the different laws of osmotic pressure.
- 13 a Outline the concept of Angle of Contact.
 OR
 b How vapour pressure over flat surface is varied over curved surface?
- 14 a Outline the properties of Transverse waves.
 OR
 b Describe the closed end organ pipe and open end organ pipe.
- 15 a Give the principle and working of magnetostriction oscillator.
 OR
 b Bring out the features that an auditorium should have for good acoustics.

SECTION - C (30 Marks)

Answer any **THREE** Questions

ALL Questions Carry **EQUAL** Marks (3 x 10 = 30)

- 16 Applying the concept of bending beams for the determination of Young's modulus of a beam by cantilever loading.
- 17 Analyse the concept, the distance between the base of inner cylinder and the base of the outer cylinder is kept constant for the determination of viscosity of liquid by Rotation viscometer.
- 18 Discuss about the excess of pressure in liquid and air bubbles.
- 19 Applying the concept of Doppler effect in sound for obtaining an expression for the apparent frequency of the note when both source and observer in motion.
- 20 Obtain an expression for Sabine's reverberation time.