Mechanical Properties of Solids

Question 1.
The ratio of the change in dimension at right angles to the applied force to the initial dimension is known as
(a) Youngs modulus
(b) Poissions ratio
(c) Lateral strain
(d) Shearing strain

▼ Answer

Answer: (c) Lateral strain

Question 2.
Hookes law essentially defines
(a) Stress
(b) Strain
(c) Yield point
(d) Elastic limit

▼ Answer

Answer: (d) Elastic limit

Question 3.
Theoretical value of Poissions ratio lies between
(a) -1 to 0.5
(b) -1 to -2
(c) 0.5 to 1
(d) None

▼ Answer

Answer: (a) -1 to 0.5

Question 4.
A wire suspended vertically from one of its ends is stretched by attaching a weight of 100N to its lower end. What is the elastic potential energy stored in the wire, if the weight stretches the wire by 1.5 mm?
(a) 5 × 10-2 J
(b) 10-3 J
(c) 2.5 × 10-3 J
(d) 7.5 × 10-2 J

▼ Answer

Answer: (d) 7.5 × 10-2 J

Question 5.
An iron bar of length l m and cross section A m^2 is pulled by a force of F Newton from both ends so as to produce and elongation in meters. Which of the following statement statements is correct
(a) Elongation is inversely proportional to length l
(b) Elongation is directly proportional to cross section A

(c) Elongation is inversely proportional to A
(d) Elongation is directly proportional to Youngs modulus

▼ Answer

Answer: (c) Elongation is inversely proportional to A

Question 6.
Out of the following materials, whose elasticity is independent of temperature?
(a) Copper
(b) Invar steel
(c) Brass
(d) Silver

▼ Answer

Answer: (b) Invar steel

Question 7.
Longitudinal strain is possible in the case of
(a) Gases
(b) Liquid
(c) Only solids
(d) Only gases & liquids

▼ Answer

Answer: (c) Only solids

Question 8.
Two wires A and B are of the same length. The diameters are in the ratio 1 : 2 and the Youngs modulus are in ratio 2 : 1. if they are pulled by the same force, then their elongations will be in ratio
(a) 4 : 1
(b) 1 : 4
(c) 1 : 2
(d) 2 : 1

▼ Answer

Answer: (d) 2 : 1

Question 9.
A body of mass 500 g is fastened to one end of a steel wire of length 2 m and area of cross-section 2 mm^2. if the breaking stress of he wire is 1.25 × 107 N/m^2, then the maximum angular velocity with which the body can be rotated in a horizontal circle is
(a) 2 rad/s
(b) 3 rad/s
(c) 4 rad/s
(d) 5 rad/s

▼ Answer

Answer: (d) 5 rad/s

Question 10.
If a material is heated and annealed, then its elasticity is

(a) Increased
(b) Decreased
(c) Not change
(d) Becomes zero

▼ Answer

Answer: (b) Decreased

Question 11.
A wire suspended vertically from one of its ends is stretched by attaching a weight of 100N to its lower end. What is the elastic potential energy stored in the wire, if the weight stretches the wire by 1.5 mm?
(a) 5 × 10-2 J
(b) 10-3 J
(c) 2.5 × 10-3 J
(d) 7.5 × 10-2 J

▼ Answer

Answer: (d) 7.5 × 10-2 J

Question 12.
Out of the following materials, whose elasticity is independent of temperature?
(a) Copper
(b) Invar steel
(c) Brass
(d) Silver

▼ Answer

Answer: (b) Invar steel

Question 13.
When impurities are added to an elastic substance, its elasticity
(a) Increases
(b) Decreases
(c) Becomes zero
(d) May increase or decrease

▼ Answer

Answer: (d) May increase or decrease

Question 14.
A body of mass 1 kg is attached to one end of a wire and rotated in horizontal circle of diameter 40 cm with a constant speed of 2 m/s. what is the area of cross-section of the wire if the stress developed in the wire is 5 × 106 N/m²?
(a) 2 mm²
(b) 3 mm²
(c) 4 mm²
(d) 5 mm²

▼ Answer

Answer: (c) 4 mm²

Question 15.
The ratio of the change in dimension at right angles to the applied force to the initial dimension is known as
(a) Youngs modulus
(b) Poissions ratio
(c) Lateral strain
(d) Shearing strain

▼ Answer

Answer: (c) Lateral strain

Question 16.
What is the energy stored per unit volume in a copper wire, which produces longitudinal strain of 0.1%. [Y = 1.1 × 1011 N/m²]
(a) 11 × 103 J/m³
(b) 5.5 × 103 J/m³
(c) 11 × 104 J/m³
(d) 5.5 × 104 J/m³

▼ Answer

Answer: (d) 5.5 × 104 J/m³

Question 17.
The following four wires of length L and the radius r are made of same material. Which of these will have the largest extension when the same tension is applied.
(a) L = 50 cm, r = 0.25 mm
(b) L = 100 cm, r = 0.5 mm
(c) L = 200 cm, r = 1 mm
(d) L = 3000 cm, r = 1.5 mm

▼ Answer

Answer: (d) L = 3000 cm, r = 1.5 mm

Question 18.
The change in the shape of a regular boy is due to
(a) Bulk strain
(b) Shearing strain
(c) Longitudinal strain
(d) Volume strain

▼ Answer

Answer: (b) Shearing strain

Question 19.
The modulus of elasticity is dimensionally equivalent to
(a) Strain
(b) Stress
(c) Surface tension
(d) Poissions ratio

▼ Answer

Answer: (b) Stress

Question 20.
Longitudinal strain is possible in the case of
(a) Gases
(b) Liquid
(c) Only solids
(d) Only gases & liquids

▼ Answer

Answer: (c) Only solids