

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) Poissons ratio
- (c) Lateral strain
- (d) Shearing strain

▼ Answer

Answer: (c) Lateral strain

Question 2.

Hooke's law essentially defines

- (a) Stress
- (b) Strain
- (c) Yield point
- (d) Elastic limit

▼ Answer

Answer: (d) Elastic limit

Question 3.

Theoretical value of Poisson's 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 m² is pulled by a force of F Newton from both ends so as to produce an elongation in meters. Which of the following 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 Young's 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 Young's 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 the wire is $1.25 \times 10^7 \text{ N/m}^2$, 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 5×10^6 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) Young's modulus
- (b) Poisson's 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%. [$Y = 1.1 \times 10^{11} \text{ N/m}^2$]

- (a) $11 \times 10^3 \text{ J/m}^3$
- (b) $5.5 \times 10^3 \text{ J/m}^3$
- (c) $11 \times 10^4 \text{ J/m}^3$
- (d) $5.5 \times 10^4 \text{ J/m}^3$

▼ Answer

Answer: (d) $5.5 \times 10^4 \text{ J/m}^3$

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) $L = 50 \text{ cm}$, $r = 0.25 \text{ mm}$
- (b) $L = 100 \text{ cm}$, $r = 0.5 \text{ mm}$
- (c) $L = 200 \text{ cm}$, $r = 1 \text{ mm}$
- (d) $L = 3000 \text{ cm}$, $r = 1.5 \text{ mm}$

▼ Answer

Answer: (d) $L = 3000 \text{ cm}$, $r = 1.5 \text{ mm}$

Question 18.

The change in the shape of a regular body 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) Poisson's 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

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