

# **CLASS XI PHY CH: 8**

## **SET 3 – Mechanical Properties of Solids**

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1. The stress applied per unit area is measured in —

- (a) Pascal (Pa)
  - (b) Joule (J)
  - (c) Newton (N)
  - (d)  $\text{m/s}^2$
- 

2. The strain produced in a body is —

- (a) The ratio of change in dimension to original dimension
  - (b) The ratio of force to area
  - (c) Product of stress and modulus
  - (d) Reciprocal of stress
- 

3. The SI unit of Young's modulus is —

- (a)  $\text{N/m}^2$
  - (b)  $\text{N/m}^3$
  - (c)  $\text{J/m}^3$
  - (d)  $\text{N}\cdot\text{m}$
- 

4. The dimensional formula of Young's modulus is —

- (a)  $[\text{ML}^{-1}\text{T}^{-2}]$
  - (b)  $[\text{MLT}^{-2}]$
  - (c)  $[\text{M}^0\text{L}^0\text{T}^0]$
  - (d)  $[\text{M}^{-1}\text{L}^3\text{T}^{-2}]$
- 

5. The property of a material to regain its shape after removing the deforming force is called —

- (a) Elasticity
  - (b) Plasticity
  - (c) Ductility
  - (d) Rigidity
- 

6. The material which can be drawn into wires is called —

- (a) Ductile
- (b) Brittle
- (c) Malleable
- (d) Hard

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**7.** The material which can be hammered into sheets is called —

- (a) Malleable
  - (b) Ductile
  - (c) Elastic
  - (d) Brittle
- 

**8.** Which of the following is most ductile?

- (a) Gold
  - (b) Copper
  - (c) Aluminium
  - (d) Lead
- 

**9.** Hooke's law is valid up to —

- (a) Elastic limit
  - (b) Breaking point
  - (c) Plastic limit
  - (d) Yield point
- 

**10.** The ratio of stress to strain is constant within —

- (a) Elastic limit
  - (b) Plastic limit
  - (c) Breaking point
  - (d) None
- 

**11.** Stress is —

- (a) Force per unit area
  - (b) Area per unit force
  - (c) Force  $\times$  area
  - (d) Energy per unit volume
- 

**12.** Strain is —

- (a) Change in dimension/original dimension
  - (b) Force per unit area
  - (c) Product of stress and force
  - (d) Energy per unit volume
-

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**13.** The slope of stress–strain curve in the elastic region gives —

- (a) Young's modulus
  - (b) Bulk modulus
  - (c) Shear modulus
  - (d) Poisson's ratio
- 

**14.** Hooke's law states —

- (a) Stress  $\propto$  Strain
  - (b) Stress  $\propto$  Strain<sup>2</sup>
  - (c) Stress  $\propto$  1/Strain
  - (d) Stress = constant
- 

**15.** The limit beyond which a body does not return to its original shape is —

- (a) Elastic limit
  - (b) Proportional limit
  - (c) Yield point
  - (d) Breaking point
- 

**16.** The work done per unit volume to stretch a wire is —

- (a)  $\frac{1}{2} \times \text{Stress} \times \text{Strain}$
  - (b) Stress  $\times$  Strain
  - (c) Force  $\times$  Distance
  - (d) Stress / Strain
- 

**17.** A body is said to be perfectly elastic if —

- (a) It regains its original shape completely
  - (b) It partially regains its shape
  - (c) It does not regain at all
  - (d) It breaks easily
- 

**18.** A body is said to be perfectly plastic if —

- (a) It does not regain its shape at all
  - (b) It regains completely
  - (c) It returns partially
  - (d) It deforms temporarily
-

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**19.** The slope of the straight-line portion of stress–strain curve represents —

- (a) Modulus of Elasticity
  - (b) Shear Modulus
  - (c) Bulk Modulus
  - (d) Rigidity
- 

**20.** The point where permanent deformation begins is —

- (a) Yield point
  - (b) Elastic limit
  - (c) Breaking point
  - (d) Plastic limit
- 

**21.** The stress corresponding to the breaking point is called —

- (a) Breaking stress
  - (b) Yield stress
  - (c) Ultimate stress
  - (d) Elastic stress
- 

**22.** The ratio of lateral strain to longitudinal strain is —

- (a) Poisson's ratio
  - (b) Bulk modulus
  - (c) Young's modulus
  - (d) Strain ratio
- 

**23.** The unit of strain energy per unit volume is —

- (a)  $\text{J/m}^3$
  - (b)  $\text{N/m}^2$
  - (c)  $\text{N/m}^3$
  - (d) Pa
- 

**24.** The stress required to double the length of a wire of Young's modulus  $Y$  is —

- (a)  $Y$
  - (b)  $2Y$
  - (c)  $Y/2$
  - (d)  $\frac{1}{2}Y$
-

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**25.** A material with large Young's modulus is —

- (a) Hard to stretch
  - (b) Easy to stretch
  - (c) Very plastic
  - (d) Easily compressible
- 

**26.** Bulk modulus is the ratio of —

- (a) Volume stress to volume strain
  - (b) Shear stress to shear strain
  - (c) Longitudinal stress to longitudinal strain
  - (d) Force to area
- 

**27.** For an incompressible fluid, bulk modulus is —

- (a) Infinite
  - (b) Zero
  - (c) Finite
  - (d) Negative
- 

**28.** The bulk modulus of air is —

- (a) Small
  - (b) Large
  - (c) Infinite
  - (d) Zero
- 

**29.** The ratio of change in volume to original volume is called —

- (a) Volumetric strain
  - (b) Shear strain
  - (c) Longitudinal strain
  - (d) Lateral strain
- 

**30.** The ratio of shear stress to shear strain is called —

- (a) Modulus of rigidity
  - (b) Bulk modulus
  - (c) Poisson's ratio
  - (d) Elastic limit
-

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**31.** For gases, the modulus of rigidity is —

- (a) Zero
  - (b) Infinite
  - (c) Finite
  - (d) Negative
- 

**32.** The maximum stress a material can withstand is called —

- (a) Breaking stress
  - (b) Yield stress
  - (c) Elastic stress
  - (d) Ultimate stress
- 

**33.** The stress–strain curve of a ductile material shows —

- (a) Elastic, yield, plastic, and fracture regions
  - (b) Only elastic region
  - (c) Only plastic region
  - (d) No definite shape
- 

**34.** The area under the stress–strain curve represents —

- (a) Energy stored per unit volume
  - (b) Work per unit length
  - (c) Force  $\times$  displacement
  - (d) Volume energy
- 

**35.** The Poisson's ratio for steel is approximately —

- (a) 0.3
  - (b) 0.5
  - (c) 0.1
  - (d) 0.7
- 

**36.** The Poisson's ratio for cork is approximately —

- (a) 0
  - (b) 0.5
  - (c) 1
  - (d) 0.3
-

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**37.** The relationship among  $Y$ ,  $K$ , and  $G$  is —

- (a)  $Y = 9KG / (3K + G)$
  - (b)  $Y = 3KG / (K + 3G)$
  - (c)  $Y = 2KG / (3K - G)$
  - (d)  $Y = K + G$
- 

**38.** The relation among  $Y$ ,  $K$ , and Poisson's ratio ( $\sigma$ ) is —

- (a)  $Y = 3K(1 - 2\sigma)$
  - (b)  $Y = K(1 - \sigma)$
  - (c)  $Y = 9K(1 + \sigma)$
  - (d)  $Y = 2K(1 + \sigma)$
- 

**39.** The work done per unit volume for stress  $S$  and strain  $e$  is —

- (a)  $\frac{1}{2}Se$
  - (b)  $Se$
  - (c)  $S/e$
  - (d)  $e/S$
- 

**40.** The property by which a body resists deformation is —

- (a) Rigidity
  - (b) Elasticity
  - (c) Plasticity
  - (d) Brittleness
- 

**41.** A perfectly rigid body has —

- (a) Infinite Young's modulus
  - (b) Zero Young's modulus
  - (c) Finite modulus
  - (d) None
- 

**42.** A perfectly plastic body has —

- (a) Zero modulus of elasticity
  - (b) Infinite modulus of elasticity
  - (c) Constant modulus
  - (d) Negative modulus
-

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**43.** In an elastic material, stress and strain are —

- (a) Directly proportional
  - (b) Inversely proportional
  - (c) Equal
  - (d) Constant
- 

**44.** The point on stress–strain curve corresponding to permanent deformation is —

- (a) Yield point
  - (b) Breaking point
  - (c) Elastic limit
  - (d) Proportional limit
- 

**45.** In Hooke's law, the proportionality constant is —

- (a) Young's modulus
  - (b) Shear modulus
  - (c) Bulk modulus
  - (d) Poisson's ratio
- 

**46.** Elasticity of steel is greater than that of rubber because —

- (a) Steel has greater Young's modulus
  - (b) Rubber has smaller Young's modulus
  - (c) Both (a) and (b)
  - (d) None
- 

**47.** The unit of modulus of rigidity is —

- (a)  $\text{N/m}^2$
  - (b)  $\text{N/m}^3$
  - (c)  $\text{J/m}^3$
  - (d)  $\text{N}\cdot\text{m}$
- 

**48.** The highest value of Poisson's ratio for a stable material is —

- (a) 0.5
  - (b) 1
  - (c) 0
  - (d) 2
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49. Stress is directly proportional to —

- (a) Force
  - (b) Area
  - (c) Strain
  - (d) Length
- 

50. Rubber is less elastic than steel because —

- (a) It has smaller Young's modulus
  - (b) It stretches more for the same stress
  - (c) It obeys Hooke's law poorly
  - (d) All of these
- 

## Answer Key – SET 3

- 1 (a) 2 (a) 3 (a) 4 (a) 5 (a) 6 (a) 7 (a) 8 (a) 9 (a) 10 (a)  
11 (a) 12 (a) 13 (a) 14 (a) 15 (a) 16 (a) 17 (a) 18 (a) 19 (a) 20 (a)  
21 (a) 22 (a) 23 (a) 24 (a) 25 (a) 26 (a) 27 (a) 28 (a) 29 (a) 30 (a)  
31 (a) 32 (a) 33 (a) 34 (a) 35 (a) 36 (a) 37 (a) 38 (a) 39 (a) 40 (a)  
41 (a) 42 (a) 43 (a) 44 (a) 45 (a) 46 (c) 47 (a) 48 (a) 49 (c) 50 (d)