CLASS XI PHY CH: 8

SET 1 – Mechanical Properties of Solids

---

1. The property by which a body regains its original shape after the removal of deforming force is called —
(a) Plasticity
(b) Elasticity
(c) Rigidity
(d) Brittleness

---

2. The ratio of stress to strain is known as —
(a) Young's modulus
(b) Shear modulus
(c) Bulk modulus
(d) Modulus of rigidity

---

3. Stress is defined as —
(a) Force per unit area
(b) Change in length per unit length
(c) Force per unit mass
(d) Pressure × volume

---

4. The SI unit of stress is —
(a) N/m^2 or Pascal
(b) N/m
(c) J/m^3
(d) $N \cdot m$

---

5. Strain is —
(a) Dimensionless quantity
(b) Having the unit of N/m^2
(c) Having the unit of J/m^3
(d) A vector

---

6. The ratio of change in length to the original length is called —
(a) Longitudinal strain
(b) Shear strain
(c) Volume strain
(d) Surface strain

CLASS XI PHY CH: 8

---

7. Hooke's law states that —
(a) Stress ∝ Strain
(b) Stress ∝ Strain²
(c) Strain ∝ 1/Stress
(d) Stress = constant

---

8. The proportional limit is the point —
(a) Up to which Hooke's law is valid
(b) Where strain becomes maximum
(c) Beyond which the body breaks
(d) At which stress is maximum

---

9. Elastic limit is the point —
(a) Up to which the body regains its original shape
(b) Where permanent deformation starts
(c) Where stress = strain
(d) At which energy is minimum

---

10. Permanent deformation occurs when —
(a) Elastic limit is crossed
(b) Within proportional limit
(c) Force is zero
(d) Stress is small

---

11. The slope of stress–strain curve in elastic region represents —
(a) Young's modulus
(b) Modulus of rigidity
(c) Bulk modulus
(d) Poisson's ratio

---

12. Young's modulus (Y) =
(a) Stress / Strain
(b) Strain / Stress
(c) Force × Area
(d) Stress × Strain

CLASS XI PHY CH: 8

13. The SI unit of Young's modulus is —
(a) N/m^2
(b) N/m^3
(c) J/m^3
(d) Pa^{-1}

---

14. Hooke's law fails when —
(a) Stress exceeds elastic limit
(b) Stress = 0
(c) Force is very small
(d) Strain = 0

---

15. The dimensional formula of stress is —
(a) $[ML^{-1}T^{-2}]$
(b) $[MLT^{-2}]$
(c) $[M^{-1}L^{3}T^{-2}]$
(d) $[M^{0}L^{0}T^{0}]$

---

16. The work done per unit volume in stretching a wire is —
(a) ½ × Stress × Strain
(b) Stress × Strain
(c) Force × Distance
(d) Stress / Strain

---

17. In case of shear strain, there is change in —
(a) Shape only
(b) Volume only
(c) Length and volume
(d) Density

---

18. When equal and opposite forces act tangentially to a surface, they produce —
(a) Shear stress
(b) Tensile stress
(c) Bulk stress
(d) Longitudinal stress

CLASS XI PHY CH: 8

19. The ratio of lateral strain to longitudinal strain is called —
(a) Poisson's ratio
(b) Young's modulus
(c) Bulk modulus
(d) Modulus of rigidity

---

20. The maximum value of Poisson's ratio is —
(a) 0.5
(b) 1
(c) 0.25
(d) 2

---

21. The dimensional formula of modulus of elasticity is —
(a) $[ML^{-1}T^{-2}]$
(b) $[MLT^{-2}]$
(c) $[M^{-1}L^{3}T^{-2}]$
(d) $[M^{0}L^{0}T^{0}]$

---

22. The bulk modulus (K) is defined as —
(a) Volume stress / Volume strain
(b) Stress / Strain
(c) Force × Area
(d) Stress × Strain

---

23. Bulk modulus is large for —
(a) Steel
(b) Rubber
(c) Water
(d) Air

---

24. A substance having large bulk modulus is —
(a) Incompressible
(b) Compressible
(c) Elastic
(d) Plastic

CLASS XI PHY CH: 8

25. The SI unit of bulk modulus is —
(a) N/m²
(b) N/m³
(c) m²/N
(d) J/m³

---

26. Shear modulus (G) is the ratio of —
(a) Shear stress to shear strain
(b) Volume stress to volume strain
(c) Tensile stress to tensile strain
(d) Force to volume

---

27. For an ideal fluid, shear modulus is —
(a) Zero
(b) Infinity
(c) Finite
(d) Undefined

---

28. Poisson's ratio has —
(a) No unit
(b) Unit of N/m²
(c) Unit of J/m³
(d) Dimension of time

---

29. For an incompressible liquid, Poisson's ratio is —
(a) 0.5
(b) 1
(c) 0
(d) ∞

---

30. The relationship between Y, K, and G is —
(a) Y = 9KG / (3K + G)
(b) Y = 3KG / (3K + G)
(c) Y = 2KG / (3K − G)
(d) Y = K + G

CLASS XI PHY CH: 8

31. The relation between Y, K, and Poisson's ratio (σ) is —
(a) $Y = 3K(1 - 2\sigma)$
(b) $Y = K(1 - \sigma)$
(c) $Y = 2K(1 + \sigma)$
(d) $Y = 9K(1 - \sigma)$

---

32. The stress at which a wire begins to flow is called —
(a) Yield point
(b) Breaking point
(c) Elastic limit
(d) Proportional limit

---

33. The point at which a wire breaks is known as —
(a) Breaking point
(b) Elastic limit
(c) Yield point
(d) Ultimate limit

---

34. The slope of stress–strain curve beyond elastic limit —
(a) Decreases
(b) Increases
(c) Remains same
(d) Becomes infinite

---

35. Rubber has —
(a) High strain, low stress
(b) Low strain, high stress
(c) Both high stress and strain
(d) No elasticity

---

36. Steel is more elastic than rubber because —
(a) Y (Young's modulus) of steel is greater
(b) Y of rubber is small
(c) Both (a) and (b)
(d) None

CLASS XI PHY CH: 8

37. Elastic potential energy per unit volume =
(a) ½ × Stress × Strain
(b) Stress × Strain
(c) Stress / Strain
(d) Force × Strain

---

38. Which one of the following has the greatest elasticity?
(a) Steel
(b) Copper
(c) Glass
(d) Rubber

---

39. The breaking stress of a wire depends on —
(a) Nature of material
(b) Area of cross-section
(c) Both (a) and (b)
(d) Temperature

---

40. The elastic limit of steel is —
(a) High
(b) Low
(c) Same as rubber
(d) Zero

---

41. In Hooke's law, if stress is doubled, strain —
(a) Doubles
(b) Halves
(c) Remains constant
(d) Becomes zero

---

42. The unit of strain energy per unit volume is —
(a) J/m^3
(b) N/m^2
(c) Pa
(d) N/m^3

CLASS XI PHY CH: 8

43. Permanent deformation occurs when —
(a) Stress exceeds elastic limit
(b) Within elastic limit
(c) Force = 0
(d) At equilibrium

---

44. The substance with highest value of Young's modulus is —
(a) Steel
(b) Copper
(c) Lead
(d) Aluminium

---

45. The curve between stress and strain is —
(a) Straight line within elastic limit
(b) Parabola
(c) Circle
(d) Hyperbola

---

46. The point where stress is maximum is —
(a) Breaking point
(b) Elastic limit
(c) Yield point
(d) Proportional limit

---

47. For gases, bulk modulus is —
(a) Very small
(b) Very large
(c) Zero
(d) Infinity

---

48. Rubber is less elastic because —
(a) Its Y is small
(b) Its strain is large
(c) It does not obey Hooke's law
(d) All the above

CLASS XI PHY CH: 8

49. Modulus of rigidity (G) is also called —
(a) Shear modulus
(b) Bulk modulus
(c) Young's modulus
(d) Tangential modulus

---

50. In Hooke's law, stress and strain are —
(a) Directly proportional within elastic limit
(b) Inversely proportional
(c) Equal
(d) Independent

✅ Answer Key – SET 1

1 (b)	2 (a)	3 (a)	4 (a)	5 (a)	6 (a)	7 (a)	8 (a)	9 (b)	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 (c)	37 (a)	38 (a)	39 (c)	40 (a)
41 (a)	42 (a)	43 (a)	44 (a)	45 (a)	46 (a)	47 (a)	48 (d)	49 (a)	50 (a)