

Stress and Strain

1) Stress is

- External force
- Internal resistive force
- Axial force
- Radial force

2) Following are the basic types of stress except

- Tensile stress
- Compressive stress
- Shear stress
- Volumetric stress

3) When tensile stress is applied axially on a circular rod its

- diameter decreases
- length increases
- volume decreases

Which of the above are true?

- Only i
- Only ii
- i & ii
- All of the above

4) When tensile stress is applied axially on a circular rod its

- diameter increases
- length decreases
- volume decreases

Which of the above are true?

- Only i
- Only ii
- i & ii
- All of the above

5) Which of the following is not a basic type of strain?

- Compressive strain
- Shear strain
- Area strain
- Volume strain

6) Tensile Strain is

- Increase in length / original length
- Decrease in length / original length
- Change in volume / original volume
- All of the above

7) Compressive Strain is

- Increase in length / original length
- Decrease in length / original length
- Change in volume / original volume
- All of the above

8) Volumetric Strain is

- Increase in length / original length
- Decrease in length / original length
- Change in volume / original volume
- All of the above

9) Hooke's law is applicable within

- Elastic limit
- Plastic limit
- Fracture point
- Ultimate strength

(Ans:a)

10) Young's Modulus of elasticity is

- Tensile stress / Tensile strain
- Shear stress / Shear strain
- Tensile stress / Shear strain
- Shear stress / Tensile strain

11) Bulk modulus of elasticity is

- Tensile stress / Tensile strain
- Shear stress / Shear strain
- Tensile stress / Shear strain
- Normal stress on each face of cube / Volumetric strain

12) Factor of safety is

- Tensile stress / Permissible stress
- Compressive stress / Ultimate stress
- Ultimate stress / Permissible stress
- Ultimate stress / Shear stress

13) Poisson's ratio is

- Lateral strain / Longitudinal strain
- Shear strain / Lateral strain
- Longitudinal strain / Lateral strain
- Lateral strain / Volumetric strain

(Ans:a)

14) A rod, 120cm long and of diameter 3.0 cm is subjected to an axial pull of 18 kN. The stress in N/mm² is.

- 22.57
- 23.47
- 24.57
- 25.47

15) The total extension in a bar, consists of 3 bars of same material, of varying sections is

a) $P/E(L_1/A_1+L_2/A_2+L_3/A_3)$

b) $P/E(L_1A_1+L_2A_2+L_3A_3)$

c) $PE(L_1/A_1+L_2/A_2+L_3/A_3)$

d) $PE(L_1/A_1 + L_2/A_2 + L_3/A_3)$

Where P=Load applied, E=young's modulus for the bar, L_{1,2,3}=Length of corresponding bars, A_{1,2,3}=Area of corresponding bars

(Ans:a)

16) The relationship between Young's modulus (E), Bulk modulus (K) and Poisson's ratio (μ) is given by

- $E = 2K(1 - 2\mu)$
- $E = 3K(1 - 2\mu)$
- $E = 2K(1 - 2\mu)$
- $E = 2K(1 - 3\mu)$

17) The relationship between Young's modulus (E), Modulus of rigidity (C) and Bulk modulus (K) is given by

- $E = 9CK / (C + 3K)$
- $E = 9CK / (2C + 3K)$
- $E = 9CK / (3C + K)$
- $E = 9CK / (C - 3K)$

18) The total extension of a taper rod of length 'L' and end diameters 'D₁' and 'D₂', subjected to a load (P), is given of

- $4PL / \pi E \cdot D_1 D_2$
- $3PL / \pi E \cdot D_1 D_2$
- $2PL / \pi E \cdot D_1 D_2$
- $PL / \pi E \cdot D_1 D_2$

Where E=Young's modulus of elasticity

19) A rod 3 m long is heated from 10°C to 90°C. Find the expansion of rod. Take Young's modulus = 1.0×10^5 MN/m² and coefficient of thermal expansion = 0.000012 per degree centigrade.

1. 0.168 cm
2. 0.208 cm
3. 0.288 cm
4. 0.348 cm

20) Elongation of a bar of uniform cross section of length 'L', due to its own weight 'W' is given by

- a) $2WL/E$
- b) WL/E
- c) $WL/2E$
- d) $WL/3E$

Where, E = Young's modulus of elasticity of material

Answers:

b,d,c,c,c,a,b,c,a,a,d,c,a,d,a,b,a,a,c,c