SHAHEEN GROUP OF INSTITUTIONS
Bidar (Head Office)

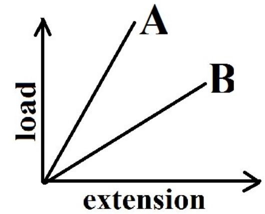
Class : NEET Repeaters   Sub: Physics   Worksheet   Date: 04-11-2019

Mechanical Properties of Solids

1. The lower surface of a cube is fixed. On its upper surface, force is applied at an angle of 30^o from its surface. The change will be in its
(A) shape (B) size (C) volume (D) both shape and size

2. For steel, the breaking stress is 6×10^6 N/m^2 and the density is 8×10^3 kg/m^3. The maximum length of steel wire, which can be suspended without breaking under its own weight is [g = 10 m/s^2]
(A) 140 m (B) 120 m (C) 75 m (D) 200 m

3. The dimensions of two wires A and B are the same. But their materials are different. The load-extension graphs are shown. If Y_A and Y_B are the values of Young's modulus of elasticity of A and B respectively then
(A) $Y_A > Y_B$
(B) $Y_A < Y_B$
(C) $Y_A = Y_B$
(D) $Y_B = 2Y_A$



4. A wire elongates by ℓ mm when a load W is hanged from it. If the wire goes over a pulley and two weights W each are hung at the two ends, the elongation of the wire will be (in mm) –
(A) ℓ (B) 2ℓ (C) zero (D) $\ell/2$

5. The Young's modulus of a rubber string 8cm long and density 1.5 kg/m^3 is 5×10^8 N/m^2, is suspended on the ceiling in a room. The increase in length due to its own weight will be
(A) 9.6×10^{-5} m (B) 9.6×10^{-11} m (C) 9.6×10^{-3} m (D) 9.6 m

6. Two wires of the same material and length but diameters in the ratio 1:2 are stretched by the same force. The potential energy per unit volume for the two wires when stretched will be in the ratio.
(A) 16 : 1 (B) 4 : 1 (C) 2 : 1 (D) 1 : 1

7. When a tension F is applied in uniform wire of length ℓ and radius r, the elongation produced is e. When tension 2F is applied, the elongation produced in another uniform wire of length 2ℓ and 2r made of same material is
(A) 0.5e (B) 1.0e (C) 1.5e (D) 2.0e

8. If the interatomic spacing in a steel wire is 2.8×10^{-10}m and $Y_{steel} = 2 \times 10^{11}$ N/m^2, then force constant in N/m is –

(A) 5.6 (B) 56 (C) 0.56 (D) 560

9. For a given material, the Young's modulus is 2.4 times that of rigidity modulus. Its Poisson's ratio is

(A) 2.4 (B) 1.2 (C) 0.4 (D) 0.2

10. If 'S' is stress and 'Y' is Young's modulus of material of a wire, the energy stored in the wire per unit volume is

(A) $\frac{S}{2Y}$ (B) $\frac{2Y}{S^2}$ (C) $\frac{S^2}{2Y}$ (D) $2S^2Y$

11. The following four wires are made of the same material. Which of these will have the largest extension when the same tension is applied?

(A) length = 300cm, diameter = 3mm (B) length = 50cm, diameter = 0.5 mm

(C) length = 100cm, diameter = 1mm (D) length = 200cm, diameter = 2mm

12. Copper of fixed volume 'V'; is drawn into wire of length 'l'. When this wire is subjected to a constant force 'F', the extension produced in the wire is 'Δl'. Which of the following graphs is a straight line?

(A) Δl versus $\frac{1}{l}$ (B) Δl versus l^2 (C) Δl versus $\frac{l}{l^2}$ (D) Δl versus 1

13. The approximate depth of an ocean is 2700m. The compressibility of water is 45.4×10^{-11} Pa^{-1} and density of water is 10^3 kg/m^3. What fractional compression of water will be obtained at the bottom of the ocean?

(A) 1.0×10^{-2} (B) 1.2×10^{-2} (C) 1.4×10^{-2} (D) 0.8×10^{-2}

14. The Young's modulus of steel is twice that of brass. Two wires of same length and of same area of cross section, one of steel and another of brass are suspended from the same roof. If we want the lower ends of the wires to be at the same level, then the weights added to the steel and brass wires must be in the ratio of

(A) 1 : 1 (B) 1 : 2 (C) 2 : 1 (D) 4 : 1

15. Two wires are made of the same material and have the same volume. The first wire has cross-sectional area A and the second wire has cross-sectional area 3A. If the length of the first wire is increased by Δl on applying a force F, how much force is needed to stretch the second wire by the same amount?

(A) 9F (B) 6F (C) 4F (D) F

Physics Worksheet						Mechanical Properties of Solids								04-11-2019
1-D	2-C	3-A	4-A	5-B	6-A	7-B	8-B	9-D	10-C	11-B	12-B	13-B	14-C	15-A