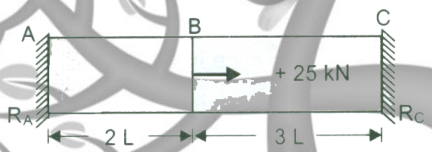
Q 1 Poisso's ratio is defined as the ratio of

a. Longitudinal stress and longitudinal strain
b. Lateral stress and longitudinal strain
c. Longitudinal stress and lateral stress
d. Lateral stress and longitudinal stress

Q 2 A prismatic bar ABC is subjected to an axial load of 25 kN; the reactions R_A and R_c will be



a. R_A = - 10 kN and R_c = - 15 kN
b. R_A = 10 kN and R_c = - 35 kN
c. R_A = - 15 kN and R_c = - 10 kN
d. R_A = 15 kN and R_c = - 40 kN

Q 3 Consider the following statement :

1. Failure occurs beyond elastic limit
2. Rupture takes place immediately after elastic limit
3. Permanent set occurs beyond elastic limit.

Which of these are considered in the theories of failure ?

a. 1, 2, and 3
b. 1 and 3 only
c. 2 and 3 only
d. 1 and 2 only

Q 4 Consider the following salient points in a stress-strain curve of a mild steel bar :

1. Yield point
2. Braking
3. Yield plateau
4. Proportionally limit
5. Ultimate point

The correct sequence in which they occur while testing the mild

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steel bar in tension from initial zero strain to failure is

a. 4, 1, 2, 3 and 5
b. 1, 4, 3, 5 and 2
c. 4, 1, 3, 5 and 2
d. 1, 4, 2, 3 and 5

Q 5 Two circular mild steel bars A and B of equal length *l* have diameters d_A = 2 cm and d_B = 3 cm. each is subjected to a tensile load of magnitude P. the ratio of the elongations of the bars l_A / l_B is

a. 2 / 3
b. 3 / 4
c. 4 / 9
d. 9 / 4

Q 6 A mild steel rod tapes uniformly from 24 mm dia. To 12 mm dia. Over its length of 400 mm. the rod when held vertical is subjected to an axial tensile load of 12 kN. E = 2 x 10^5 N/mm^2 the extension of the rod in mm would be

A. $\frac{3\pi}{2}$ B. $\frac{2}{3\pi}$

C. $\frac{\pi}{3}$ D. $\frac{1}{3\pi}$

Q 7 A member ABCD is subjected to a force system as shown in the figure

a. 365 (compressive)
b. 450 (tensile)
c. 85 (compressive)
d. 320 (compressive)

Q 8 Two-dimensional stress system on a block made of a material with poisson's ratio of 0.3 is shown in the figure

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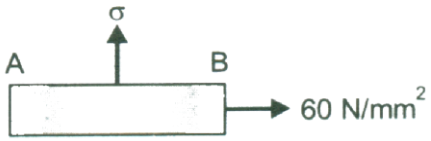


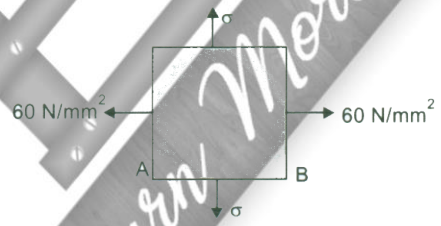
The limiting magnitude of the stress so as to result in on change in length AB of the block is

a. 60 N/mm^2
b. 120 N/mm^2
c. 200 N/mm^2
d. 240 N/mm^2

Q 9 Lead , as a material used in construction, has E = 15 Gpa and K = 50 Gpa. What is its poisson's ratio ?

a. 0.225
b. 0.30
c. 0.40
d. 0.45

Q 10 For a block with Young's modulus of its material being 210 Gpa and its poisson's ratio being 0.25, when subjected to a stress system as shown in the figure, what is the magnitude of the stress σ for no strain along AB?



a. 30 n/MM^2
b. 60 n/MM^2
c. 120 n/MM^2
d. 240 n/MM^2

Q 11 A solid conical bar of circular cross-section is suspended vertically as shown in the figure. The diameter of the bar at the base, D, equals 100 mm and its length L, is 0.5 m. if E = 200 GN/m^2 and its weight per unit volume is 80 kN/m^{3,} the elongation of the under self weight is

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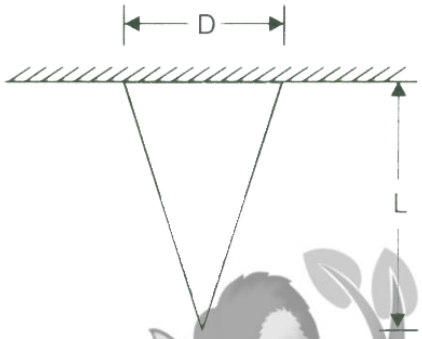
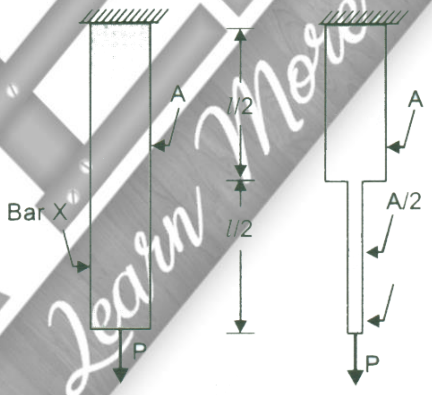


a. 1. 50 X 10^{-6} mm
b. 1. 67 X 10^{-5} mm
c. 1. 71 X 10^{-6} mm
d. 1. 87 X 10^{-5} mm

Q12 What is the ratio of the strain energy in bar X to that in bar Y when the material of the two bars is the same? The cross-sectional areas are as indicated over the indicated lengths.



a. 1 / 3
b. 2 / 3
c. 4 / 3
d. 1 / 6

Q 13 The symmetry of the stress tensor at a point in a body when at equilibrium is obtained from

a. Conservation of mass
b. Force equilibrium equations
c. Moment equilibrium equations
d. Conservation of energy

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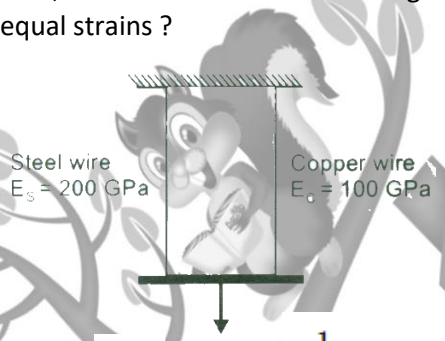
Q14 A mechanism shown in the figure consists of equally long steel and copper wires which carry the applied load in equal shares. What shall be the ratio of the diameter of the copper wire to that of the steel wire, when both the wires undergo equal strains ?



a. $\sqrt{2}$ b. $\frac{1}{\sqrt{2}}$

c. 1.0 d. 1/2

$\frac{1}{2}$

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