Mechanics of Materials (New Engine)

1 Multiple Choice 1 point

Calculator

5. A rectangular steel bar 37.5 mm wide and 50 mm thick is pinned at each end and subjected to axial compression. The bar has a length of 1.75 m. The modulus of elasticity is 200 GPa. What is most nearly the critical buckling load?

- 60 kN
- 140 kN
- 93 kN
- 110 kN

2 Multiple Choice 1 point

Calculator

A 1-ft rod with a diameter of 0.5 in. is subjected to a tensile force of 1,300 lb and has an elongation of 0.009 in. The modulus of elasticity (ksi) of the material is most nearly:

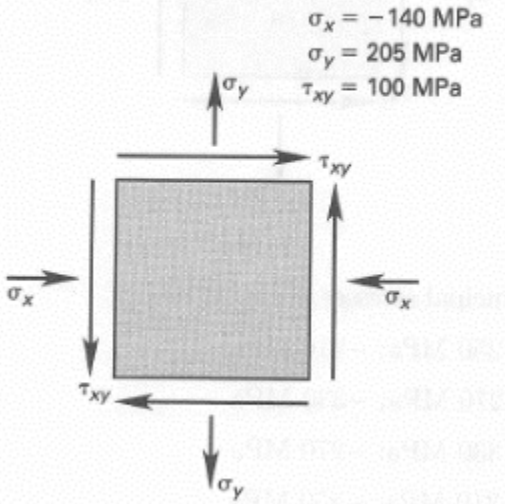
- 740 ksi
- 10,000 ksi
- 884 ksi
- 8,840 ksi

3

Multiple Choice 1 point

Calculator

1. The element is subjected to the plane stress condition shown.



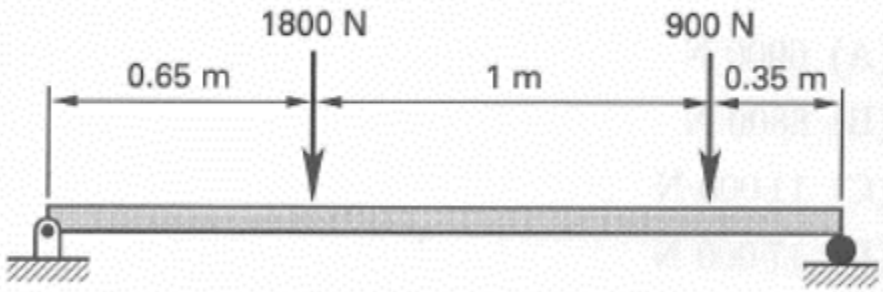
What is the maximum shear stress?

- 200 MPa
- 100 MPa
- 210 MPa
- 160 MPa

4 Multiple Choice 1 point

Calculator

3. Refer to the simply supported beam shown.



What is most nearly the maximum bending moment?

- 890 N·m
- 660 N·m
- 460 N·m
- 340 N·m

5 Multiple Choice 1 point

8. If δ is deformation, and L is the original length of the specimen, what is the definition of normal strain, ε?

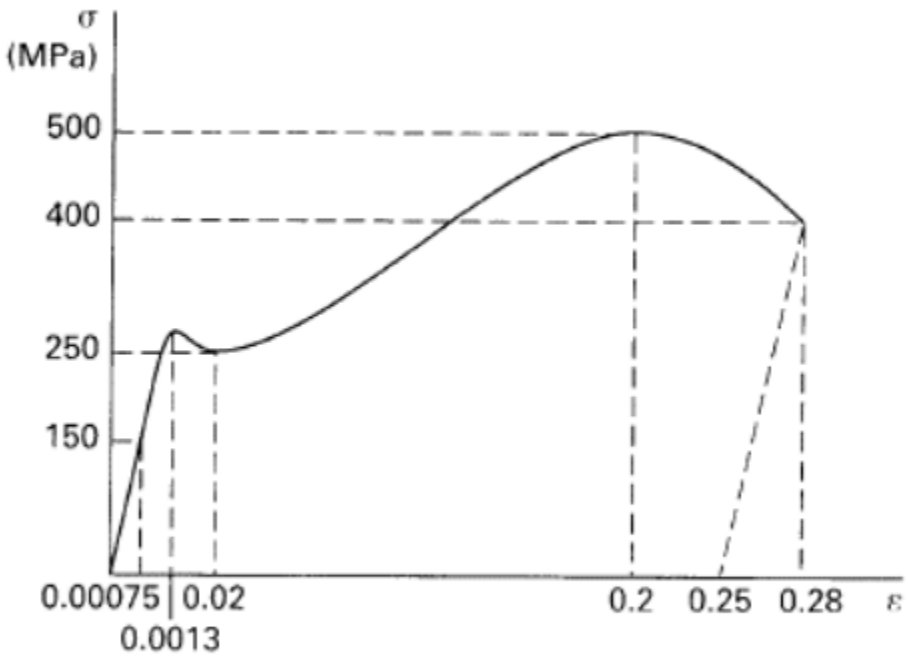
- $\varepsilon = \dfrac{\delta}{L}$
- $\varepsilon = \dfrac{L+\delta}{L}$
- $\varepsilon = \dfrac{L+\delta}{\delta}$
- $\varepsilon = \dfrac{\delta}{L+\delta}$

6

Multiple Choice 1 point

Calculator

10. A stress-strain diagram is shown.



What is most nearly the modulus of elasticity of the material?

- 100 GPa
- 20 GPa
- 200 GPa
- 80 GPa

7 Multiple Choice 1 point

Calculator

The following preliminary concrete mix has been designed assuming that the aggregates are in oven-dry condition.

Water = 305 lb/yd^3
Cement = 693 lb/yd^3
Coarse aggregate (SSD) = 1,674 lb/yd^3
Fine aggregate (SSD) = 1,100 lb/yd^3

The properties of the aggregates are:

Property	Coarse Aggregate	Fine Aggregate
Absorption (moisture content at SSD)	0.5%	0.7%
Moisture content as used in mix	2.0%	6.0%

The amount of water (lb/yd^3) that would be used in the final mix is most nearly:

- 388
- 222
- 206
- 305