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Courses » **Mechanics Of Materials** Announcements **Course** Ask a Question Progress Mentor

Unit 9 - Week 7 -Stresses and deflection in homogeneous beams loaded about one principal axis

Course outline

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Week 1

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Week 4-Concept of strain

Week 5- Constitutive relation, strain energy and potential

Week 6- Displacement due to uniaxial loading, temperature and bending

Week 7 -Stresses and deflection in homogeneous beams loaded about one principal axis

- Shear force and bending moment diagram
- Variation of axial stress
- Deflected shape and rotation of cross section
- Expression to find shear stress

Assignment 7

The due date for submitting this assignment has passed. **Due on 2018-03-14, 23:59 IST.**

Submitted assignment

Based on the data given in question 1, answer the following question up to 4

1)

A simply supported beam 6m long is to carry a downward acting uniformly distributed load of 7 kN/m including the weight of the beam. The load is acting in the principal plane of the cross section. If the wooden beam has a rectangular cross section with depth by width ratio $h/b = 1.2$ and the allowable tensile and compressive axial stress in the beam is, $\sigma_w = 8.4$ MPa. Find the following:

The maximum bending moment in the beam is _____ kNm

Hint

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Numeric) 31.5

5 points

2) The magnitude of the reaction force acting at the supports is _____ kN

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Numeric) 21

5 points

3) The minimum required h is _____ cm

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Numeric) 30

5 points

- Finding centroid of a cross section
- Parallel axis theorem and its application
- Vertical shear stress in I section
- Horizontal shear stress in I section
- Connection design
- Quiz : Assignment 7
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Week 8 - Stresses and deflection in beams loaded about one principal axis

week 9: Stresses and deflection in beams not loaded about principal axis

Week 10: Stresses and displacement due to torsion or inflation

Week 11

Week 12 - Buckling of columns

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Notes

4) The maximum shear stress in the beam with the above determined h is _____ kPa

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Numeric) 420

5 points

5)

The magnitude of the maximum bending stress that will be induced in a steel wire of diameter $d = 0.8$ mm if it is wound on a drum of diameter $D = 50$ cm, assuming that the material behaves elastically with Young's modulus, $E_s = 200$ GPa is _____ MPa

No, the answer is incorrect.

Score: 0

Accepted Answers:

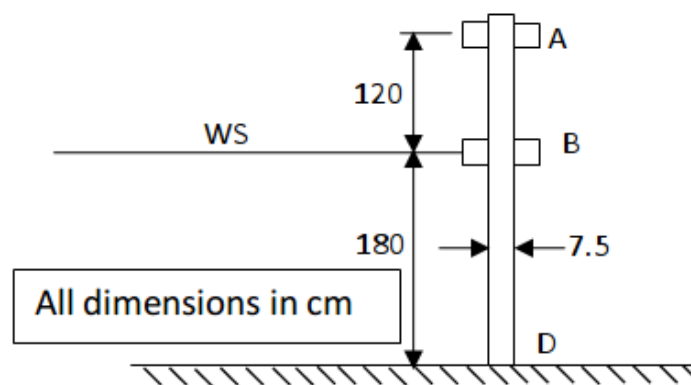
(Type: Numeric) 320

10 points

Based on the data given in question 6, answer the following up to question 17

6)

A temporary dam in a water channel is formed by setting vertical 7.5×30 cm planks between guide rails AA and BB as shown in figure. Assuming no support at D, calculate the following when the water depth on the left side of the dam is 1.8 m as shown, Young's Modulus of wood, $E_w = 20$ GPa, density of water is $\rho_w = 1000$ kg/m³ and acceleration due to gravity, $g = 10$ m/s²:



Water pressure at D is _____ kPa

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Numeric) 18

5 points

7) Magnitude of the reaction force at A _____ kN

Hint

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 4.76,4.96

5 points

8) Magnitude of the reaction force at B _____ kN

Hint

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 9.62,9.82

5 points

9) Magnitude of the bending moment at A _____ kNm

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Numeric) 0

5 points

10) Magnitude of the bending moment at B _____ kNm

Hint

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 5.73,5.93

5 points

11) Magnitude of the bending moment at D _____ kNm

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Numeric) 0

5 points

12) Magnitude of the maximum bending stress induced in the plank is _____ MPa

Hint

No, the answer is incorrect.

Score: 0

Accepted Answers:
(Type: Range) 20.64,20.84

5 points

13) Magnitude of the maximum shear stress induced in the plank is _____ kPa

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Numeric) 324

5 points

14) Magnitude of the displacement of the point D is _____ mm

Hint

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 44.6,44.8

5 points

15) The magnitude of the rotation at point D is _____ radians

Hint

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 0.025,0.035

5 points

16) The magnitude of the rotation at point B is _____ radians

Hint

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 0.01,0.012

5 points

17) The magnitude of the rotation at point A is _____ radians

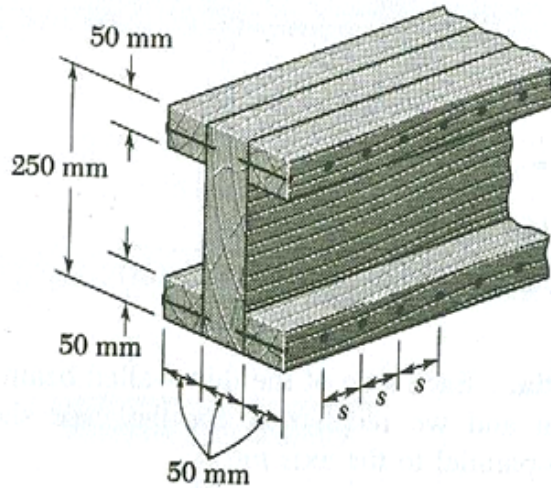
Hint

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 0.004,0.006

5 points

18) The built-up wooden beam having I shaped cross section as shown in figure is subjected to a vertical shear of 3 kN. Knowing that the longitudinal spacing of the nails is $s = 50$ mm, the shearing force in each nail is _____ N.



Hint

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Numeric) 224.3

5 points

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