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

## Unit 10 - Week 8 - Stresses and deflection in beams loaded about one principal axis

### Course outline

Week 0

How to access the portal

Week 1

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Week 3

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

Week 8 - Stresses and deflection in beams loaded about one principal axis

- Definition of shear center
- Shear center of Channel section
- Expression to find shear

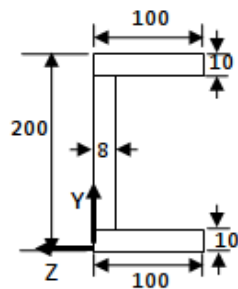
### Assignment 8

The due date for submitting this assignment has passed. **Due on 2018-03-21, 23:59 IST.**

#### Submitted assignment

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

1) A beam having a thin walled channel section, as shown in figure, is loaded in a vertical plane parallel to the web so as to produce simple bending in this plane. For this section find the following:



All dimensions in mm

The Y coordinate of the centroid of the cross section from the specified origin is \_\_\_\_\_ mm

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

(Type: Numeric) 100

5 points

2) The Z coordinate of the centroid of the cross section from the specified origin is \_\_\_\_\_ mm

Hint

**No, the answer is incorrect.**

**Score: 0**

**Accepted Answers:**

(Type: Range) -30.84, -30.64

5 points

3) The Y coordinate of the shear center of the cross section from the specified origin is \_\_\_\_\_ mm

center

- Shear force and bending moment diagram
- Deflected shape and rotation of cross section
- Finding allowable load
- Modified bending equation
- Bending of a composite beam
- Connection design
- Quiz : Assignment 8
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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

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Numeric) 100

5 points

4) The Z coordinate of the shear center of the cross section from the specified origin is \_\_\_\_\_ mm

No, the answer is incorrect.

Score: 0

Accepted Answers:

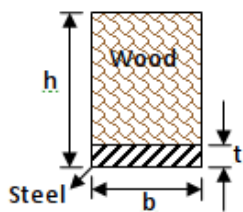
(Type: Range) 33.8,34

5 points

Based on the data given in question 5, answer the following up to question 8

5)

A simply supported beam 4m long is carrying a concentrated load P at the middle has a cross section shown in figure. Let  $P = 100$  kN,  $E_s/E_w = 20$ ,  $b = 20$  cm,  $h = 30$  cm, and  $t = 2$  cm. For this beam



The magnitude of the maximum tensile stress in the steel is \_\_\_\_\_ MPa

Hint

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 129.2,129.4

10 points

6) The magnitude of the maximum compressive stress in the wood is \_\_\_\_\_ MPa

Hint

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 20.5,20.7

10 points

7) The maximum shear stress in the cross section is \_\_\_\_\_ MPa

Hint

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 1.16,1.18

10 points

8) The shear stress at the wood steel interface is \_\_\_\_\_ MPa

Hint

No, the answer is incorrect.

Score: 0

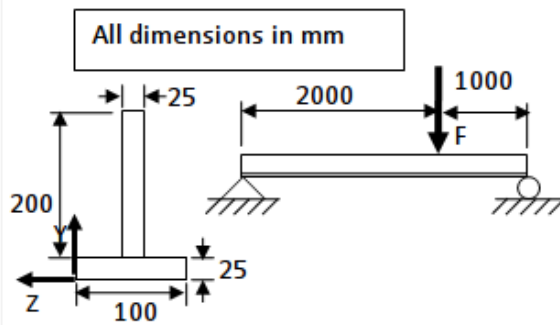
Accepted Answers:

(Type: Range) 1.1,1.12

10 points

Based on the data given in the question 9 ,answer the following up to 16

9) A T-beam shown in figure is made of a material the behavior of which may be idealized as having a tensile proportional limit of 20 MPa and a compressive proportional limit of 40 MPa and a Young's modulus of 100 GPa. In your calculations neglect the self-weight of the beam and report the following:



The Y coordinate of the centroid of the cross section from the specified origin is \_\_\_\_\_ mm

Hint

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 87.4,87.6

5 points

10)The Z coordinate of the centroid of the cross section from the specified origin is \_\_\_\_\_ mm

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Numeric) -50

5 points

11)

Moment of inertia,  $I_z$  of the cross section about the centroid of the cross section is \_\_\_\_\_  $\times 10^6 \text{ mm}^4$

Hint

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 37.8,40

5 points

12) Find the magnitude of the largest force  $F$  that may be applied to this beam in a downward direction is \_\_\_\_\_ kN

Hint

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 12.9,13.2

5 points

13) Location along the axis of the beam from the hinge support where maximum deflection occurs \_\_\_\_\_ m

Hint

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 1.5,1.7

5 points

14) The magnitude of the maximum deflection of the beam is \_\_\_\_\_ mm

Hint

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Range) 1.6,1.8

5 points

15) Location along the axis of the beam from the hinge support where maximum rotation occurs \_\_\_\_\_ m

No, the answer is incorrect.

Score: 0

Accepted Answers:

(Type: Numeric) 3

5 points

16) The magnitude of the maximum rotation of the beam is \_\_\_\_\_ degrees

Hint

**No, the answer is incorrect.****Score: 0****Accepted Answers:***(Type: Range) 0.1,0.12*

5 points

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