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

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:

![Diagram of a channel section with dimensions](https://example.com/diagram.png)

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

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

No, the answer is incorrect. Score: 0

Accepted Answers:
(Type: Range) -30.84,-30.64

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.

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.

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.
8) The shear stress at the wood steel interface is __________ MPa

No, the answer is incorrect.
Score: 0
Accepted Answers:
(Type: Range) 1.16, 1.18

10 points

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:

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

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: Range) 87.4, 87.6

5 points

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

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

14) The magnitude of the maximum deflection of the beam is _________ mm

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