

Unit 5 - Week 3

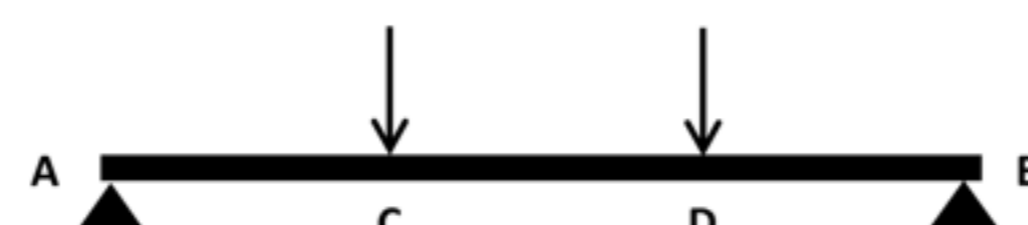
Course outline	
How does an NPTEL online course work?	
Week 0 Assignment 0	
Week 1	
Week 2	
Week 3	<ul style="list-style-type: none"> Bending Stress in Beam -I Bending Stress in Beam -II Bending Stress in Beam -III Shear Stress in Beam Theory of Column Week 3 Lecture Material Quiz : Assignment 3 Week 3 Feedback Form
Week 4	
Week 5	
Week 6	
Week 7	
Week 8	
Assignment Solution	
Download Videos	
Homework Solution	
Live Interactive Session	
Text Transcripts	

Assignment 3

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment.

Due on 2020-10-07, 23:59 IST.

- 1) A simply supported beam is symmetrically loaded (both magnitude of the loads and geometrical distance) as shown in the figure below. Read the figure and select correct option regarding the portion of the beam under Pure Bending. 1 point



- (A) Portion AC and BD is under Pure Bending
 (B) Portion CD is only under Pure Bending
 (C) No portions of the beam is under Pure Bending
 (D) The whole beam is under Pure Bending

No, the answer is incorrect.
Score: 0

Accepted Answers:
(B) Portion CD is only under Pure Bending

- 2) Read the following statements regarding the bending stress distribution in beam section and select TWO correct options 1 point

- (A) Bending stress is zero at neutral axis
 (B) Bending stress is maximum at neutral axis
 (C) Bending stress is zero at top and bottom layer of the beam
 (D) Bending stress is highest at top and bottom layer of the beam

No, the answer is incorrect.
Score: 0

Accepted Answers:
(A) Bending stress is zero at neutral axis
(D) Bending stress is highest at top and bottom layer of the beam

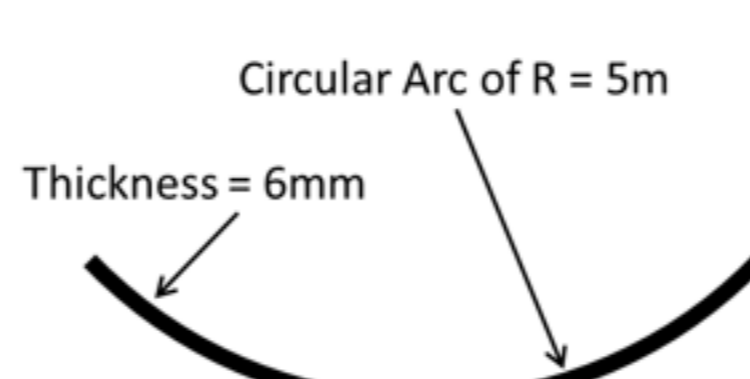
- 3) A simply supported beam of rectangular cross section is carrying a full span UDL. If the span of the beam is increased by 20 percent without changing the intensity of loading, then the maximum bending stress in the beam will increase by _____ percent

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Numeric) 44

- 4) **For Question Number 4 and 5, please read the following statement and answer accordingly.**

A flat metal bar of 15mm width, 6mm thick and 300mm long is bend into a circular arc having radius 5 meter as shown in the figure. The Young's Modulus of Elasticity of the metal is $1.5 \times 10^5 \text{ N/mm}^2$.



The maximum stress in the metal bar will be _____ N/mm²

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Numeric) 90

- 5) The moment required to bend the flat metal bar is _____ N-m

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Numeric) 8.1

- 6) **For Question Number 6 and 7, please read the following statement and answer accordingly.**

A beam of 150mm X 300mm (depth) rectangular cross section is simply supported over a span of 6-meter. When the beam is loaded with full span UDL of 75 KN/m intensity, the bending stress just touches its yield stress limit and failure is initiated.

Keeping a factor of safety = 1.25 on the yield stress. The permissible bending stress of the beam material will be _____ N/mm²

No, the answer is incorrect.
Score: 0

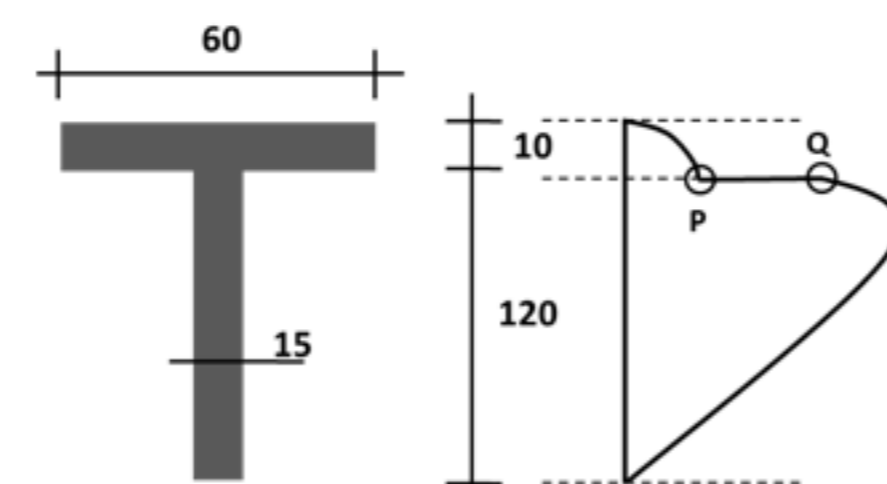
Accepted Answers:
(Type: Numeric) 120

- 7) The same beam (same material and cross section) is now used as a cantilever beam of span 3-meter. The maximum full span UDL that can be supported within the permissible limit is _____ KN/m.

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Numeric) 60

- 8) The shear stress distribution over a T-section is shown in the figure below. In the shear force distribution diagram there are two points marked as P and Q. If the shear stress at point P is 20N/mm², then the shear stress at Q in N/mm² will be



- (A) 40
 (B) 45
 (C) 60
 (D) 80

No, the answer is incorrect.
Score: 0

Accepted Answers:
(D) 80

- 9) For a long column: A = cross section area, L = effective length, I = moment of inertia of cross section area, R = radius of gyration, and S = slenderness ratio, The which of the following TWO relationships are true

(A)	$S = L \times R$
(B)	$R = \frac{I}{A}$
(C)	$S = \frac{L}{R}$
(D)	$R = \frac{L}{I}$

- A
 B
 C
 D

No, the answer is incorrect.
Score: 0

Accepted Answers:
B
C

- 10) The critical stress of a long column is represented by

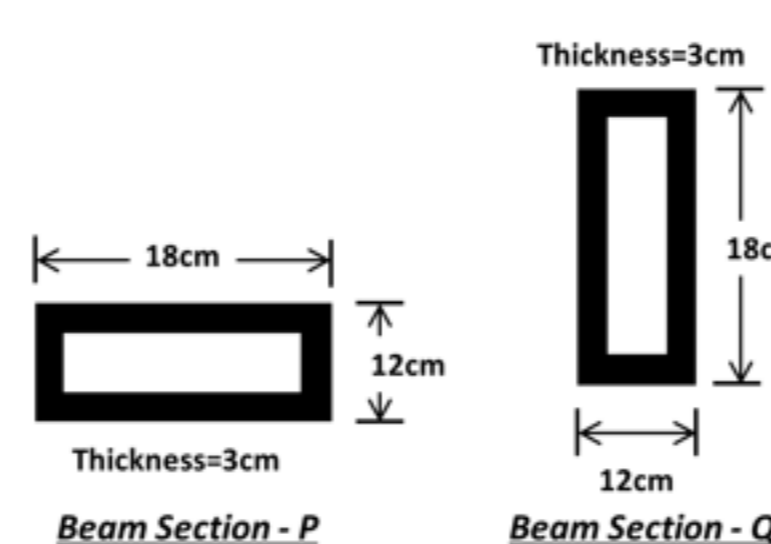
(A)	$\sigma_{cr} = \frac{\pi^2 E}{\lambda^2}$
(B)	$\sigma_{cr} = \frac{\pi^2 EI}{\lambda^2}$
(C)	$\sigma_{cr} = \frac{\pi^2 E}{L^2}$
(D)	$\sigma_{cr} = \frac{\pi E}{\lambda^2}$

- A
 B
 C
 D

No, the answer is incorrect.
Score: 0

Accepted Answers:
A

- 11) Two hollow beam sections are shown as P & Q in the figure below. If both the beam section is having same material, the strength of beam section-Q will be _____ times higher than the beam section -P



No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 1.37, 1.41

- 12) A 400mm X 600mm (depth) beam of rectangular cross section is subjected to a shear force of 270kN. The shear stress at 100mm above neutral axis will be _____ N/mm²

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Numeric) 1.5

- 13) Match the beam sections in Group-I and the corresponding shear stress distribution profile in Group-II 2 points

Group-I	Group-II
P	1
Q	2
R	3
S	4

- (A) P-4, Q-1, R-2, S-3
 (B) P-4, Q-2, R-3, S-1
 (C) P-3, Q-4, R-2, S-1
 (D) P-3, Q-4, R-1, S-2

No, the answer is incorrect.
Score: 0

Accepted Answers:
(C) P-3, Q-4, R-2, S-1

- 14) The geometric properties of two columns X and Y are given below: 2 points

Column-X:
Length: 3-meter, Cross section Dimension: 300 X 300mm, Both End of column are hinged

Column-Y:
Length: 5-meter, Cross section Dimension: 420 X 420mm, Both End of column are fixed

Match the parameter ratio in column-X and Column-Y in Group-I and the corresponding values in Group-II

Group-I	Group-II (Column-X : Column-Y)
P Radius of Gyration	1 1.0.83
Q Effective Length	2 1.5.53
R Slenderness Ratio	3 1.1.4
S Critical Load	4 1.0.59

- (A) P-2, Q-3, R-4, S-1
 (B) P-3, Q-1, R-4, S-2
 (C) P-3, Q-4, R-1, S-2
 (D) P-4, Q-1, R-2, S-3

No, the answer is incorrect.
Score: 0

Accepted Answers:
(B) P-3, Q-1, R-4, S-2

- 15) A 3-meter long metal member required 20kN-m moment to bend in a circular profile of 30-meter radius. If the same member act as a column with both ends hinged. The critical load that the member can take 2 points

- (A) 1452
 (B) 1245
 (C) 844
 (D) 658

No, the answer is incorrect.
Score: 0

Accepted Answers:
(D) 658