Code No: 07A30101 **R07** **Set No. 2**

II B.Tech I Semester Examinations,November 2010
STRENGTH OF MATERIALS - I
Civil Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. A beam with a span of 6 meters carries a point load of 40 kN at 4 meters from the left support. If, for the section $I_{xx} = 73.3 \times 10^6$ m^4 and E = 200 GN/m^2, Using Macaulay's Method, find:
   (a) The deflection under the load;
   (b) The position and amount of maximum deflection. [8+8]

2. A simply supported beam of length 3m carries a point load of 12 kN at a distance of 2m from left support. The cross-section of the beam is shown in Figure 2. Determine the maximum tensile and compressive stress at X-X. [16]

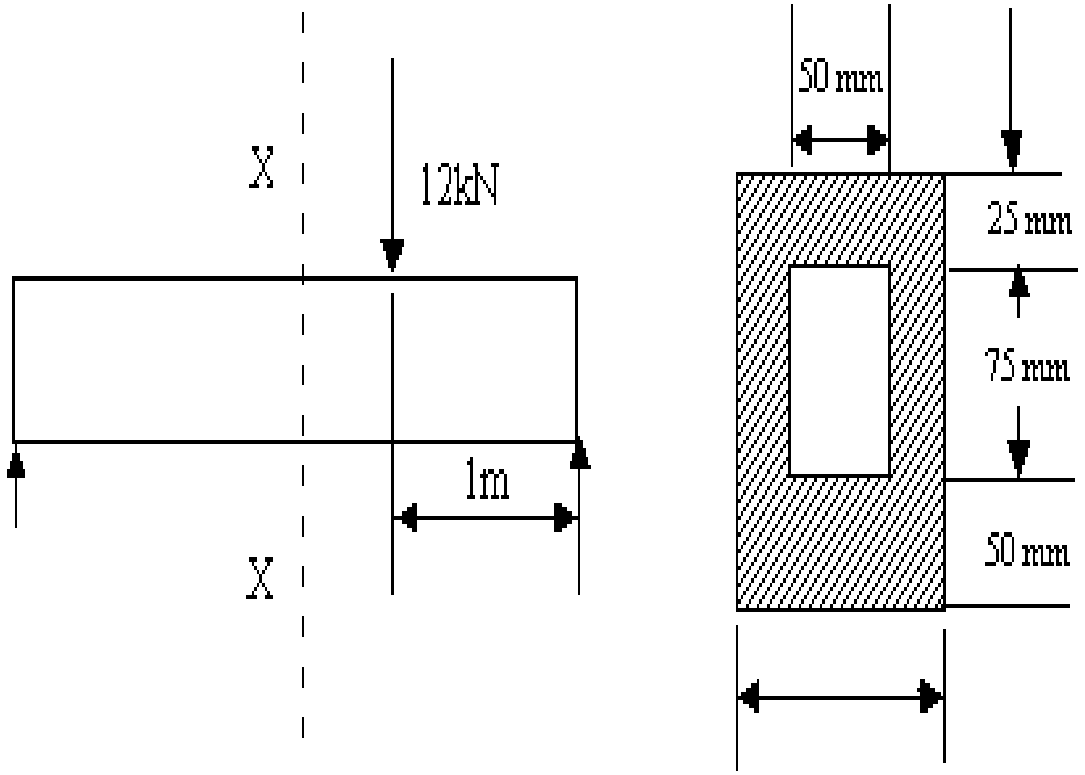

Figure 2

3. An axial pull of 35000 N is acting on a bar consisting of three lengths as shown in Figure 3. If the Young's modulus = 2.1×10^5 N/mm^2, determine: Stresses in each section and Total extension of the bar. [16]

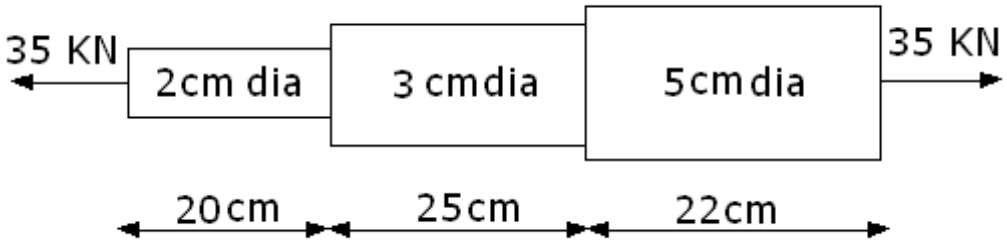

Figure 3

4. Draw the S.F. and B.M. diagrams for the beam which is loaded as shown in Figure 4. Determine the points of contraflexure within the span AB. [16]

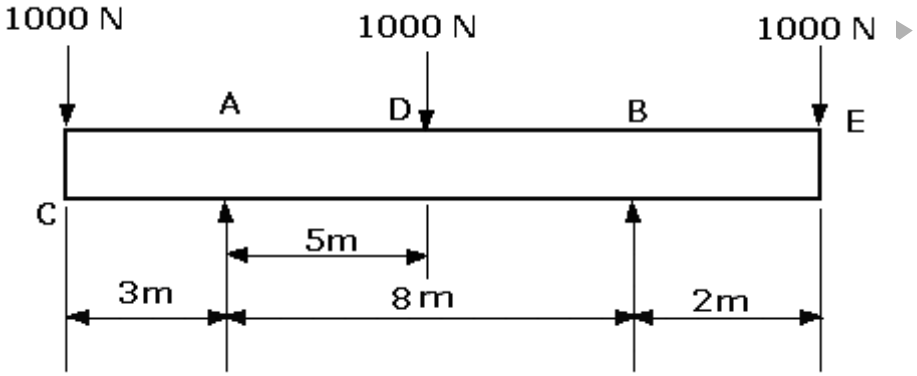

Figure 4

5. A spherical shell of internal diameter 0.9 m and of thickness 10 mm is subjected to an internal pressure of 1.4 N/mm^2. Determine the increase in diameter and increase in volume. Take E = 2 $\times$ 10^5 N/mm^2 and μ = 1/3. [16]

6. A circular beam of 100.5 mm diameter is subjected to a shear force of 10 kN. Calculate the value of maximum shear stress, and sketch the variation of the shear stress along the depth of the beam. [16]

7. The maximum instantaneous extension, produced by an unknown falling weight through a height of 3.5 cm in a vertical bar of length 3m and of cross-sectional area 6 cm^2, is 2.1 mm. Determine instantaneous stress induced in the vertical bar, and the value of unknown weight. Take E = 2 $\times$ 10^5 N/mm^2. [16]

8. (a) Differentiate between a thin cylinder and a thick cylinder.
   (b) Find an expression for the radial pressure and hoop stress at any point in case of a thick cylinder. [6+10]

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Code No: 07A30101 **R07** **Set No. 4**

II B.Tech I Semester Examinations,November 2010
STRENGTH OF MATERIALS - I
Civil Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) Differentiate between a thin cylinder and a thick cylinder.
   (b) Find an expression for the radial pressure and hoop stress at any point in case of a thick cylinder. [6+10]
2. A circular beam of 100.5 mm diameter is subjected to a shear force of 10 kN. Calculate the value of maximum shear stress, and sketch the variation of the shear stress along the depth of the beam. [16]
3. A beam with a span of 6 meters carries a point load of 40 kN at 4 meters from the left support. If, for the section $I_{xx} = 73.3 \times 10^6$ m^4 and E = 200 GN/m^2, Using Macaulay's Method, find:
   (a) The deflection under the load;
   (b) The position and amount of maximum deflection. [8+8]
4. A simply supported beam of length 3m carries a point load of 12 kN at a distance of 2m from left support. The cross-section of the beam is shown in Figure 4. Determine the maximum tensile and compressive stress at X-X. [16]

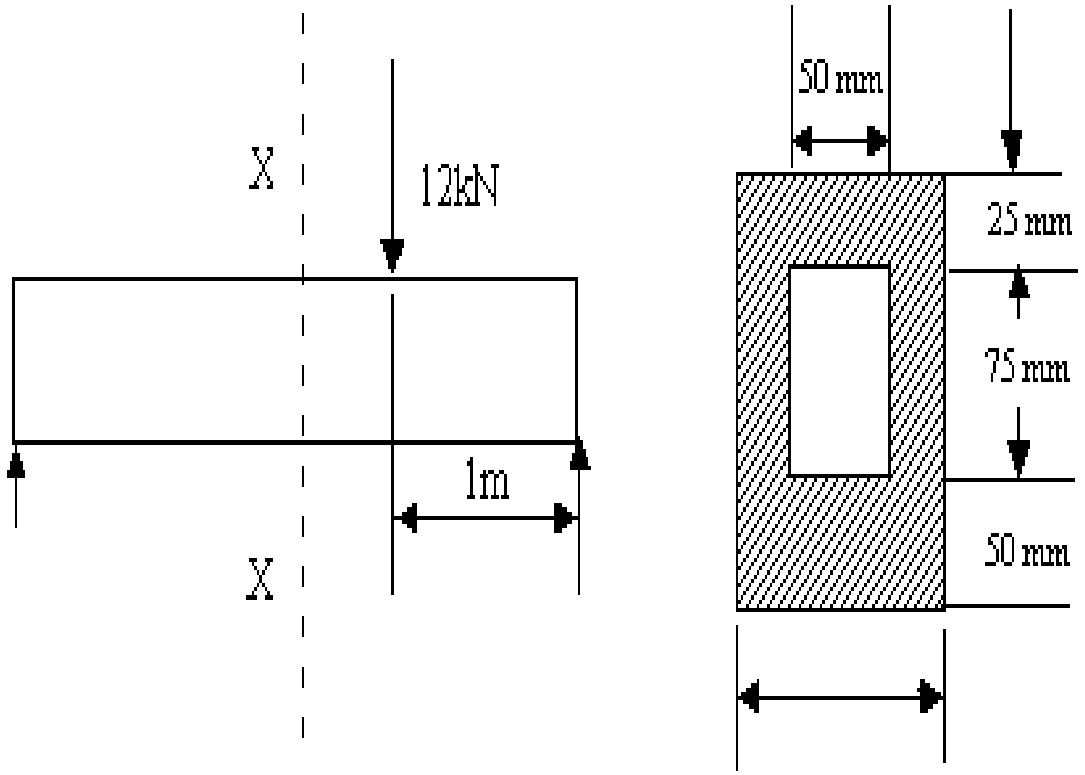

Figure 4

5. Draw the S.F. and B.M. diagrams for the beam which is loaded as shown in Figure 5. Determine the points of contraflexure within the span AB. [16]

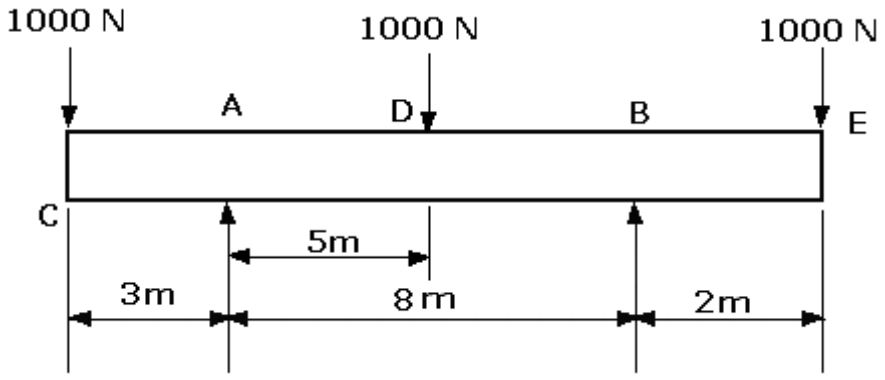

Figure 5

6. An axial pull of 35000 N is acting on a bar consisting of three lengths as shown in Figure 6. If the Young's modulus = 2.1×10^5 N/mm^2, determine: Stresses in each section and Total extension of the bar. [16]

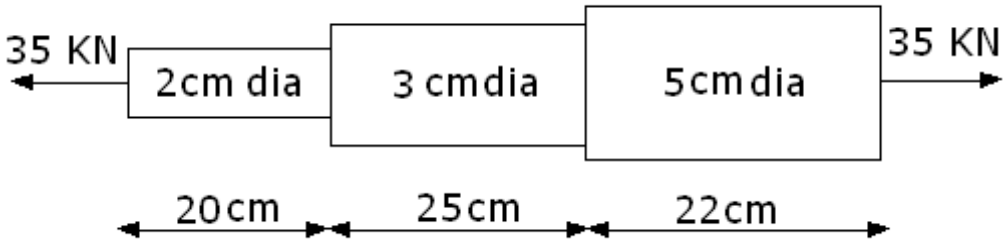

Figure 6

7. The maximum instantaneous extension, produced by an unknown falling weight through a height of 3.5 cm in a vertical bar of length 3m and of cross-sectional area 6 cm^2, is 2.1 mm. Determine instantaneous stress induced in the vertical bar, and the value of unknown weight. Take E = 2×10^5 N/mm^2. [16]

8. A spherical shell of internal diameter 0.9 m and of thickness 10 mm is subjected to an internal pressure of 1.4 N/mm^2. Determine the increase in diameter and increase in volume. Take E = 2×10^5 N/mm^2 and $\mu = 1/3$. [16]

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Code No: 07A30101 **R07** **Set No. 1**

II B.Tech I Semester Examinations,November 2010
STRENGTH OF MATERIALS - I
Civil Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. A simply supported beam of length 3m carries a point load of 12 kN at a distance of 2m from left support. The cross-section of the beam is shown in Figure 1. Determine the maximum tensile and compressive stress at X-X. [16]

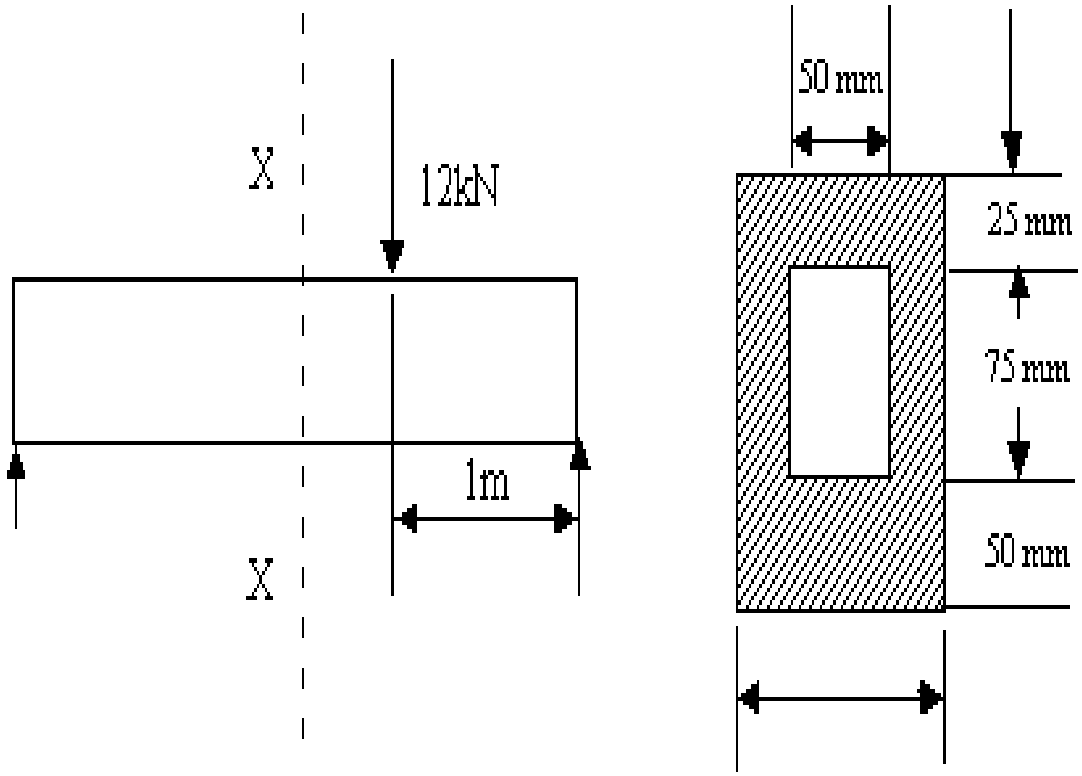

Figure 1

2. A beam with a span of 6 meters carries a point load of 40 kN at 4 meters from the left support. If, for the section $I_{xx} = 73.3 \times 10^6$ m^4 and E = 200 GN/m^2, Using Macaulay's Method, find:
   (a) The deflection under the load;
   (b) The position and amount of maximum deflection. [8+8]

3. Draw the S.F. and B.M. diagrams for the beam which is loaded as shown in Figure 3. Determine the points of contraflexure within the span AB. [16]

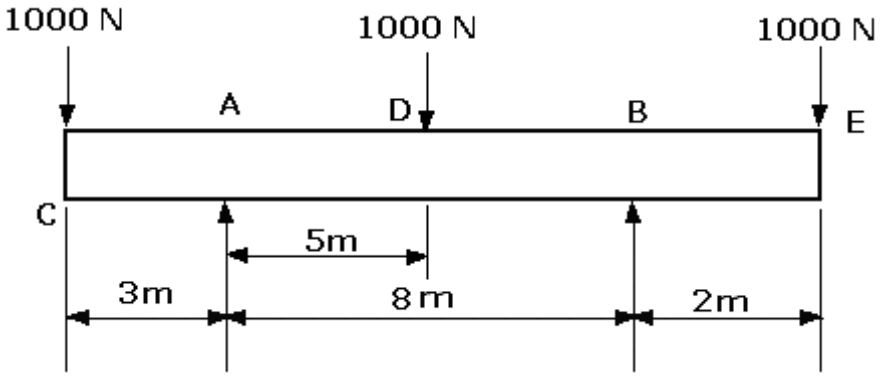

Figure 3

4. A spherical shell of internal diameter 0.9 m and of thickness 10 mm is subjected to an internal pressure of 1.4 N/mm^2. Determine the increase in diameter and increase in volume. Take E = 2 × 10^5 N/mm^2 and $\mu = 1/3$. [16]

5. A circular beam of 100.5 mm diameter is subjected to a shear force of 10 kN. Calculate the value of maximum shear stress, and sketch the variation of the shear stress along the depth of the beam. [16]

6. (a) Differentiate between a thin cylinder and a thick cylinder.
   (b) Find an expression for the radial pressure and hoop stress at any point in case of a thick cylinder. [6+10]

7. The maximum instantaneous extension, produced by an unknown falling weight through a height of 3.5 cm in a vertical bar of length 3m and of cross-sectional area 6 cm^2, is 2.1 mm. Determine instantaneous stress induced in the vertical bar, and the value of unknown weight. Take E = 2 × 10^5 N/mm^2. [16]

8. An axial pull of 35000 N is acting on a bar consisting of three lengths as shown in Figure 8. If the Young's modulus = 2.1 × 10^5 N/mm^2, determine: Stresses in each section and Total extension of the bar. [16]

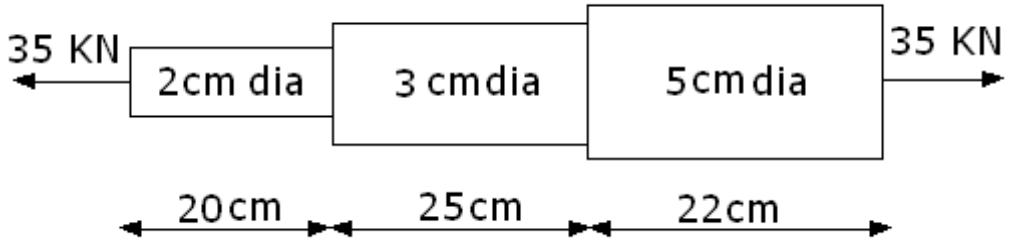

Figure 8

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Code No: 07A30101 **R07** **Set No. 3**

II B.Tech I Semester Examinations,November 2010
STRENGTH OF MATERIALS - I
Civil Engineering

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. A spherical shell of internal diameter 0.9 m and of thickness 10 mm is subjected to an internal pressure of 1.4 N/mm^2. Determine the increase in diameter and increase in volume. Take E = 2 × 10^5 N/mm^2 and $\mu = 1/3$. [16]

2. A circular beam of 100.5 mm diameter is subjected to a shear force of 10 kN. Calculate the value of maximum shear stress, and sketch the variation of the shear stress along the depth of the beam. [16]

3. Draw the S.F. and B.M. diagrams for the beam which is loaded as shown in Figure 3. Determine the points of contraflexure within the span AB. [16]

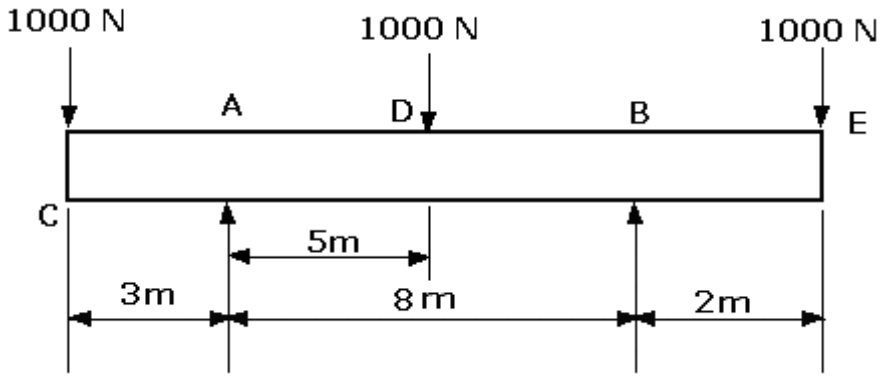

Figure 3

4. An axial pull of 35000 N is acting on a bar consisting of three lengths as shown in Figure 4. If the Young's modulus = 2.1 × 10^5 N/mm^2, determine: Stresses in each section and Total extension of the bar. [16]

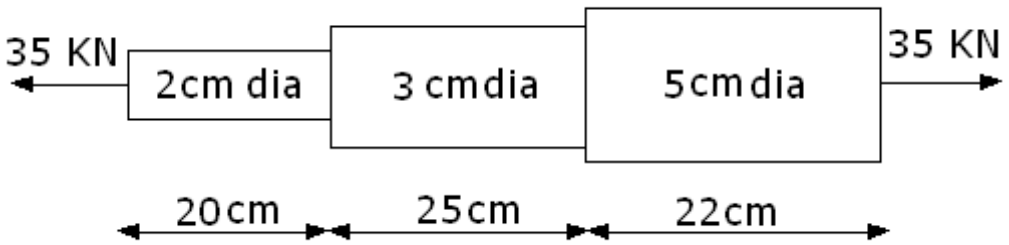

Figure 4

5. (a) Differentiate between a thin cylinder and a thick cylinder.
   (b) Find an expression for the radial pressure and hoop stress at any point in case of a thick cylinder. [6+10]

Code No: 07A30101 **R07** **Set No. 3**

6. A beam with a span of 6 meters carries a point load of 40 kN at 4 meters from the left support. If, for the section $I_{xx} = 73.3 \times 10^6$ m^4 and E = 200 GN/m^2, Using Macaulay's Method, find:

   (a) The deflection under the load;

   (b) The position and amount of maximum deflection. [8+8]

7. The maximum instantaneous extension, produced by an unknown falling weight through a height of 3.5 cm in a vertical bar of length 3m and of cross-sectional area 6 cm^2, is 2.1 mm. Determine instantaneous stress induced in the vertical bar, and the value of unknown weight. Take E = 2×10^5 N/mm^2. [16]

8. A simply supported beam of length 3m carries a point load of 12 kN at a distance of 2m from left support. The cross-section of the beam is shown in Figure 8. Determine the maximum tensile and compressive stress at X-X. [16]

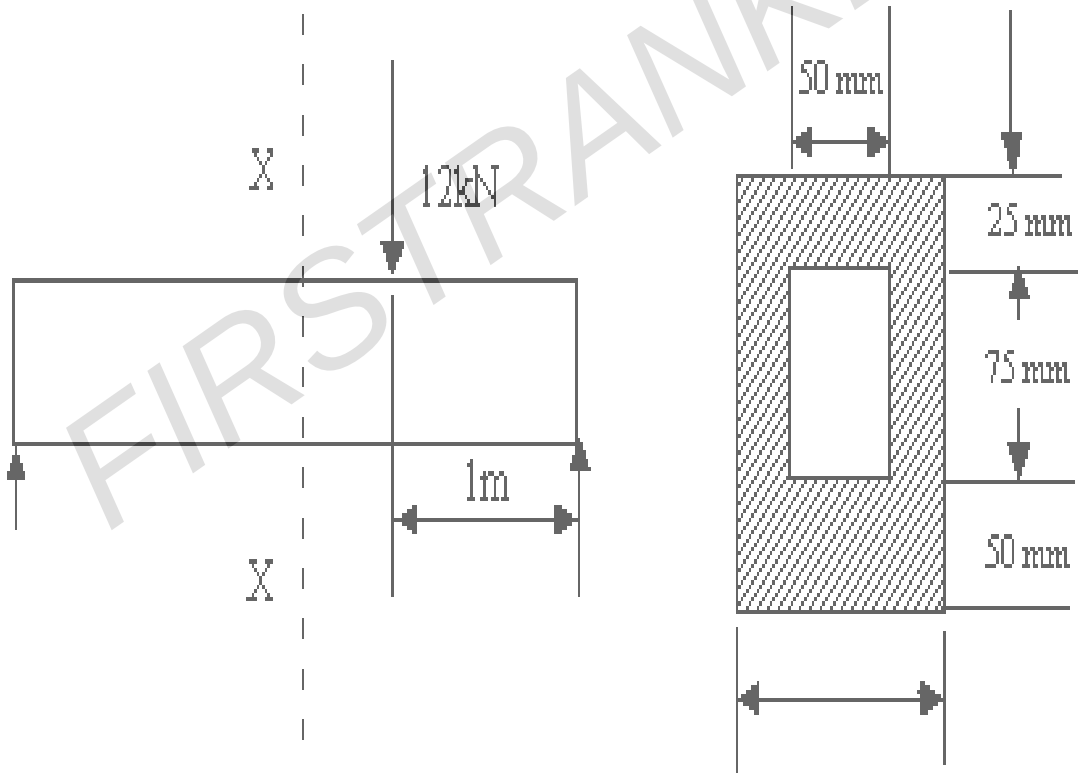

Figure 8

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