Code No: R05210103 **R05** **Set No. 2**

II B.Tech I Semester Examinations,May/June 2012
STRENGTH OF MATERIALS-I
Civil Engineering

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

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. Write short notes on
   (a) Moment area method
   (b) Macaulay's method
   (c) Deflections of propped beams. [16]

2. Establish the relation between S. F. & B.M. and rate of loading at a section of a beam. Obtain the maximum B. M. for the beam shown in Figure 2 by drawing the S. F. D. Find the value of slope of the S. F. D . [16]

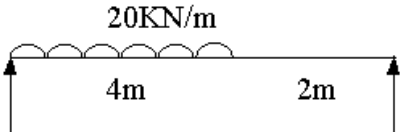

Figure 2

3. A thick cylinder having internal radius 200 mm and external radius 300 mm is subjected to $4N/mm^2$. Find the internal pressure that can be applied if the max. permissible stress is $15N/mm^2$. Find also the change in thickness of the cylinder. Take $E = 200GN/m^2$ and $\frac{1}{m} = 0.3$ [16]

4. Rails of 15 m length were laid on the track when the temperature was 20^0C. A gap of 1.8 mm was kept between two consecutive rails. At what max temperature the rails will remain stress free ? If the temperature is raised further by 15^0C, what will be the magnitude and nature of stresses induced in the rails? [16]

5. (a) A cylindrical shell is 400 mm internal diameter, 8 mm thick and 1m. long. Find the change in the internal diameter and the length, when the cylinder is subjected to an internal pressure of 8N/mm^2. Take E = 2×10^5 N/mm^2, $\mu = 0.3$.
   (b) A riveted boiler 2.25 m in diameter has to sustain an internal pressure of 1 N/mm^2. The efficiency of the joint is 70% and a safe stress of 60 N/mm^2 is allowed in the material. Find the thickness of the shell.

   [8+8]

6. A flat plate of 80 cm length, and uniform thickness 10 mm, tapers uniformly form 120 mm width to 60 mm. Find the elongation due to an axial pull of 70 kN if E = 200 GPa. Derive the formula used. [16]

7. For a circular section of diameter d, subjected to an S.F.(F) obtain the shear stress distribution and maximum & average shear stress. [16]

8. Calculate the section modulus for the I – section shown in Figure 8 and hence calculate maximum bending stress if the B. M = 50 KNm. [16]

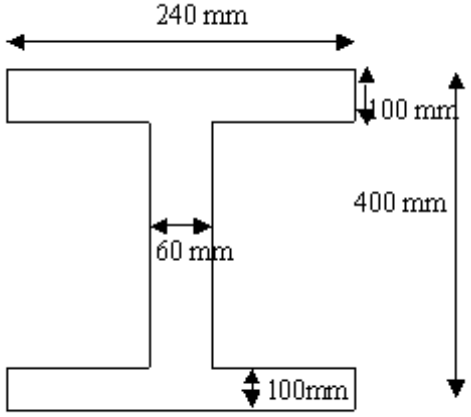

Figure 8

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Code No: R05210103 **R05** **Set No. 4**

II B.Tech I Semester Examinations,May/June 2012
STRENGTH OF MATERIALS-I
Civil Engineering

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

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. (a) A cylindrical shell is 400 mm internal diameter, 8 mm thick and 1m. long. Find the change in the internal diameter and the length, when the cylinder is subjected to an internal pressure of 8N/mm^2. Take E = 2 × 10^5 N/mm^2, $\mu = 0.3$.

   (b) A riveted boiler 2.25 m in diameter has to sustain an internal pressure of 1N/mm^2. The efficiency of the joint is 70% and a safe stress of 60 N/mm^2 is allowed in the material. Find the thickness of the shell .

   [8+8]

2. A flat plate of 80 cm length, and uniform thickness 10 mm, tapers uniformly form 120 mm width to 60 mm. Find the elongation due to an axial pull of 70 kN if E = 200 GPa. Derive the formula used. [16]

3. For a circular section of diameter d, subjected to an S.F.(F) obtain the shear stress distribution and maximum & average shear stress. [16]

4. Calculate the section modulus for the I – section shown in Figure 4 and hence calculate maximum bending stress if the B. M = 50 KNm. [16]

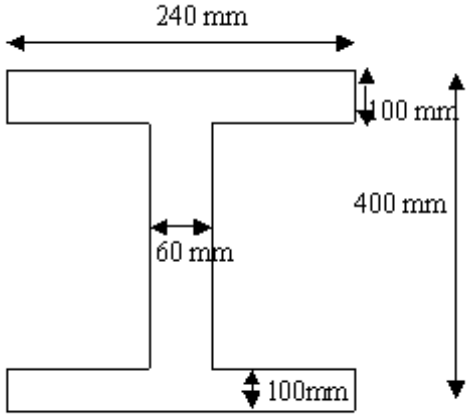

Figure 4

5. Write short notes on

   (a) Moment area method

   (b) Macaulay's method

   (c) Deflections of propped beams. [16]

6. Establish the relation between S. F. & B.M. and rate of loading at a section of a beam. Obtain the maximum B. M. for the beam shown in Figure 6 by drawing the S. F. D. Find the value of slope of the S. F. D . [16]

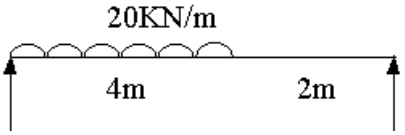

Figure 6

7. Rails of 15 m length were laid on the track when the temperature was 20^0C. A gap of 1.8 mm was kept between two consecutive rails. At what max temperature the rails will remain stress free ? If the temperature is raised further by 15^0C, what will be the magnitude and nature of stresses induced in the rails? [16]

8. A thick cylinder having internal radius 200mm and external radius 300mm is subjected to $4N/mm^2$. Find the internal pressure that can be applied if the max. permissible stress is $15N/mm^2$. Find also the change in thickness of the cylinder. Take $E = 200GN/m^2$ and $\frac{1}{m} = 0.3$ [16]

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Code No: R05210103 **R05** **Set No. 1**

II B.Tech I Semester Examinations,May/June 2012
STRENGTH OF MATERIALS-I
Civil Engineering

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

Answer any FIVE Questions
All Questions carry equal marks

⋆ ⋆ ⋆ ⋆ ⋆

1. Establish the relation between S. F. & B.M. and rate of loading at a section of a beam. Obtain the maximum B. M. for the beam shown in Figure 1 by drawing the S. F. D. Find the value of slope of the S. F. D . [16]

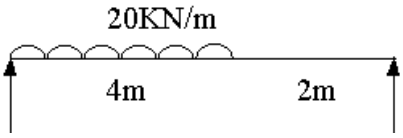

Figure 1

2. A flat plate of 80 cm length, and uniform thickness 10 mm, tapers uniformly form 120 mm width to 60 mm. Find the elongation due to an axial pull of 70 kN if E = 200 GPa. Derive the formula used. [16]

3. For a circular section of diameter d, subjected to an S.F.(F) obtain the shear stress distribution and maximum & average shear stress. [16]

4. Rails of 15 m length were laid on the track when the temperature was 20^0C. A gap of 1.8 mm was kept between two consecutive rails. At what max temperature the rails will remain stress free ? If the temperature is raised further by 15^0C, what will be the magnitude and nature of stresses induced in the rails? [16]

5. (a) A cylindrical shell is 400mm internal diameter, 8mm thick and 1m. long. Find the change in the internal diameter and the length, when the cylinder is subjected to an internal pressure of 8N/mm^2. Take E = 2×10^5 N/mm^2, $\mu = 0.3$.

   (b) A riveted boiler 2.25 m in diameter has to sustain an internal pressure of 1N/mm^2. The efficiency of the joint is 70% and a safe stress of 60 N/mm^2 is allowed in the material. Find the thickness of the shell.

   [8+8]

6. Write short notes on

   (a) Moment area method

   (b) Macaulay's method

   (c) Deflections of propped beams. [16]

7. Calculate the section modulus for the I – section shown in Figure 1 and hence calculate maximum bending stress if the B. M = 50 KNm. [16]

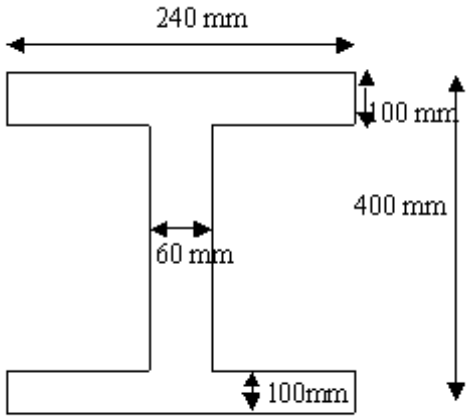

Figure 1

8. A thick cylinder having internal radius 200mm and external radius 300mm is subjected to $4N/mm^2$. Find the internal pressure that can be applied if the max. permissible stress is $15N/mm^2$. Find also the change in thickness of the cylinder. Take $E = 200GN/m^2$ and $\frac{1}{m} = 0.3$ [16]

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Code No: R05210103 **R05** **Set No. 3**

II B.Tech I Semester Examinations,May/June 2012
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. Calculate the section modulus for the I – section shown in Figure 1 and hence calculate maximum bending stress if the B. M = 50 KNm. [16]

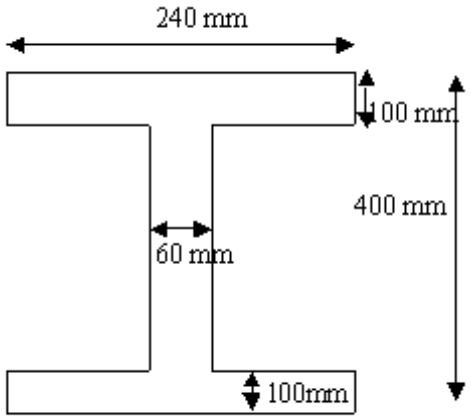

Figure 1

2. Write short notes on
   (a) Moment area method
   (b) Macaulay's method
   (c) Deflections of propped beams. [16]

3. A flat plate of 80 cm length, and uniform thickness 10 mm, tapers uniformly form 120 mm width to 60 mm. Find the elongation due to an axial pull of 70 kN if E = 200 GPa. Derive the formula used. [16]

4. Rails of 15 m length were laid on the track when the temperature was 20^0C. A gap of 1.8 mm was kept between two consecutive rails. At what max temperature the rails will remain stress free ? If the temperature is raised further by 15^0C, what will be the magnitude and nature of stresses induced in the rails? [16]

5. Establish the relation between S. F. & B.M. and rate of loading at a section of a beam. Obtain the maximum B. M. for the beam shown in Figure 5 by drawing the S. F. D. Find the value of slope of the S. F. D . [16]

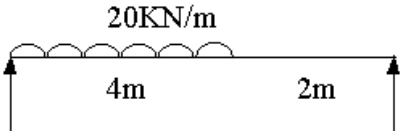

Figure 5

6. (a) A cylindrical shell is 400mm internal diameter, 8mm thick and 1m. long. Find the change in the internal diameter and the length, when the cylinder is subjected to an internal pressure of 8N/mm^2. Take E = 2×10^5 N/mm^2, $\mu = 0.3$.

   (b) A riveted boiler 2.25 m in diameter has to sustain an internal pressure of 1N/mm^2. The efficiency of the joint is 70% and a safe stress of 60 N/mm^2 is allowed in the material. Find the thickness of the shell.

   [8+8]

7. For a circular section of diameter d, subjected to an S.F.(F) obtain the shear stress distribution and maximum & average shear stress. [16]

8. A thick cylinder having internal radius 200mm and external radius 300mm is subjected to $4N/mm^2$. Find the internal pressure that can be applied if the max. permissible stress is $15N/mm^2$. Find also the change in thickness of the cylinder. Take $E = 200GN/m^2$ and $\frac{1}{m} = 0.3$ [16]

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