Code No: 07A30101 **R07** **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

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1. (a) Write the Lami's equation for thick cylindrical shell and explain the terms.
   (b) A thick cylindrical shell of 160 mm internal diameter is 45 mm thick. The shell is subjected to an internal pressure of 52.5 N/mm^2. Find the maximum and minimum intensities of hoop stress across the section. [4+12]

2. A beam AB of span 8 meters is simply supported at the ends. It carries as uniformly distributed load of 30 kN/m over its entire length and a concentrated load of 60 kN at 3 meters from the support A. Determine the maximum deflection in the beam and the location where the maximum deflection occurs. [16]

3. Find the maximum shear stress induced by a load of 4 kN in the vertical section of hollow beam of a square section if the outside width is 10 cm and the thickness of material is 2 cm. [16]

4. A weight of 10 kN falls by 30 mm on a collar rigidly attached to a vertical bar 4m long and 1000 mm^2 in section. Find the instantaneous expansion of the bar. Take E = 210 GPa. Derive the formula you use. [16]

5. (a) Derive from the first principles the expressions for circumferential and longitudinal stresses in a thin cylinder closed at both ends and subjected to internal fluid pressure.
   (b) What thickness of metal would be required for cast-iron water pipe 80 cm in diameter under a head of 100 m? Assume the permissible tensile stress for cast-iron as 20 MN/m^2. [8+8]

6. A rod 150 cm long and of diameter 2.0 cm is subjected to an axial pull of 20 kN. If the modulus of elasticity of the material of the rod is 2 $\times 10^5$ N/mm^2; determine: The stress, Strain, and Elongation of the rod. [16]

7. Compare the flexural strength of the following three beams of equal weight:
   (a) I- Section 100 mm $\times$ 200mm having 10mm flange thickness and 8 mm web thickness.
   (b) A rectangular section having depth equal to twice the width
   (c) Solid circular section. [16]

8. A cantilever beam of length 2 m carries the point loads as Shown in Figure 8. Draw the shear force and B.M. diagrams for the cantilever beam. [16]

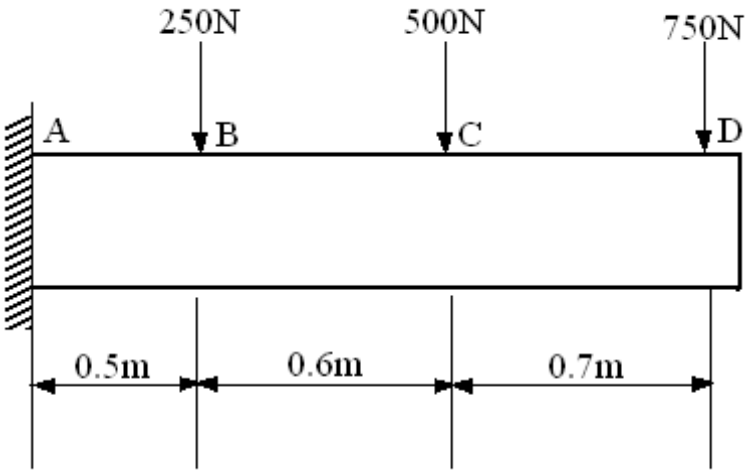

Figure 8

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Code No: 07A30101 **R07** **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

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1. Compare the flexural strength of the following three beams of equal weight:
   (a) I- Section 100 mm × 200mm having 10mm flange thickness and 8 mm web thickness.
   (b) A rectangular section having depth equal to twice the width
   (c) Solid circular section. [16]

2. A weight of 10 kN falls by 30 mm on a collar rigidly attached to a vertical bar 4m long and 1000 mm^2 in section. Find the instantaneous expansion of the bar. Take E = 210 GPa. Derive the formula you use. [16]

3. Find the maximum shear stress induced by a load of 4 kN in the vertical section of hollow beam of a square section if the outside width is 10 cm and the thickness of material is 2 cm. [16]

4. A cantilever beam of length 2 m carries the point loads as Shown in Figure 4. Draw the shear force and B.M. diagrams for the cantilever beam. [16]

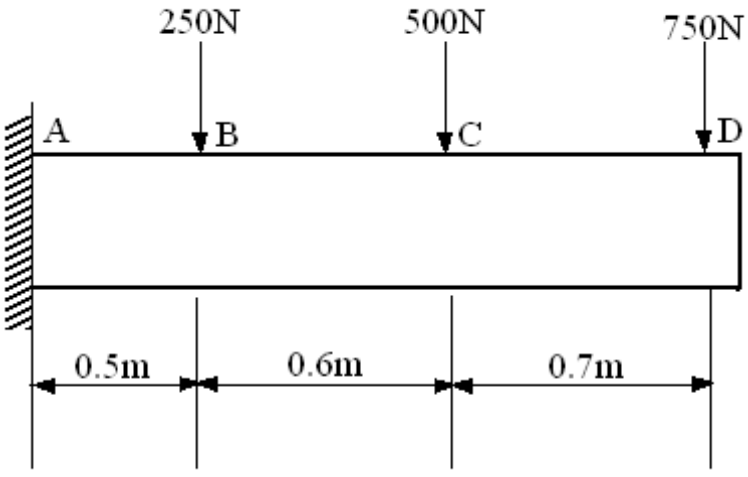

Figure 4

5. A beam AB of span 8 meters is simply supported at the ends. It carries as uniformly distributed load of 30 kN/m over its entire length and a concentrated load of 60 kN at 3 meters from the support A. Determine the maximum deflection in the beam and the location where the maximum deflection occurs. [16]

6. (a) Derive from the first principles the expressions for circumferential and longitudinal stresses in a thin cylinder closed at both ends and subjected to internal fluid pressure.

   (b) What thickness of metal would be required for cast-iron water pipe 80 cm in diameter under a head of 100 m? Assume the permissible tensile stress for cast-iron as 20 MN/m^2. [8+8]

7. (a) Write the Lami's equation for thick cylindrical shell and explain the terms.

   (b) A thick cylindrical shell of 160 mm internal diameter is 45 mm thick. The shell is subjected to an internal pressure of 52.5 N/mm^2. Find the maximum and minimum intensities of hoop stress across the section. [4+12]

8. A rod 150 cm long and of diameter 2.0 cm is subjected to an axial pull of 20 kN. If the modulus of elasticity of the material of the rod is 2 $\times 10^5$ N/mm^2; determine: The stress, Strain, and Elongation of the rod. [16]

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Code No: 07A30101 **R07** **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

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1. A rod 150 cm long and of diameter 2.0 cm is subjected to an axial pull of 20 kN. If the modulus of elasticity of the material of the rod is 2 $\times 10^5$ N/mm^2; determine: The stress, Strain, and Elongation of the rod. [16]

2. A weight of 10 kN falls by 30 mm on a collar rigidly attached to a vertical bar 4m long and 1000 mm^2 in section. Find the instantaneous expansion of the bar. Take E = 210 GPa. Derive the formula you use. [16]

3. Find the maximum shear stress induced by a load of 4 kN in the vertical section of hollow beam of a square section if the outside width is 10 cm and the thickness of material is 2 cm. [16]

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5. A beam AB of span 8 meters is simply supported at the ends. It carries as uniformly distributed load of 30 kN/m over its entire length and a concentrated load of 60 kN at 3 meters from the support A. Determine the maximum deflection in the beam and the location where the maximum deflection occurs. [16]

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   (b) What thickness of metal would be required for cast-iron water pipe 80 cm in diameter under a head of 100 m? Assume the permissible tensile stress for cast-iron as 20 MN/m^2. [8+8]

7. A cantilever beam of length 2 m carries the point loads as Shown in Figure 7. Draw the shear force and B.M. diagrams for the cantilever beam. [16]

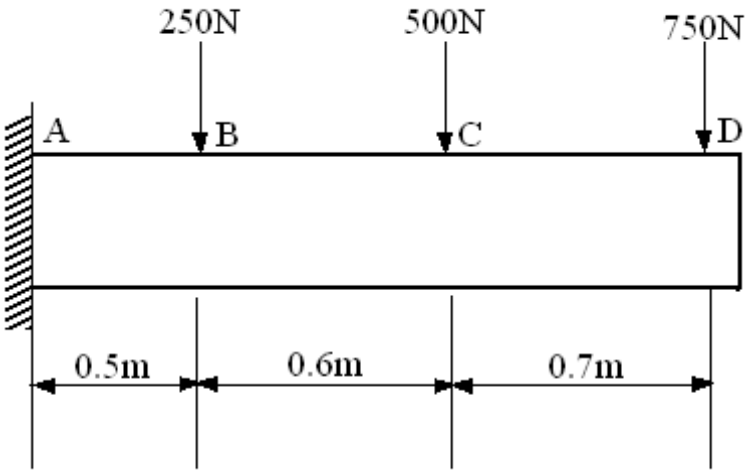

Figure 7

8. Compare the flexural strength of the following three beams of equal weight:
   (a) I- Section 100 mm × 200mm having 10mm flange thickness and 8 mm web thickness.
   (b) A rectangular section having depth equal to twice the width
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Code No: 07A30101 **R07** **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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3. Find the maximum shear stress induced by a load of 4 kN in the vertical section of hollow beam of a square section if the outside width is 10 cm and the thickness of material is 2 cm. [16]

4. A weight of 10 kN falls by 30 mm on a collar rigidly attached to a vertical bar 4m long and 1000 mm^2 in section. Find the instantaneous expansion of the bar. Take E = 210 GPa. Derive the formula you use. [16]

5. A cantilever beam of length 2 m carries the point loads as Shown in Figure 5. Draw the shear force and B.M. diagrams for the cantilever beam. [16]

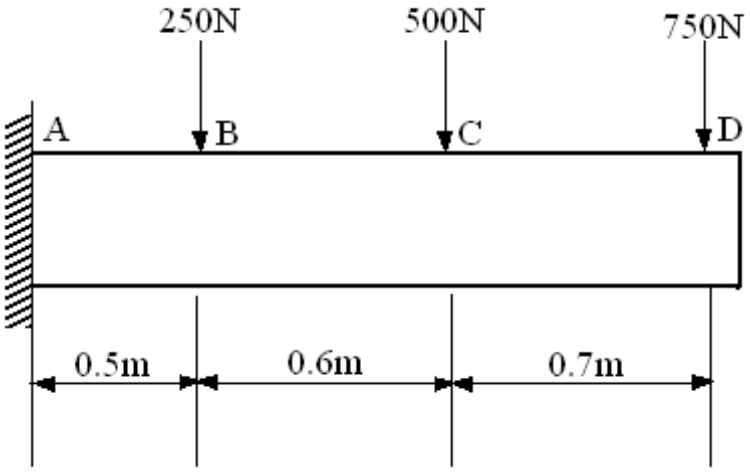

Figure 5

6. (a) Write the Lami's equation for thick cylindrical shell and explain the terms.
   (b) A thick cylindrical shell of 160 mm internal diameter is 45 mm thick. The shell is subjected to an internal pressure of 52.5 N/mm^2. Find the maximum and minimum intensities of hoop stress across the section. [4+12]

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