Code.No: 07A3EC07 | R07 | SET-1

**II B.TECH – I SEM EXAMINATIONS, NOVEMBER - 2010**
**MECHANICS OF SOLIDS**
**(Common to ME, MCT, MMT, MEP, AME)**

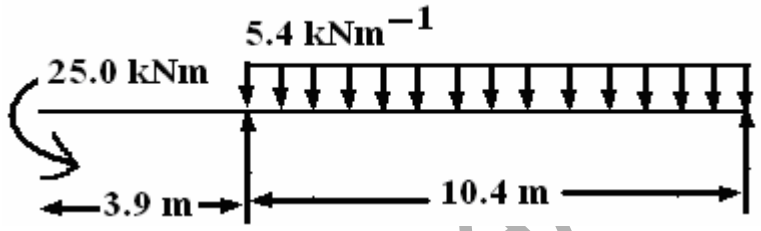
**Time: 3hours** **Max.Marks:80**

**Answer any FIVE questions**
**All questions carry equal marks**
- - -

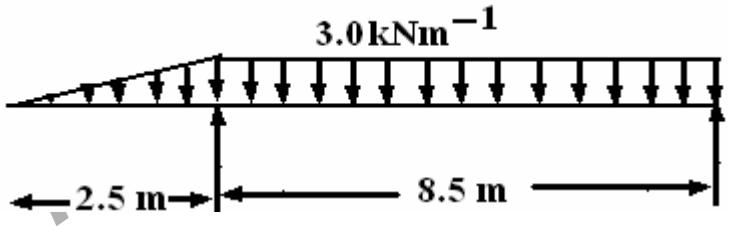
1.a) Define proportionality limit, elasticity limit, yield stress and ultimate stress of a material.

b) A square concrete pedestal is to sustain a load of 500.0 kN. Determine a suitable cross section for the pedestal, if the allowable stress is 15.0 MPa. What is the allowable load, if the deformation of the 2.0 m high pedestal should not exceed 1.0 mm? Assume Young's modulus for concrete to be 25.0 GPa. [8+8]

2.a) Develop Bending moment and Shear force for the figure given below indicating the maximum and minimum values.

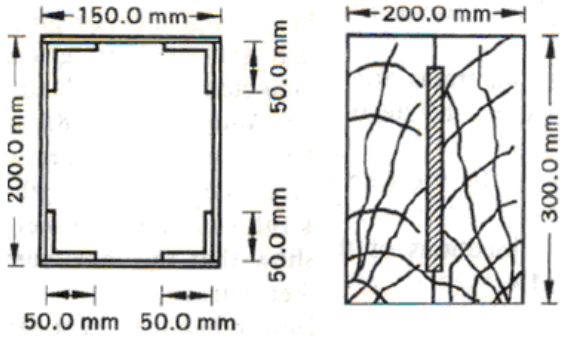



b) Develop Bending moment and Shear force for the figure given below indicating the maximum and minimum values. [8+8]




3. A rectangular steel bar, 20 mm wide by 40 mm high and 4 m long, is simply supported at its ends. If the density of steel is 7850 kg/m$^3$, determine the maximum bending stress caused by the weight of the bar. [16]

4. Develop the shear stress distribution diagrams for the sections shown for the following figures when subjected to a transverse S.F. of 200.0 kN. What are the maximum shear stresses? [16]




(Contd…….2)

| Code.No: 07A3EC07 | R07 | SET-1 |
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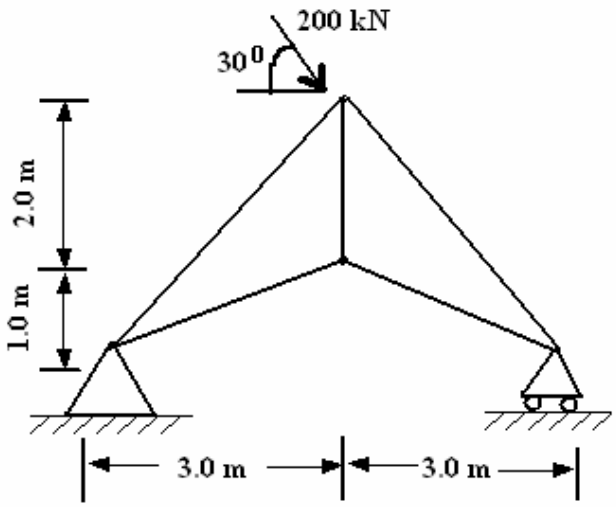
5. Analyze the truss indicated in the figure by method of joints. [16]




6.a) Determine the maximum deflection δ in a simply supported beam of length L carrying a concentrated load of P at mid span.

b) Determine the maximum deflection δ in a simply supported beam of length L carrying a uniformly distributed load through out the length. [8+8]

7.a) What are the assumptions of the thin cylinder theory? Discuss the limitations and justification.

b) Derive the expressions for stresses in a thin spherical shell under radial pressure.[8+8]

8. The outer diameter of a cylinder is 1.6 times its inner diameter. Assuming υ = 0.28, determine the ratio of external and internal pressures applied separately, so that in both the cases
a) The largest stresses have the same numerical values
b) The largest strains have the same numerical values. [16]

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Code.No: 07A3EC07 | R07 | SET-2

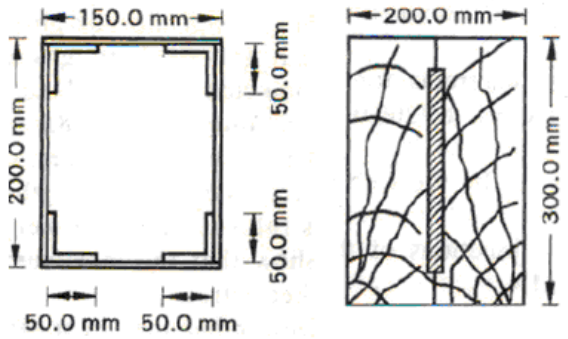
**II B.TECH – I SEM EXAMINATIONS, NOVEMBER - 2010**
**MECHANICS OF SOLIDS**
**(Common to ME, MCT, MMT, MEP, AME)**

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

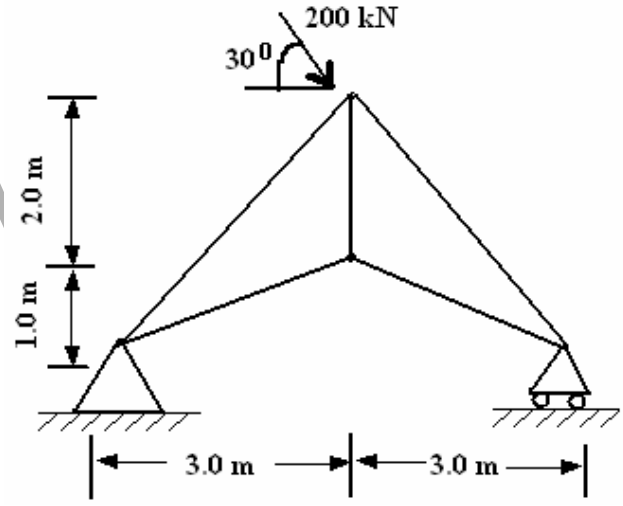
**Answer any FIVE questions**
**All questions carry equal marks**
- - -

1. A rectangular steel bar, 20 mm wide by 40 mm high and 4 m long, is simply supported at its ends. If the density of steel is 7850 kg/m$^3$, determine the maximum bending stress caused by the weight of the bar. [16]

2. Develop the shear stress distribution diagrams for the sections shown for the following figures when subjected to a transverse S.F. of 200.0 kN. What are the maximum shear stresses? [16]




3. Analyze the truss indicated in the figure by method of joints. [16]




4.a) Determine the maximum deflection δ in a simply supported beam of length L carrying a concentrated load of P at mid span.
b) Determine the maximum deflection δ in a simply supported beam of length L carrying a uniformly distributed load through out the length. [8+8]

5.a) What are the assumptions of the thin cylinder theory? Discuss the limitations and justification.
b) Derive the expressions for stresses in a thin spherical shell under radial pressure.[8+8]

(Contd…….2)

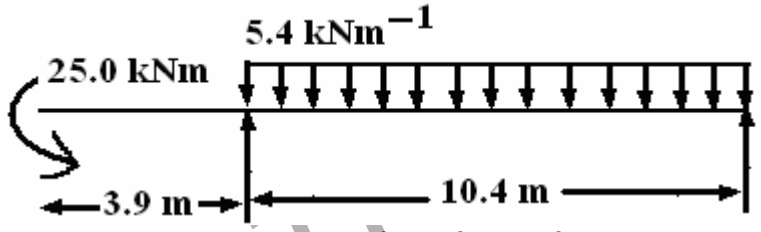
| Code.No: 07A3EC07 | R07 | SET-2 |
|---|---|---|

6. The outer diameter of a cylinder is 1.6 times its inner diameter. Assuming υ = 0.28, determine the ratio of external and internal pressures applied separately, so that in both the cases
   a) The largest stresses have the same numerical values
   b) The largest strains have the same numerical values. [16]

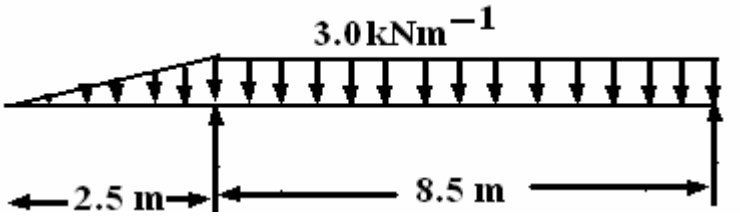
7.a) Define proportionality limit, elasticity limit, yield stress and ultimate stress of a material.

b) A square concrete pedestal is to sustain a load of 500.0 kN. Determine a suitable cross section for the pedestal, if the allowable stress is 15.0 MPa. What is the allowable load, if the deformation of the 2.0 m high pedestal should not exceed 1.0 mm? Assume Young's modulus for concrete to be 25.0 GPa. [8+8]

8.a) Develop Bending moment and Shear force for the figure given below indicating the maximum and minimum values.




b) Develop Bending moment and Shear force for the figure given below indicating the maximum and minimum values. [8+8]

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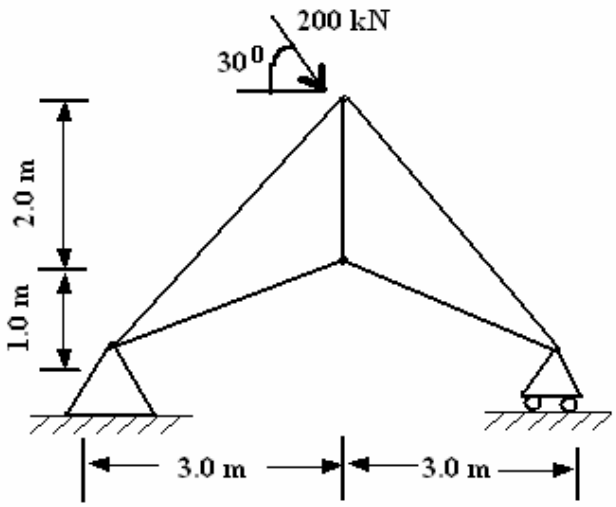
Code.No: 07A3EC07 | R07 | SET-3

**II B.TECH – I SEM EXAMINATIONS, NOVEMBER - 2010**
**MECHANICS OF SOLIDS**
**(Common to ME, MCT, MMT, MEP, AME)**

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

**Answer any FIVE questions**
**All questions carry equal marks**
- - -

1. Analyze the truss indicated in the figure by method of joints. [16]




2.a) Determine the maximum deflection δ in a simply supported beam of length L carrying a concentrated load of P at mid span.
b) Determine the maximum deflection δ in a simply supported beam of length L carrying a uniformly distributed load through out the length. [8+8]

3.a) What are the assumptions of the thin cylinder theory? Discuss the limitations and justification.
b) Derive the expressions for stresses in a thin spherical shell under radial pressure.[8+8]

4. The outer diameter of a cylinder is 1.6 times its inner diameter. Assuming υ = 0.28, determine the ratio of external and internal pressures applied separately, so that in both the cases
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5.a) Define proportionality limit, elasticity limit, yield stress and ultimate stress of a material.
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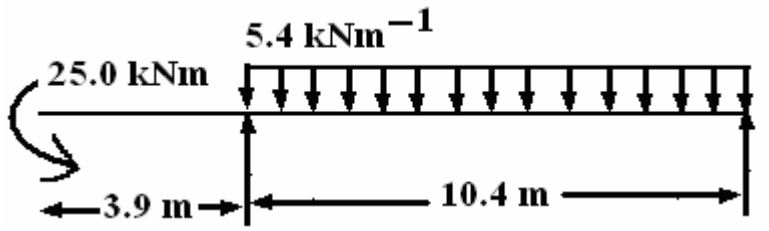
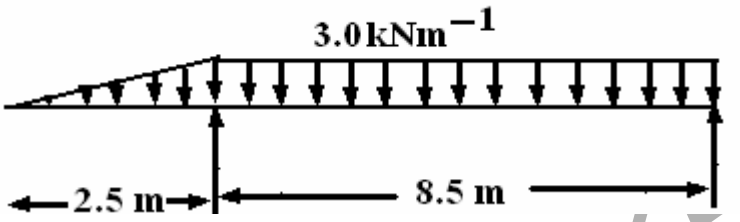
(Contd…….2)

| Code.No: 07A3EC07 | R07 | SET-3 |
|---|---|---|

6.a) Develop Bending moment and Shear force for the figure given below indicating the maximum and minimum values.

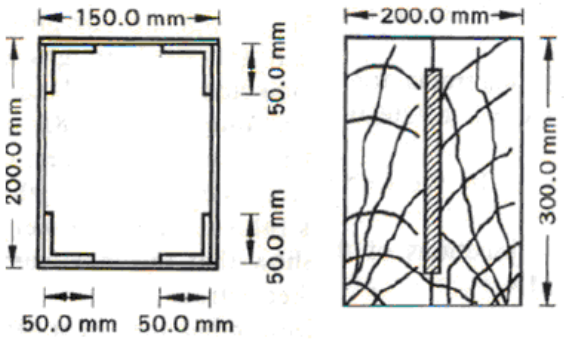



b) Develop Bending moment and Shear force for the figure given below indicating the maximum and minimum values. [8+8]




7. A rectangular steel bar, 20 mm wide by 40 mm high and 4 m long, is simply supported at its ends. If the density of steel is 7850 kg/m$^3$, determine the maximum bending stress caused by the weight of the bar. [16]

8. Develop the shear stress distribution diagrams for the sections shown for the following figures when subjected to a transverse S.F. of 200.0 kN. What are the maximum shear stresses? [16]

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Code.No: 07A3EC07 | R07 | SET-4

**II B.TECH – I SEM EXAMINATIONS, NOVEMBER - 2010**
**MECHANICS OF SOLIDS**
**(Common to ME, MCT, MMT, MEP, AME)**

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

**Answer any FIVE questions**
**All questions carry equal marks**
- - -

1.a) What are the assumptions of the thin cylinder theory? Discuss the limitations and justification.
b) Derive the expressions for stresses in a thin spherical shell under radial pressure.[8+8]

2. The outer diameter of a cylinder is 1.6 times its inner diameter. Assuming $\upsilon = 0.28$, determine the ratio of external and internal pressures applied separately, so that in both the cases
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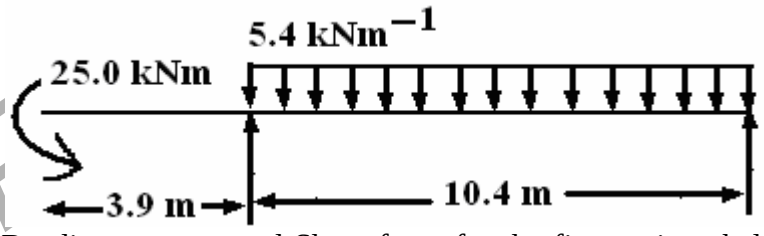
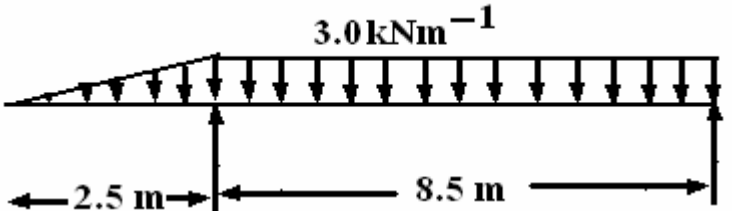
b) The largest strains have the same numerical values. [16]

3.a) Define proportionality limit, elasticity limit, yield stress and ultimate stress of a material.
b) A square concrete pedestal is to sustain a load of 500.0 kN. Determine a suitable cross section for the pedestal, if the allowable stress is 15.0 MPa. What is the allowable load, if the deformation of the 2.0 m high pedestal should not exceed 1.0 mm? Assume Young's modulus for concrete to be 25.0 GPa. [8+8]

4.a) Develop Bending moment and Shear force for the figure given below indicating the maximum and minimum values.




b) Develop Bending moment and Shear force for the figure given below indicating the maximum and minimum values. [8+8]

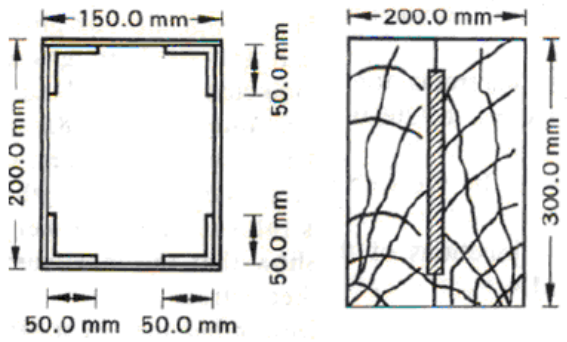



5. A rectangular steel bar, 20 mm wide by 40 mm high and 4 m long, is simply supported at its ends. If the density of steel is 7850 kg/m$^3$, determine the maximum bending stress caused by the weight of the bar. [16]

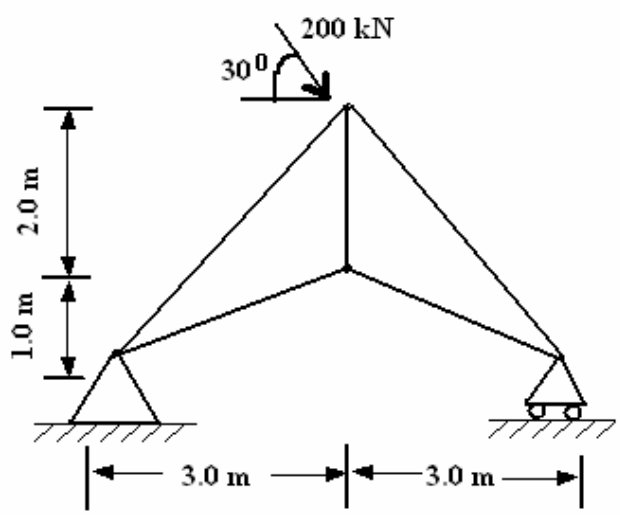
(Contd…….2)

| Code.No: 07A3EC07 | R07 | SET-4 |
|---|---|---|

6. Develop the shear stress distribution diagrams for the sections shown for the following figures when subjected to a transverse S.F. of 200.0 kN. What are the maximum shear stresses? [16]




7. Analyze the truss indicated in the figure by method of joints. [16]




8.a) Determine the maximum deflection δ in a simply supported beam of length L carrying a concentrated load of P at mid span.

b) Determine the maximum deflection δ in a simply supported beam of length L carrying a uniformly distributed load through out the length. [8+8]

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