

Code No: RR210102

RR

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 steel wire 2.5 mm dia . is firmly held in a clamp from which it hangs vertically. An anvil is secured to the wire 1.5 m below the clamp. The wire is to be tested allowing a weight bored to slide over the wire to drop freely from 1m height above the anvil . Find the weight required to stress the wire to  $900 \text{ N/mm}^2$ , if  $E = 200 \text{ Gpa}$ . Neglect the weight of the anvil and assume the wire to remain elastic. [16]
2. (a) Explain the different modes of failure of a riveted Joint.  
 (b) A water tank is made with 10mm thick plates. The plates are Jointed by lap Joint using 18mm diameter rivets at a pitch of 60mm. Find the efficiency of the Joint if the rivets are power driven. [8+8]
3. Find the forces in all the members of the warrentype Cantilever truss shown in Figure 3 by the method of sections. Tabulate the values. [16]

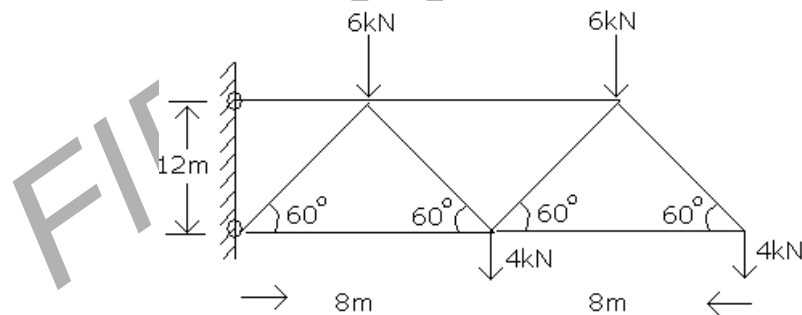


Figure 3

4. Define the terms
  - (a) Hoop stress
  - (b) Longitudinal stress and

Derive the expressions for the same in thin spherical shells. Also obtain the expressions for change in diameter and volume. [16]
5. (a) What are the limitations of the moment area method?  
 (b) State and prove moment area theorem - 1. [6+10]
6. Obtain the shear stress distribution for a rectangular cross section  $230 \times 400 \text{ mm}$  subjected to a shear force of 40 KN. Calculate maximum and average shear stress. [16]

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7. A steel rod of stepped section, of total length 300 mm is subjected to an axial tensile load of 150 kN. The left and right end portions are of constant dia. 50 mm. Find the dia. of the middle portion if the max. permissible stress in it is  $140 \text{ N/mm}^2$ . Find also the length of the middle portion if the total elongation of the rod is 0.15 mm. Take  $E = 200 \text{ GPa}$ . [16]
8. Obtain the S.F.D. & B. M d and find the maximum values for the beam loaded as shown in Figure 8. [16]

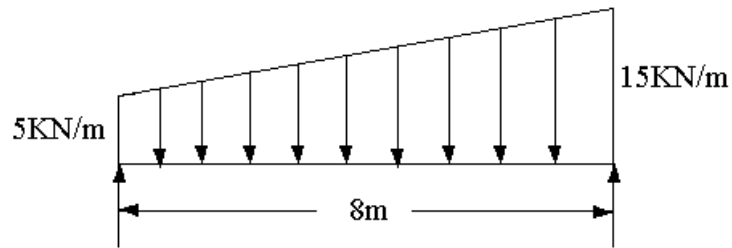


Figure 8

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Set No. 4

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**STRENGTH OF MATERIALS - I**  
**Civil Engineering**

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 (b) State and prove moment area theorem - 1. [6+10]
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 (b) A water tank is made with 10mm thick plates. The plates are Jointed by lap Joint using 18mm diameter rivets at a pitch of 60mm. Find the efficiency of the Joint if the rivets are power driven. [8+8]
7. Find the forces in all the members of the warrentype Cantilever truss shown in Figure 7 by the method of sections. Tabulate the values. [16]

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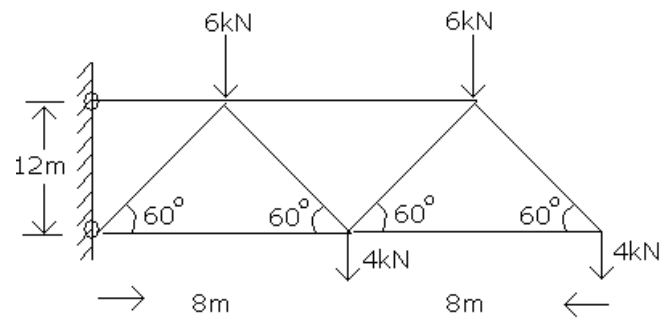


Figure 7

8. Obtain the S.F.D. & B. M d and find the maximum values for the beam loaded as shown in Figure 8. [16]

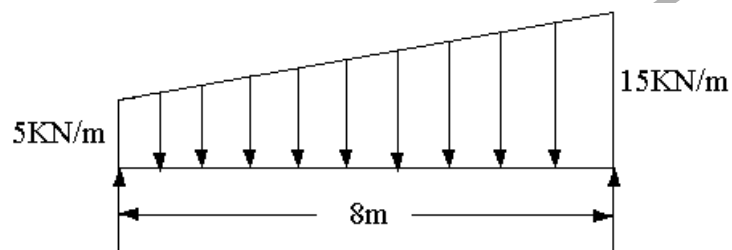


Figure 8

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Set No. 1

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4. Obtain the S.F.D. & B. M d and find the maximum values for the beam loaded as shown in Figure 4. [16]

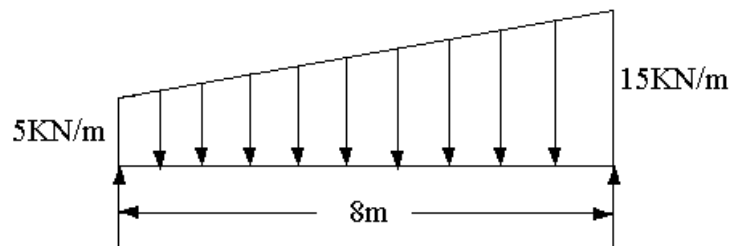


Figure 4

5. Obtain the shear stress distribution for a rectangular cross section  $230 \times 400 \text{ mm}$  subjected to a shear force of 40 kN. Calculate maximum and average shear stress. [16]
6. (a) What are the limitations of the moment area method?  
 (b) State and prove moment area theorem - 1. [6+10]
7. A steel rod of stepped section, of total length 300 mm is subjected to an axial tensile load of 150 kN. The left and right end portions are of constant dia. 50 mm.

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Find the dia. of the middle portion if the max. permissible stress in it is  $140 \text{ N/mm}^2$ . Find also the length of the middle portion if the total elongation of the rod is  $0.15 \text{ mm}$ . Take  $E = 200 \text{ GPa}$ . [16]

8. Find the forces in all the members of the warrentype Cantilever truss shown in Figure 8 by the method of sections. Tabulate the values. [16]

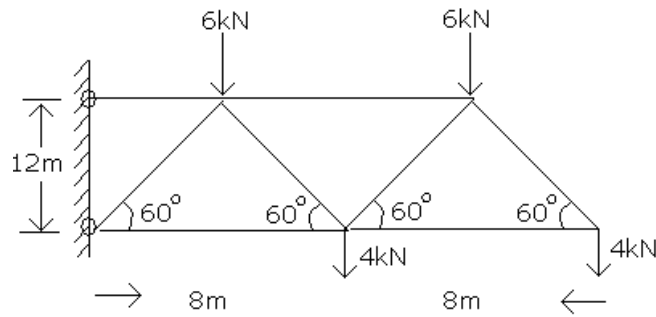


Figure 8

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Set No. 3

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**Civil Engineering**

Time: 3 hours

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- What are the limitations of the moment area method?
  - State and prove moment area theorem - 1. [6+10]
- A steel rod of stepped section, of total length 300 mm is subjected to an axial tensile load of 150 kN. The left and right end portions are of constant dia. 50 mm. Find the dia. of the middle portion if the max. permissible stress in it is  $140 \text{ N/mm}^2$ . Find also the length of the middle portion if the total elongation of the rod is 0.15 mm. Take  $E = 200 \text{ GPa}$ . [16]
- A steel wire 2.5 mm dia. is firmly held in a clamp from which it hangs vertically. An anvil is secured to the wire 1.5 m below the clamp. The wire is to be tested allowing a weight bored to slide over the wire to drop freely from 1m height above the anvil. Find the weight required to stress the wire to  $900 \text{ N/mm}^2$ , if  $E = 200 \text{ GPa}$ . Neglect the weight of the anvil and assume the wire to remain elastic. [16]
- Find the forces in all the members of the warrentype Cantilever truss shown in Figure 4 by the method of sections. Tabulate the values. [16]

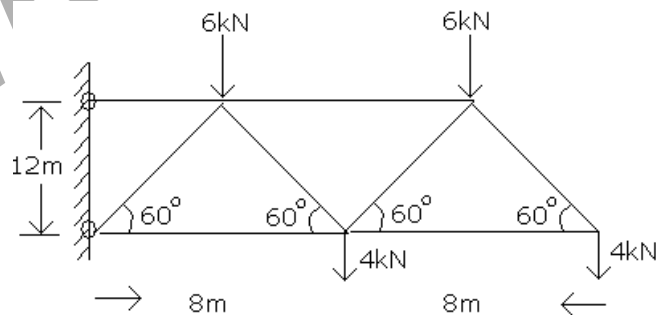


Figure 4

- Explain the different modes of failure of a riveted Joint.
  - A water tank is made with 10mm thick plates. The plates are Jointed by lap Joint using 18mm diameter rivets at a pitch of 60mm. Find the efficiency of the Joint if the rivets are power driven. [8+8]
- Obtain the S.F.D. & B. M d and find the maximum values for the beam loaded as shown in Figure 6. [16]

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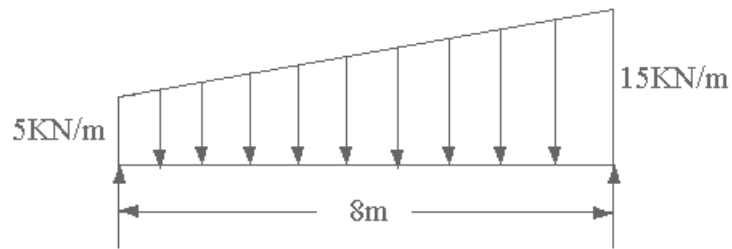


Figure 6

7. Define the terms

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