

II B.Tech II Semester Examinations, APRIL 2011
STRENGTH OF MATERIALS - II
Civil Engineering

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

Answer any FIVE Questions
All Questions carry equal marks

1. Calculate the safe compressive load on an hollow C.I. column(one end rigidly fixed and other end hinged) of 15 cm external dia, 10cms internal dia. and 8m in length. Use Euler's formula with a factor of safety of 5 and $E= 100\text{kN}/\text{mm}^2$. [16]
2. A semi circular beam is supported on three equally spaced columns. Derive expressions for Max B.M and Max Twisting Moment by deriving the general expressions. [16]
3. In an experimental determination of the buckling load for a 12mm dia mild steel pin ended struts of various lengths, two of the values obtained were
 - (a) When length is 50cms load is 10 KN and
 - (b) When length is 20cms load is 30 KN.Make necessary calculations and state whether either of the values of the loads, confirm with Euler's formula for the critical load. Take $E = 2 \times 10^4 \text{KN}/\text{cm}^2$. [16]
4. A railway wagon having a mass of 6000Kg. and moving with a speed of 12Kmph. has to be stopped by four buffer springs in which the maximum compression allowed is 20cm. Calculate the number of turns in each spring when the dia of the wire is 3cm. and the mean dia of coil is 15 cm. Take $C = 8 \times 10^4 \text{N}/\text{mm}^2$. [16]
5. A square pin is required to resist a pull of 40KN and a shear force of 15KN Derive a Suitable section according to strain energy theory. Maximum elastic stress in tension is $350\text{N}/\text{mm}^2$, Poisson's ratio is 0.3. Adopt a factor of safety of 2.5. [16]
6. A hollow rectangular column of external depth 1m and external width 1.0 m is 10cm thick. Calculate the maximum and minimum stress in the section of the column if a vertical load of 200 KN is acting with an eccentricity of 20 cm. [16]
7. A cantilever truss is loaded as shown in figure 3. By method of joints analyze the truss. [16]

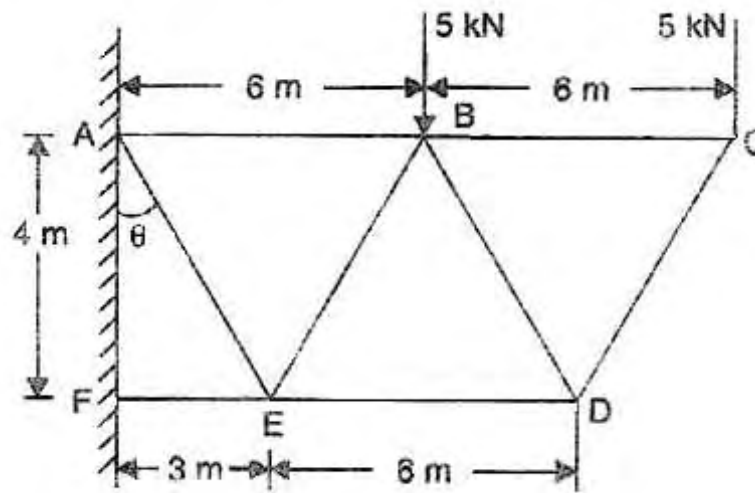


Figure 3

8. Determine I_{uu} and I_{vv} graphically by using Mohr-circle method for an angle section $225 \times 175 \times 15$ mm. [16]

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3. A square pin is required to resist a pull of 40 kN and a shear force of 15 kN. Derive a suitable section according to strain energy theory. Maximum elastic stress in tension is 350 N/mm^2 , Poisson's ratio is 0.3. Adopt a factor of safety of 2.5. [16]
4. A railway wagon having a mass of 6000 kg, and moving with a speed of 12 kmph. has to be stopped by four buffer springs in which the maximum compression allowed is 20 cm. Calculate the number of turns in each spring when the dia of the wire is 3 cm. and the mean dia of coil is 15 cm. Take $C = 8 \times 10^4 \text{ N/mm}^2$. [16]
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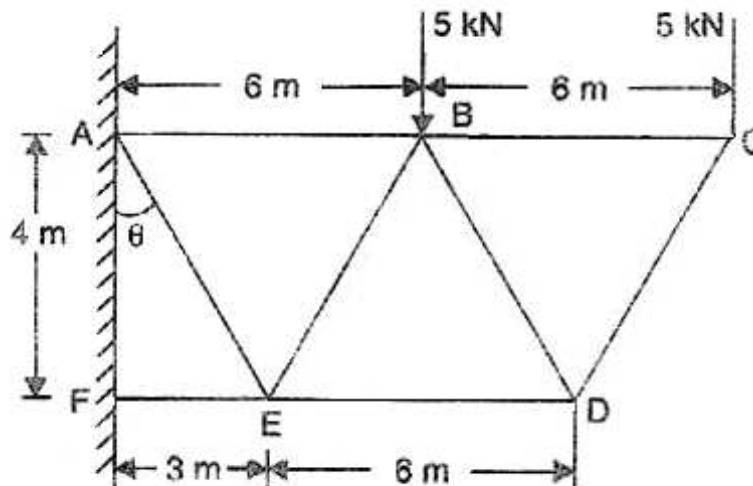


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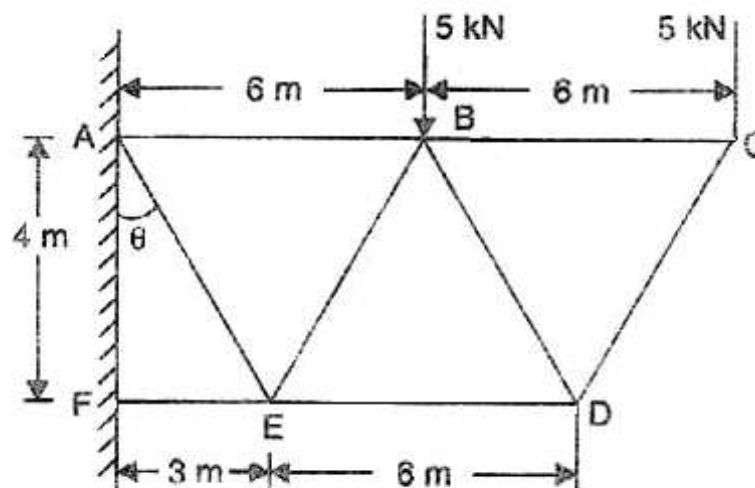


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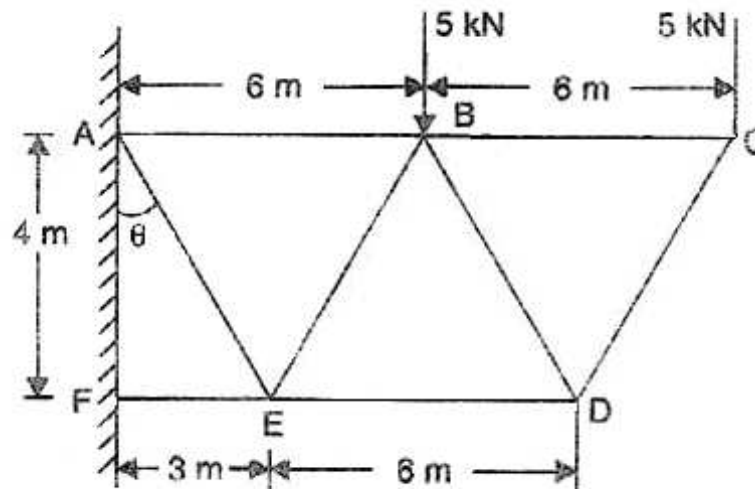


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