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RM-6449

B. E. - II (Sem. IV) (Civil) Examination

May / June – 2010

Structural Analysis - I

Time : **3** Hours] [Total Marks : **100**

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ B. E. - 2 (Sem. 4) (Civil)

Name of the Subject :

☛ Structural Analysis - 1

☛ Subject Code No. : 6 4 4 9 ☛ Section No. (1, 2,.....) : 1&2

Seat No. :

Student's Signature

(2) Figures to the right indicate full marks.

(3) Answers to the two sections should be written in **separate** answer books.

(4) Assume suitable data when required and mention it clearly.

(5) Use of non-programmable calculator is permitted.

SECTION - I

1 The feet of a tripod resting on a smooth ground are tied by horizontal bars forming a triangle BCD, as shown in figure (a), where E is the mid point of CD and F is the mid point of BE. The apex A [figure 1(b)] of the tripod is 3m vertical above point F. Determine the forces in all the members due to a load of 100 kN suspended from apex A. (Use tension coefficient method). **20**

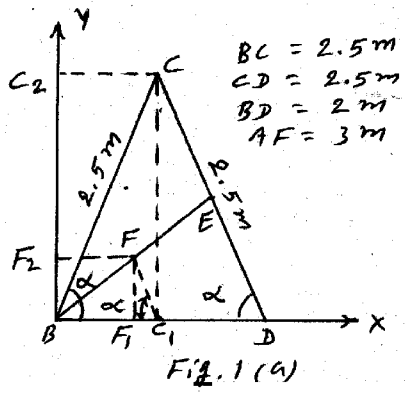


Fig. 1 (a)

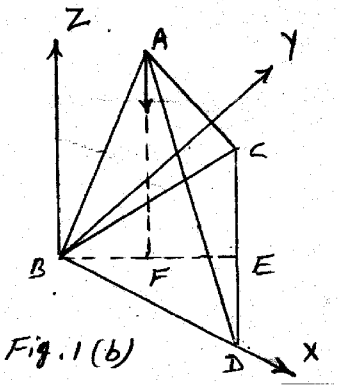


Fig. 1 (b)

2 A beam of rectangular section 80 mm wide and 120 mm deep is subjected to a bending moment of 12 kN.m. The trace of the plane of loading is inclined at 45° to the Y-Y axis of the section. Locate the neutral axis of the section and calculate the maximum bending stress induced in the section. **15**

OR

2 Determine the principal moment of inertia of the unequal angle section 90 x 60 x 10 mm as shown in figure 2. **15**

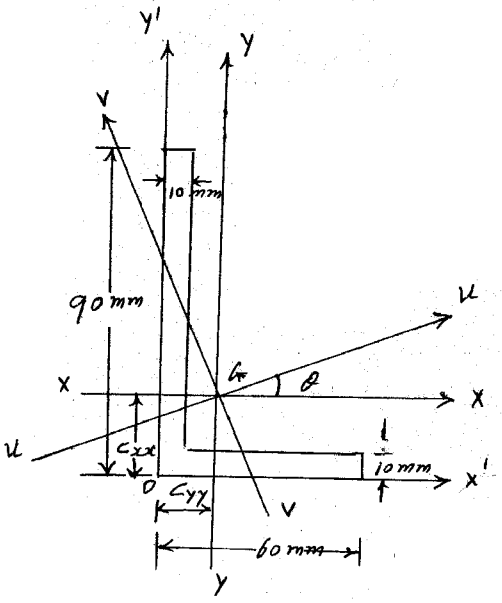


Fig. 2

3 (a) Write short note on shear centre. **4**

(b) Locate the shear centre of the channel section shown in figure 3. **11**

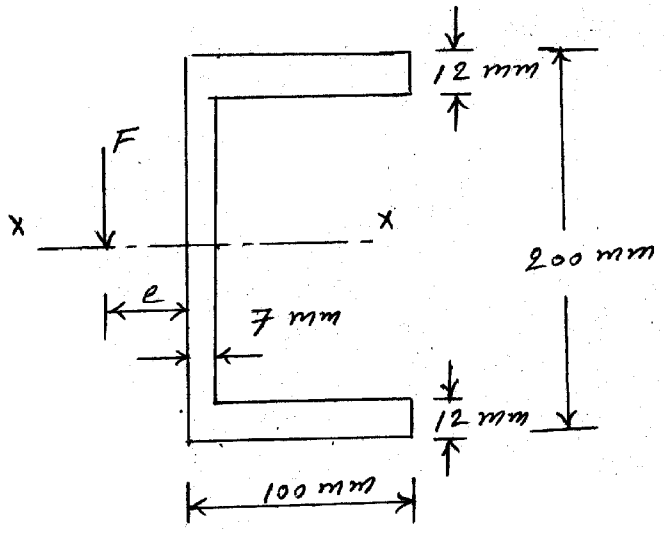


Fig. 3

SECTION - II

4 (a) Construct the influence line for RA, RC and shear and bending at B for the beam as shown in **Fig. 4**. **10**

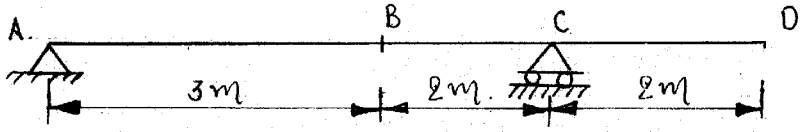


Fig. 4

(b) A train of loading shown in **Fig. 5**. passes from right to left with 65 kN loading over a simply supported beam having span 16 m. Determine : (a) Absolute maximum shear, (b) Absolute maximum moment in beam. **10**

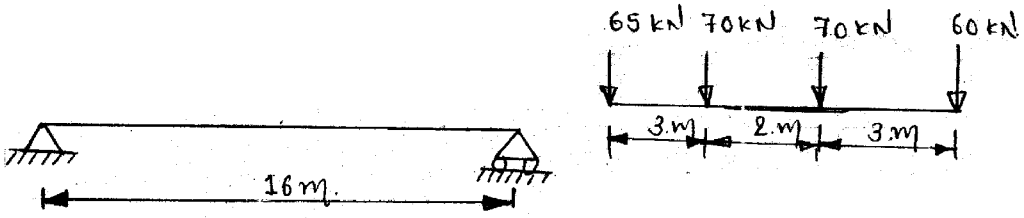


Fig. 5

OR

(b) For the through bridge truss shown in **Fig. 6** draw I.L. diagrams for members BC, CI, HI. **10**

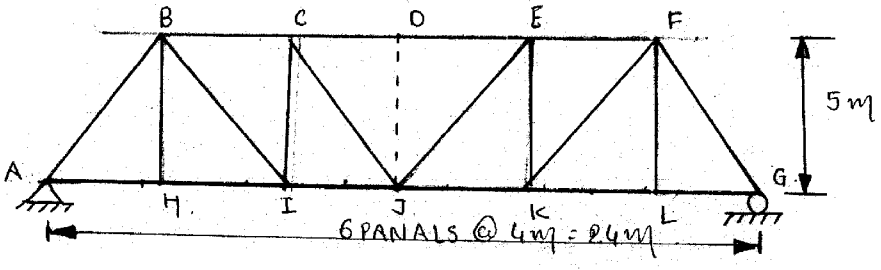


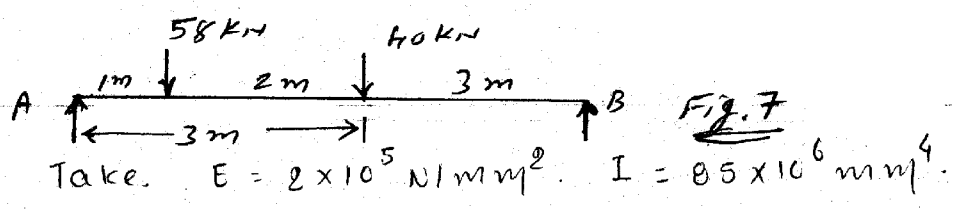
Fig. 6

5 (a) A beam of length 6 m is simply supported at its ends and carries point load of 58 kN and 40 kN at a distance of 1m and 3m respectively. Find out

(i) Deflection at p.t 58 kN

(ii) maximum deflection

Use successive integration method (**Fig. 7**)



(b) A simply supported beam of length 6m carried a point load 4 kN at distance 2m. From each end, if E = 2 × 10^5 N/mm^2 and I = 10^8 mm^2. For the beam, then using conjugate beam method. Determine **10**
(i) Deflection at point D
(ii) Slope at A (See **Fig.** 8)

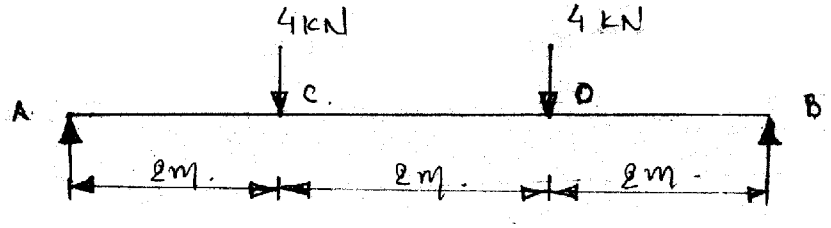


Fig. 8

6 Determine the vertical deflection at free end C of the beam ABC. shown in figure 9. using Castiglion's first theorem. Take E = 2 × 10^5/mm^2 and I = 8 × 10^8 mm^4.