* K D - 6 4 4 9 *

KD-6449

B. E. II (Sem. IV) Examination

December – 2012

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)**

Name of the Subject :

☛ **Structural Analysis - 1**

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

Seat No. :

Student's Signature

1. Assumed suitable data, if necessary.
2. Figure to the right indicate full marks.
3. Explain with neat sketches, if needed.
4. Use of non-programmable calculator is permitted

1 (a) A space frame consists of six members AF, BE, BF,FE, EC and FD. The frame is pinned to vertical wall at ABCD in such a way that ABCD from square as shown in fig. also ABEF is a rectangle in horizontal plane. Using method of tension coefficient force in each members due to loading 160 kN applied E acting towards the joint D . 20

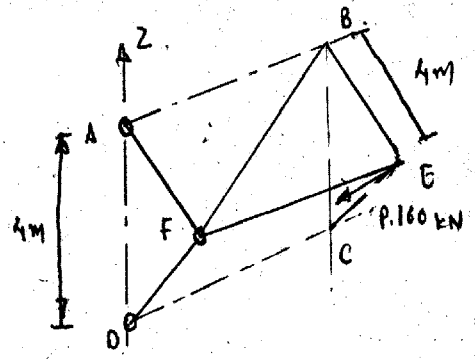
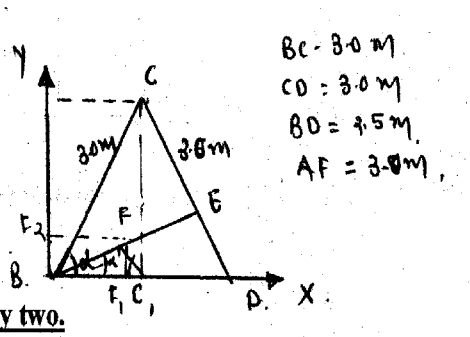


Fig-1

(a) The feet of tripod resting on smooth ground are tried by horizontal bars forming a triangular bars forming a triangular BCD, as shown in fig. 2 of the tripod is 3 m vertical above point F determine the force in all the members due to a load of 8 KN suspended from apex A (used tension co-efficient method) 20



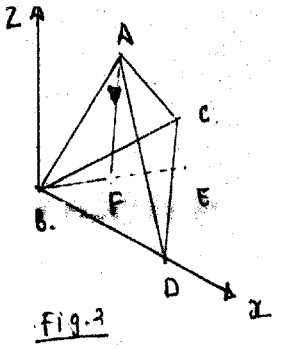


Fig-2

2 **Attempt any two.** 30

1 A wooden beam of cross-section 100 X 150 mm is used as shown in fig. 3 to support a sloping Mangalore tilted roof. It has an effective span of 5 m and carried a uniformly distribution load of 5 kN/m acting vertically downward determines the maximum stress developed in beam.

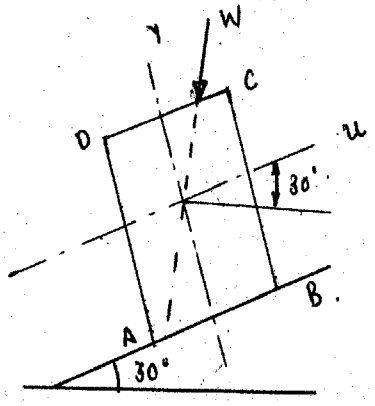


Fig-3

2 Locate shear center of channel section as shown in fig. 4

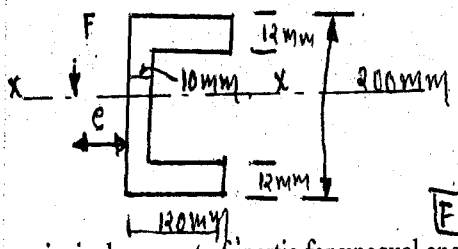


Fig-4

3 Determine the principal moment of inertia for unequal angle angle section 60x 50 x 6 mm shown in fig. 5

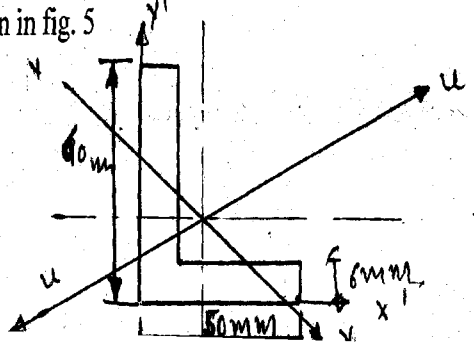


Fig-5.

3 (a) A beam is simply supported at A,B and C has an internal hinged at a distance of 4 m form AB. AB = 8m and BC = 12 m. draw influence line for: fig.6 15

(i) Reaction R_A

(ii) Reaction R_B

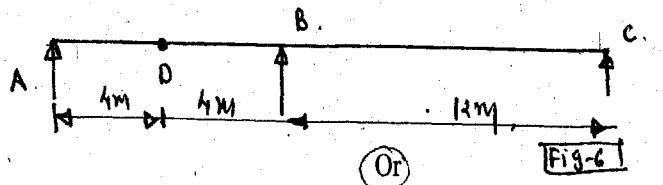


Fig-6

Or

(a) Determine the max. Shear developed A of the simple beam as shown in fig. when series of concentrated loads shown move across the girder. From right to left. Fig.7 15

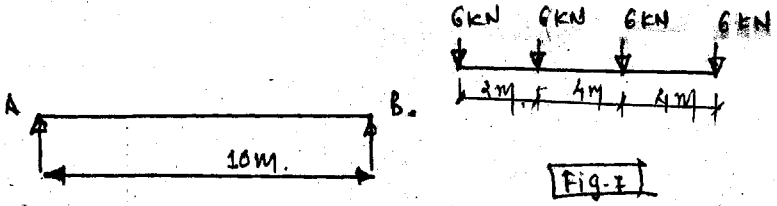


Fig-7

(b) Draw influence line diagram for the forces in the members U_1U_2, U_2U_3 and L_2L3 of through types bridge truss. Fig. 8 15

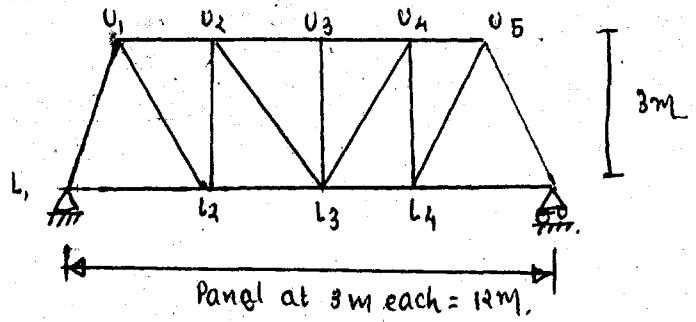


Fig-8

4 **Attempt any two.** 20

(a) Determine slope and deflection at pt. B of beam shown in fig. 9 using successive integrating method. Take $E = 2 \times 10^5$ N/mm^2 and $I_{xx} = 15158.3$ cm^4.

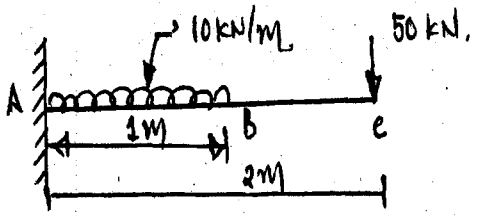


Fig-9

(b) Determine the slope and deflection at free end of a cantilever beam fig. 10 using conjugate beam method. $E = 2 \times 10^5$ N/mm^2 ,$I = 2.1 \times 10^8$ mm^4.

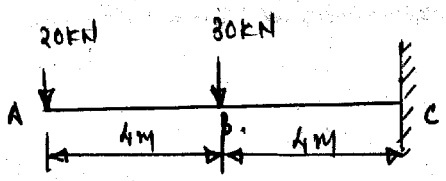


Fig-10

(c) Determine vertical deflection at free end C of the beam ABC shown in fig. 11 using castigliano's first theorem. $E = 2 \times 10^5$ N/mm^2 ,$I = 8.2 \times 10^8$ mm^4

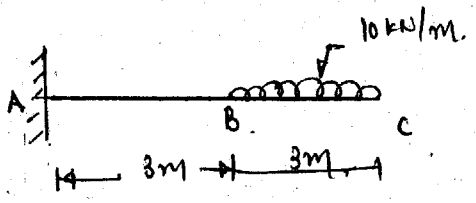


Fig-11