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Roll No. _____ Total No. of Pages : 7

5E3151

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B.Tech.V Sem.(Main/Back) Examination Dec.2012
Civil Engg.
5CE1 Theory of Structures -I

Time : 3 Hours **Maximum Marks : 80**

Min. Passing Marks : 24

Instructions to Candidates:

*Attempt any **five question** selecting **one question** from **each unit**. All Questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly.*

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. **Nil** 2. **Nil**

UNIT-I

Q.1. (a) Explain Moment - Area Theorems. (4)

(b) Define static indeterminacy. Compute the static indeterminacy for the following structure shown in Fig 1(a) & Fig 1(b).

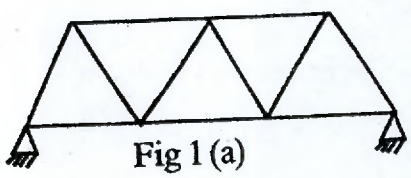

Fig 1 (a)

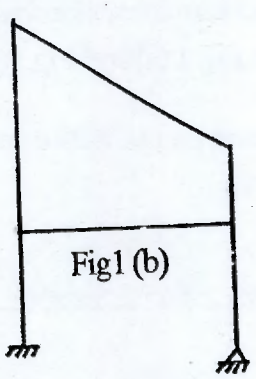

Fig1 (b)

(c) Refer Fig 2. Find out deflection at point F. Two sets of loads and displacements for points D,E and F are given as follows-

		D	E	F
Set I	Load at	—	—	20KN downward
	Displacement at	clockwise rotation of 0.1 radian	1mm towards left	—

		D	E	F
Set II	Load at	anti clockwise movement of 1.6 KN-m	20KN towards right	—
	Displacement at	—	—	??

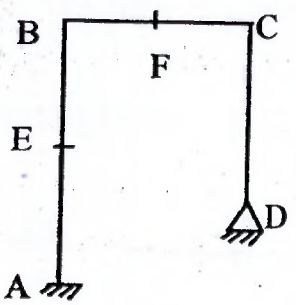

Fig2

OR

Q.1 (a) Explain Maxwell's reciprocal theorem. (4)

(b) Define kinematic indeterminacy. Compute the kinematic indeterminacy for the structures shown in Fig 1 (a) and Fig 1(b)

(c) Compute the vaction at point C of the propped contilever beam in Fig 3 using moment aera method. (8)

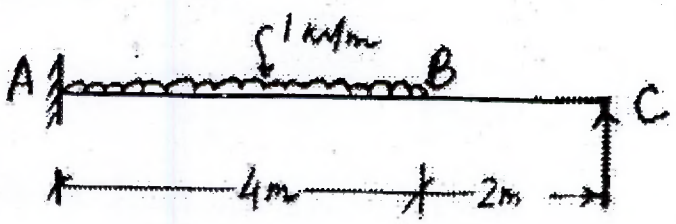

Fig 3

Q.2 Ar
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UNIT-II

Q.2 Analyze the frame shown in Fig 4 using slope-deflection method. Draw BMD and deflected shape. 16

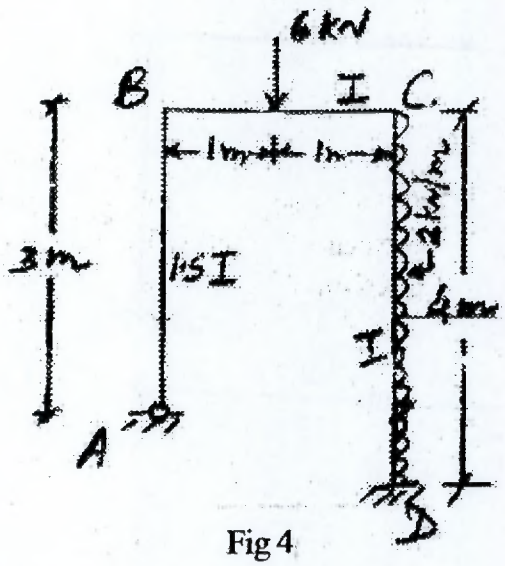

Fig 4

OR

Q.2. Analyze the frame shown in Fig 4 Using moment distribution method. Draw BMD and deflected shape. (16)

UNIT-III

Q.3 (a) Explain the basic concept of conjugate beam method. (4)

(b) Determine the stiffness at A and carry over factor from A to B for the beam shown in Fig 5.

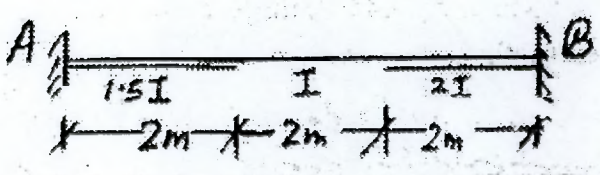

Fig 5

OR

Q.3 (a) Explain the basic concept of column analogy method. (4)

(b) Solve the portal frame shown in Fig 6 by column analogy method & Draw BMD. 12

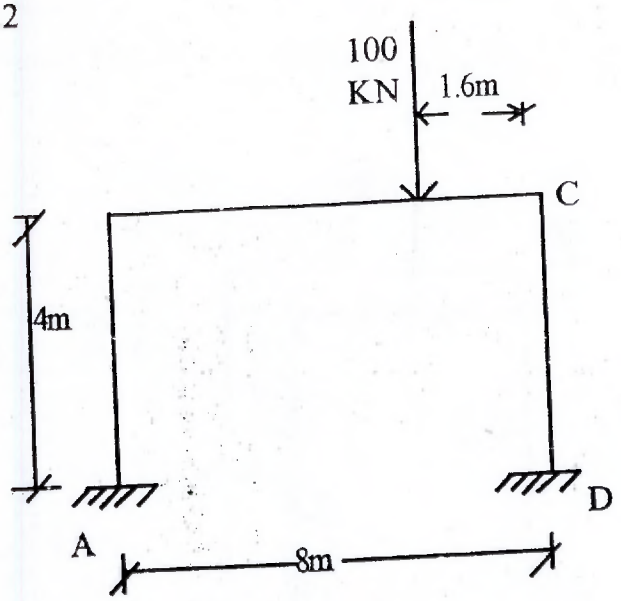

Fig 6

UNIT - IV

Q.4 (a) A crane structure is shown in Fig 7. The length of member AD is '2L' and all other members are of length 'L'. The cross sectional area of member AD is '2a' and that of all other members is 'a'. Find out vertical deflection of F. (10)

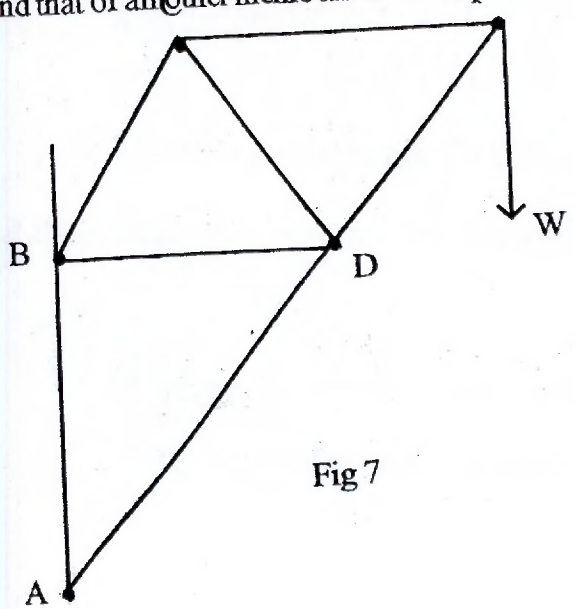

Fig 7

(b) Determine the arial focus in the members of frame shown in Fig 8. Take AE constant (6)

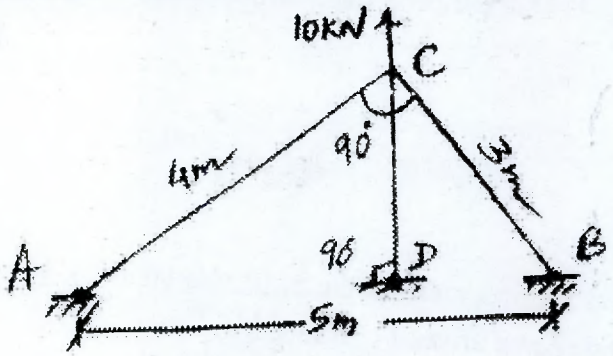

Fig 8

OR

Q.4. (a) A trussed timber beam, 120mm wide and 160mm deep, is 4m long and has a central C.I strut 1m long and 100mm^2 area of cross section. The tie nods are of steel and 500mm^2 area of cross section. Calculate the thrust in the strut if the beam carries a u.d.l. of 10KN/m. Take E wood = 1 x 10^4 N/mn^2, E_{CI} = 1 x 10^5 N/mm^2 and E steel = 2 x 10^5 N/mm^2. (10)

(b) A steel bar bent to the shape shown in Fig 9 is fixed at A and carries a vertical load Wat C. Calculate vertical deflection of C.EI cinstant throughout. (6)

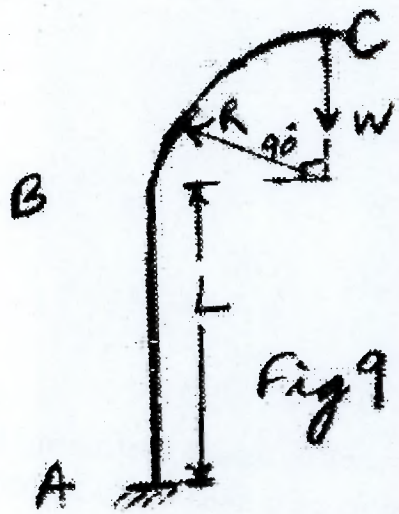

Fig 9

(b)

UNIT-V

Q.5 (a) Write procedure to solve building frame with lateral load by factor method. (4)

(b) Using contilever method, analyze the frame shown in Fig 10. Assume that all columns have equal area of cross section. (12)

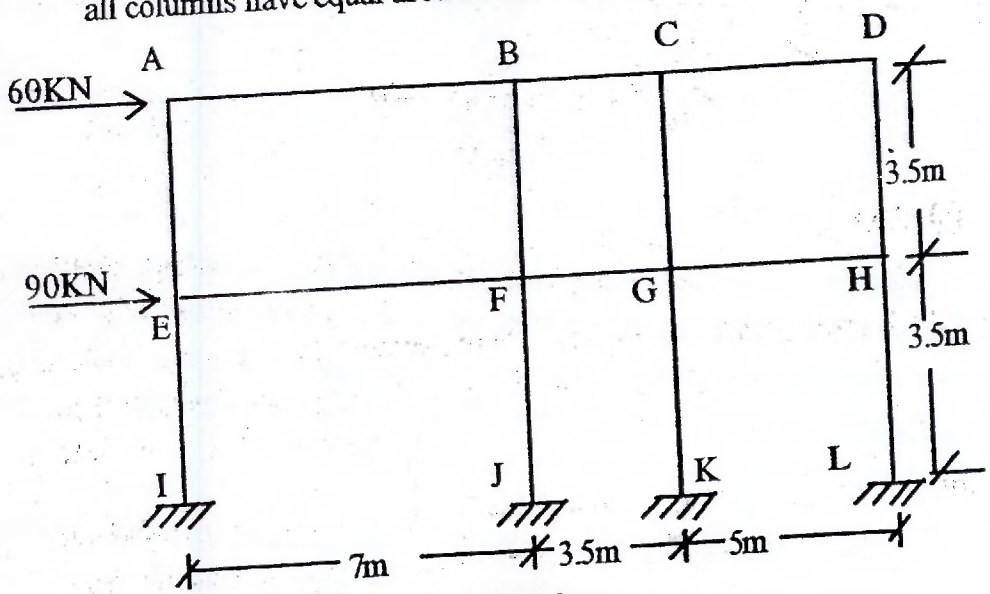

Fig 10

OR

Q.5 (a) What do you understand by tension coefficient? Derive the equations used in tension coefficient method applied to plane frame. (4)

(b) Plan of a tripod is shown in Fig 11.The feet A, B & C are in same plane and apex D is 3.7 m above the plane. Find the focus in the members assuming joints are pin joints.

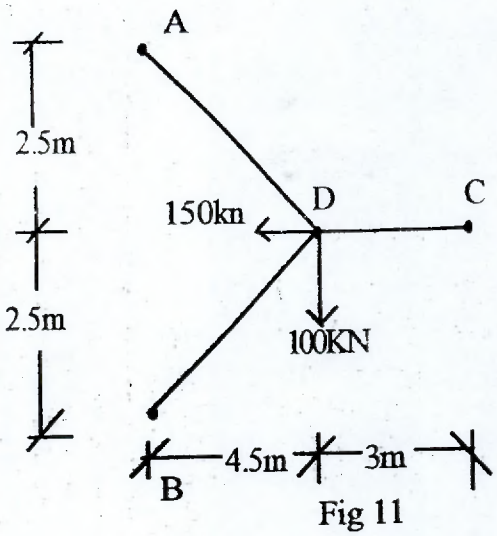

Fig 11

Forces 150KN and 100KN are applied at D in horizontal plane.
