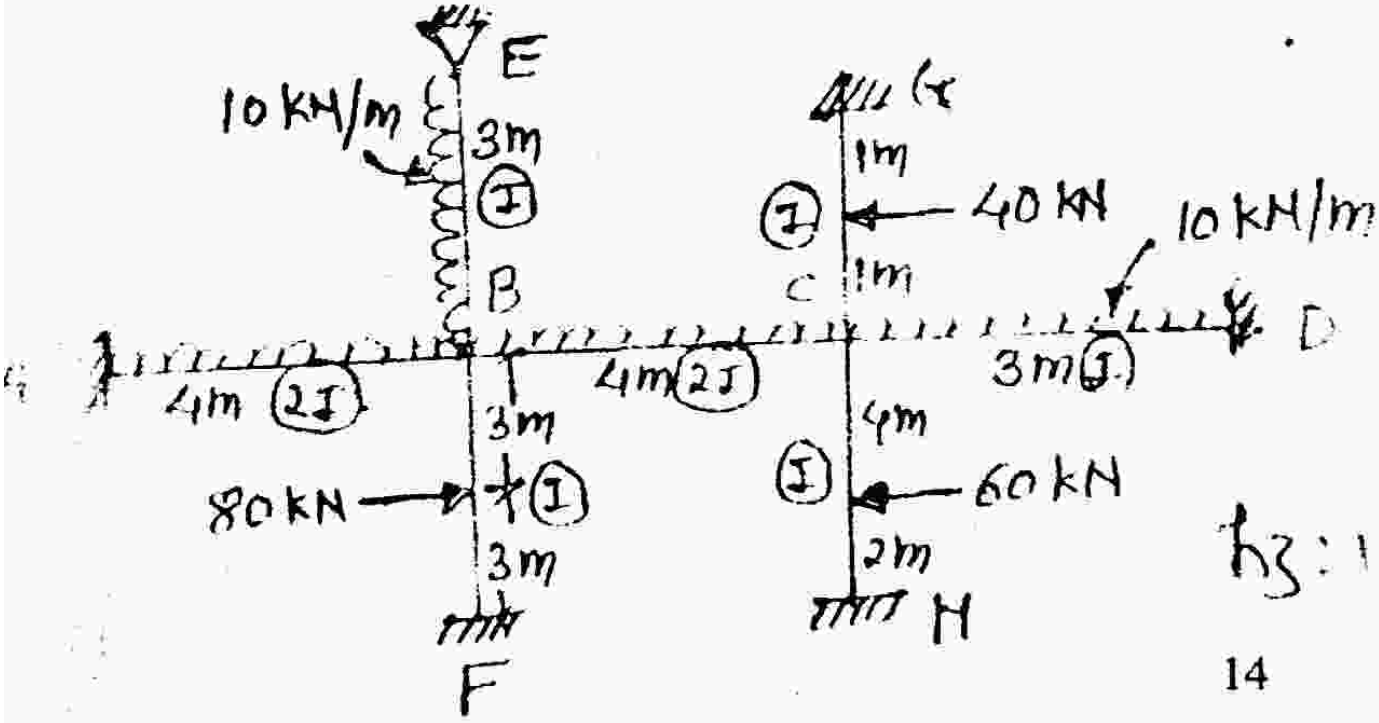
Fifth Semester B. E. (Civil Engg.) (CBS) Examination

STRUCTURAL ANALYSIS–II

Time : Three Hours] [Max. Marks : 80

N. B. :
(1) All questions carry marks as indicated.
(2) Due credit will be given to neatness and adequate dimensions.
(3) Assume suitable data wherever necessary.
(4) Illustrate your answers wherever necessary with the help of neat sketches.
(5) All questions are compulsory.
(6) Use of non–programmable pocket calculator is permitted.

1. Analyse the frame loaded as shown in fig. 1 by Kani's method and sketch the bending moment diagram.



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OR

2. Analyse the frame loaded as shown in fig.2 by Kani's method and sketch the bending moment diagram.

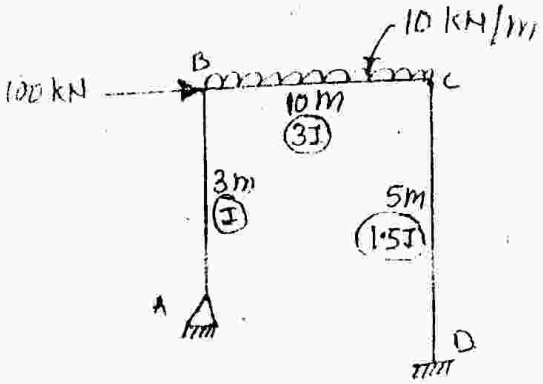

Fig 2

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3. For continuous beam as shown in fig 3 determine support moment by moment distribution method and draw SFD and BMD.

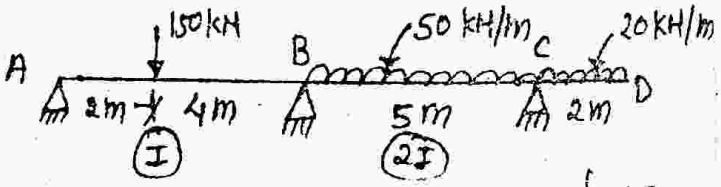

Fig 3

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OR

4. Analyse given portal frame by moment distribution method and draw bending moment diagram refer fig.4

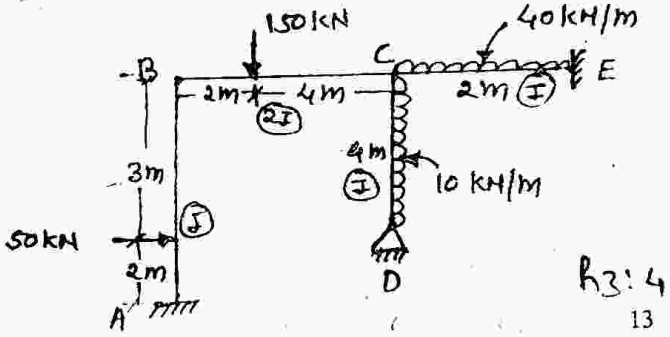

Fig 4

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5. For the truss as shown in fig.5 determine the joint displacement and the member forcess by stiffness method
Assume E = 200 kN/mm^2
A = 500 mm^2(For all member)

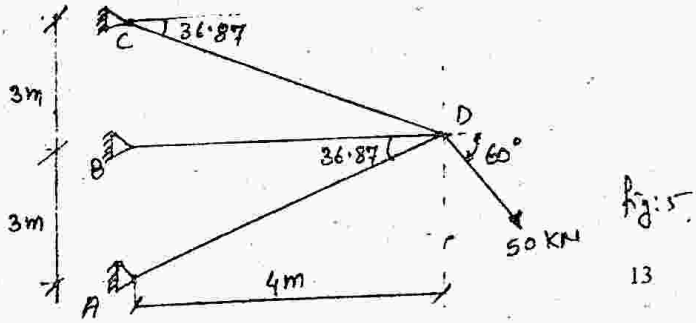

Fig 5

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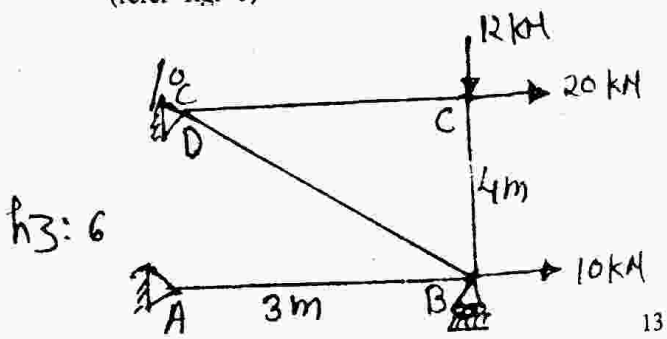
OR

6. Determine Global load matrix and stiffness matrix in given truss for the following effects,
   (1) Temp fall by 50^0C.
   (2) Member BD is 0.1 mm too long.
   (3) Here c/s area of each members is 10 cm^2. Assume
   E = 20000 kN/cm^2
   $\alpha = 12 \times 10^{-6}/^0C$
   (refer fig. 6)



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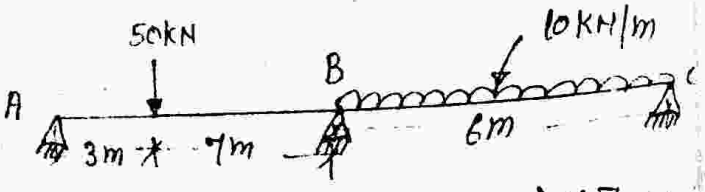
7. Analyse the given continuos beam using stiffness matrix method and plot SFD and BMD. Take EI constant.



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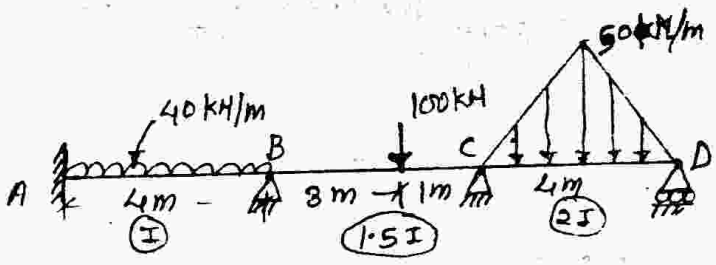
OR

8. For given continous beam calculate Global stiffness matrix and Global load matrix.



h3: 8 14

9. Derive member stiffness matrix for a plane frame element. 13

OR

10. Determine the Global stiffness matrix as shown in fig. 9 taking size of member as
    30 x 50 cm and E = 25.5 x $10^6 kN/m^2$

[Fig. On Next page]

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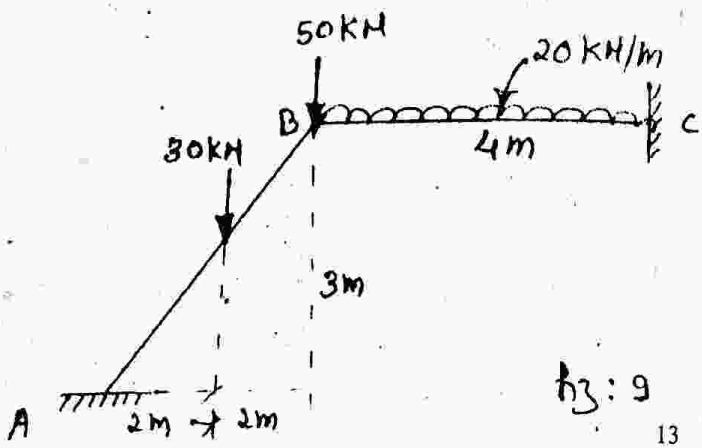

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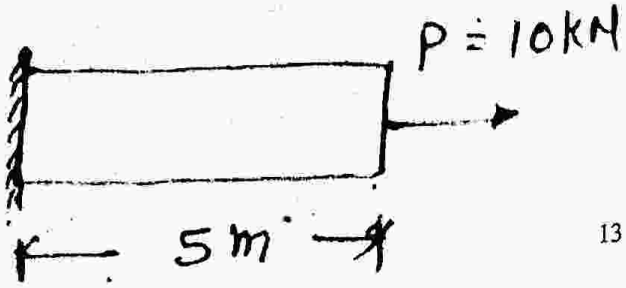
11. Using Rayleigh–Ritz method find displacement of the bar shown in fig. Assume $u = a_1 + a_2x$

$A = 100\ mm^2$

$E = 2 \times 10^5\ N/mm^2$



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OR

12. Explain the following terms in detail (any **three**) :—

(i) D'Alembert Principle,

(ii) Inertia force,

(iii) Equation of motion,

(iv) SDOF system. 13