

(3 Hours)

[Total Marks : 100

MASPER

- N.B.:
- (1) Question No. 1 is compulsory.
 - (2) Attempt any four questions out of remaining six questions.
 - (3) Assume suitable data if required and state it clearly.
 - (4) Figures to right indicate full marks.

1. (a) Answer the followings :
- (i) Distinguish clearly between statically determinate and indeterminate structures. 3
 - (ii) Distinguish between stiffness and flexibility method of analysis. 3
 - (iii) Define flexibility and stiffness coefficients. 2
- (b) Analyse the frame shown in figure, if the outer temperature of all members rise by 30°C while no change in inner temperature.
 $\alpha_1 = 12 \times 10^{-6} / ^{\circ}\text{C}$ and $d = 600 \text{ mm}$ $EI = 10,000 \text{ kN-m}^2$.
for all (Neglect the axial deformation) 12

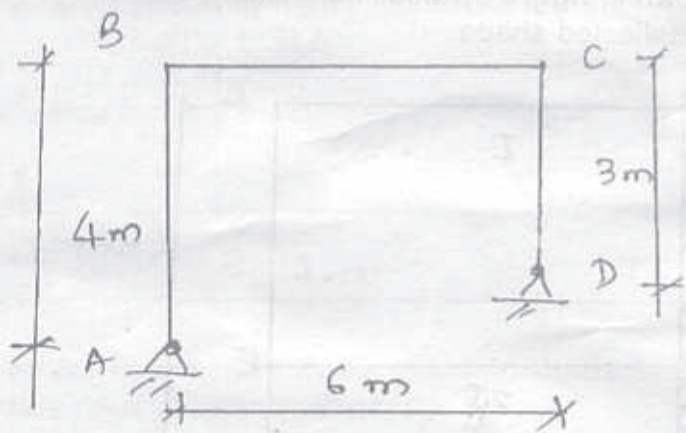
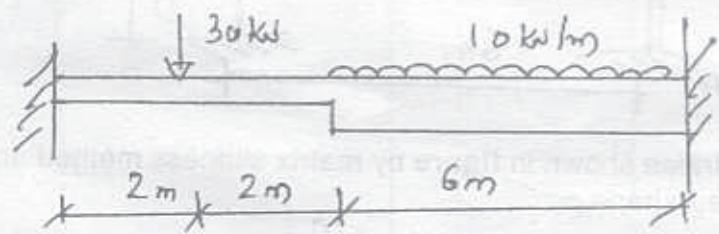
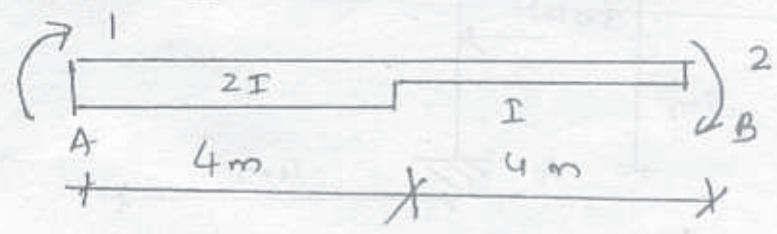


Fig QN 1 b

2. (a) Analyse the following beam by column Analogy and draw BMD. 10

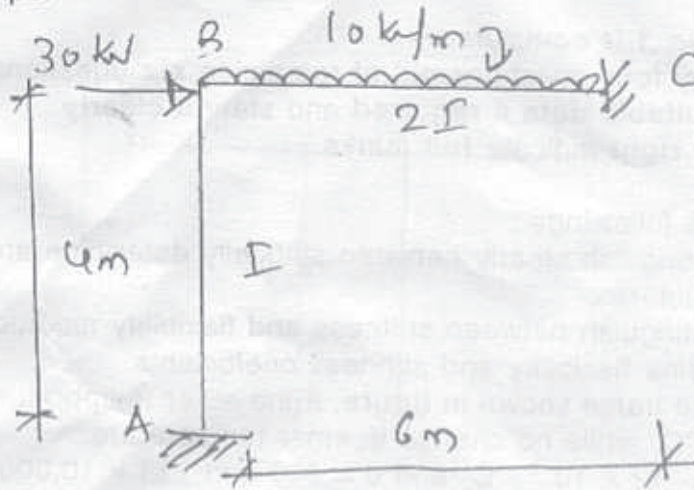


- (b) For the non prismatic beam element shown in figure, calculate the stiffness coefficient K_{11} and K_{21} . Also calculate COF from B to A. 10

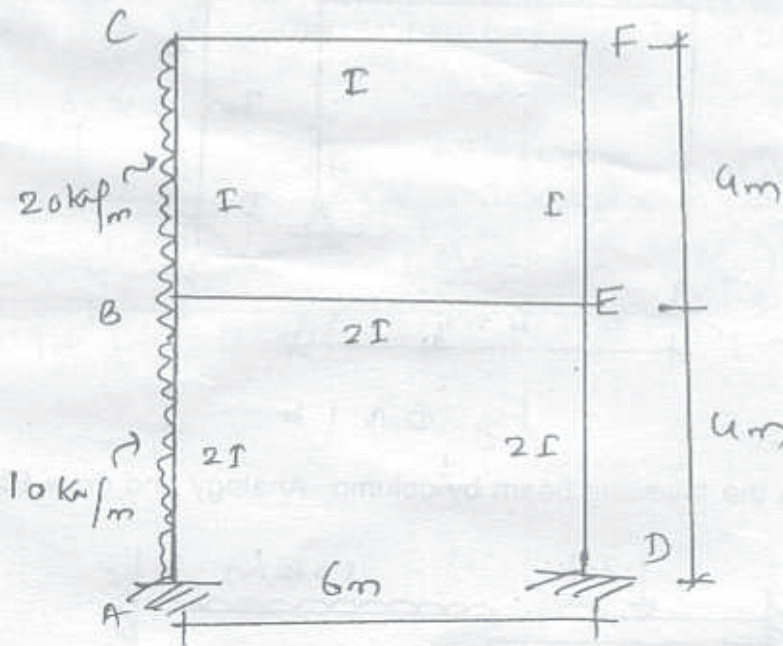


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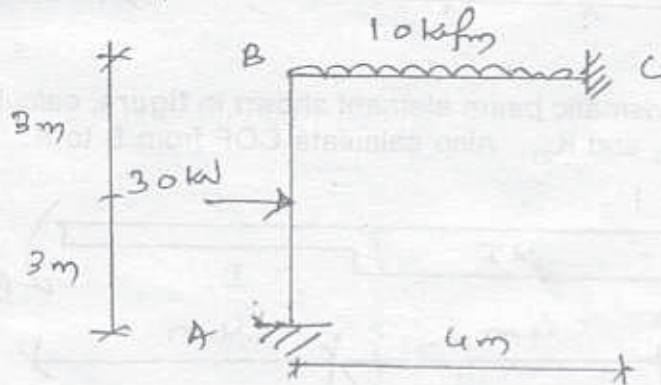
3. Analyse the frame shown in figure by Elastic Centre Method and draw BMD and Deflected shape. 20



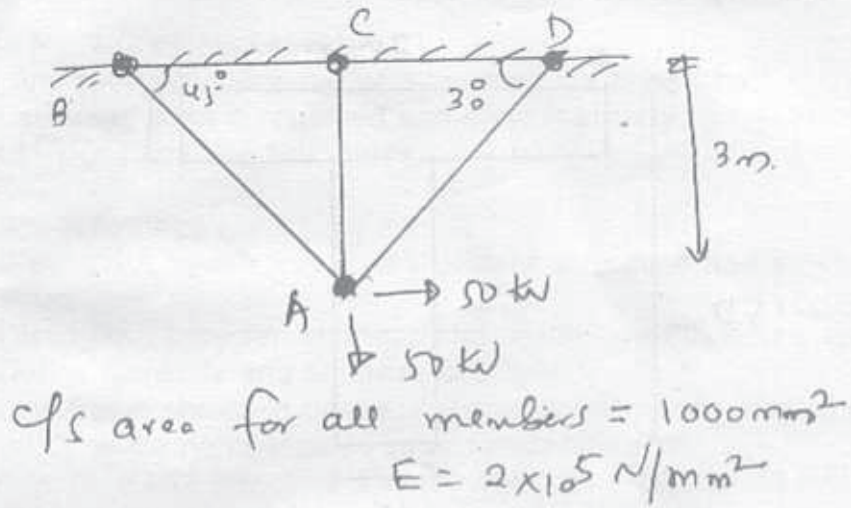
4. Analyse the frame shown in figure by Modified Moment distribution method and draw SFD, BMD and deflected shape. 20



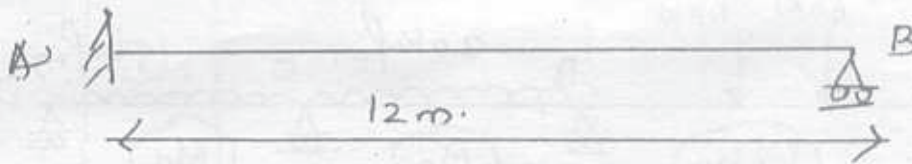
5. (a) Analyse the frame shown in figure by matrix stiffness method and draw BMD and deflected shape : 10



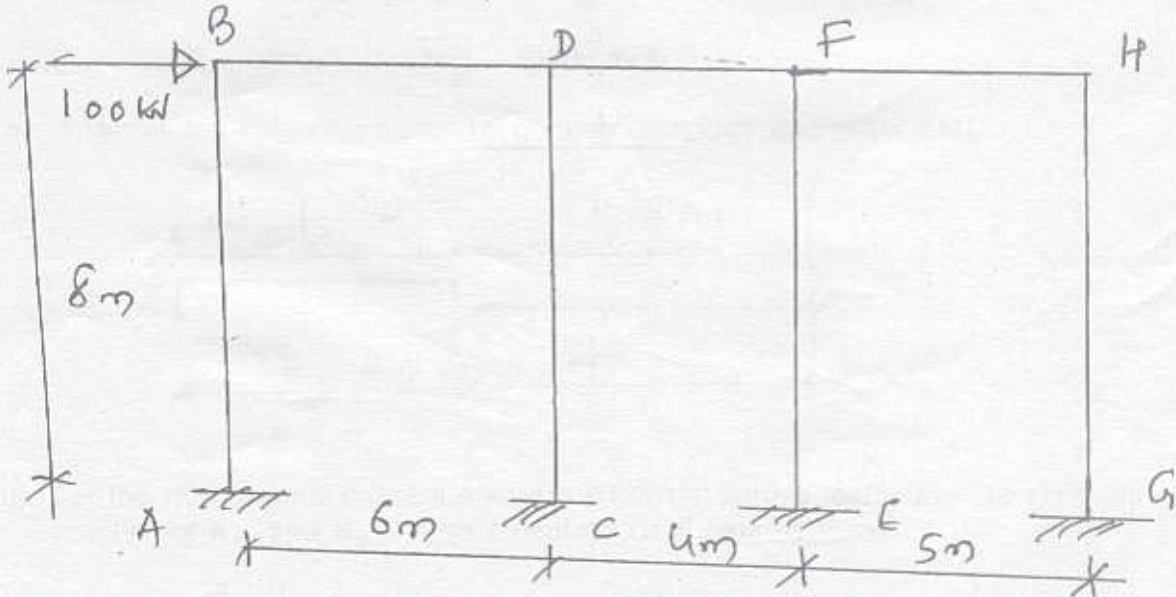
(b) Analyse the pin-jointed frame shown in figure by stiffness matrix method 10 and calculate the member force and member displacements.



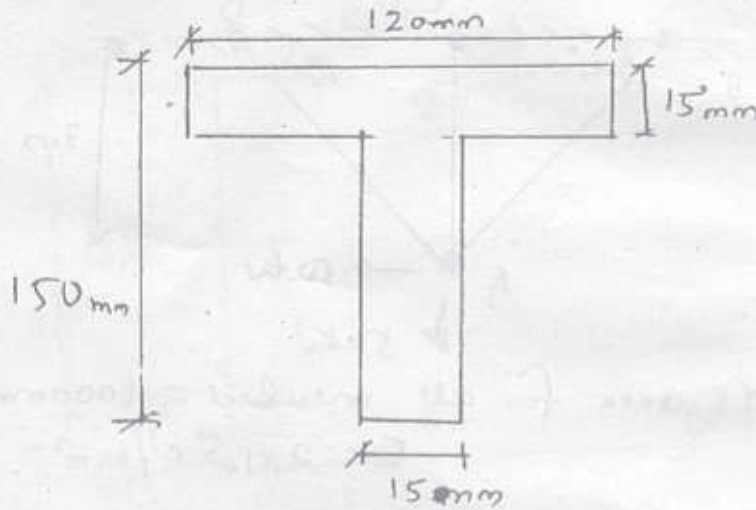
6. (a) For the beam shown in figure, construct ILD for : 10
 (i) Reaction at B ' R_B '
 (ii) BM at A ' M_A '
 Show ordinates at 2 m intervals



(b) Analyse the rigid jointed frame shown in figure by cantilever method and 10 draw BMD and deflected shape.



- (a) For the section shown in figure, calculate the shape factor. If $\sigma_y = 250 \text{ N/mm}^2$. Calculate M_p value of the section. 6



- (b) A continuous beam is subjected to the working loads as shown in figure. 14
 If M_p value is 100 kN-m. Calculate the load factor for the beam.

