(3 Hours) [Total Marks: 80]

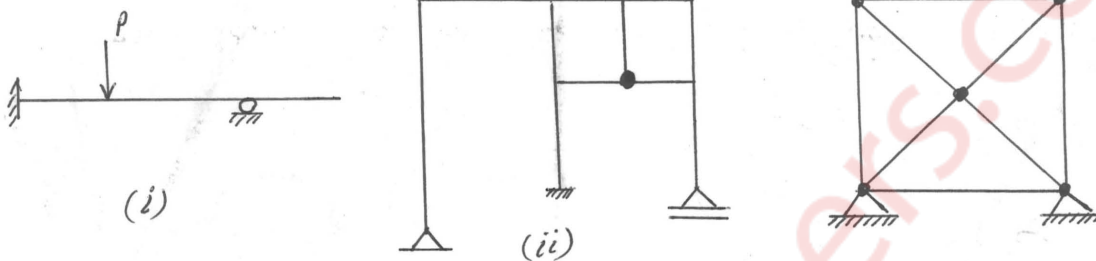N.B: (1) Question **No. 1** is compulsory.

(2) Attempt any **Three** questions out of remaining five questions.

(3) Assume suitable data wherever required and state it clearly.

(4) Illustrate your answers with neat component sketches wherever required.

1. Attempt any four of the following   20
   (a) Determine degree of static and kinematic indeterminacy of following   06
        structures.
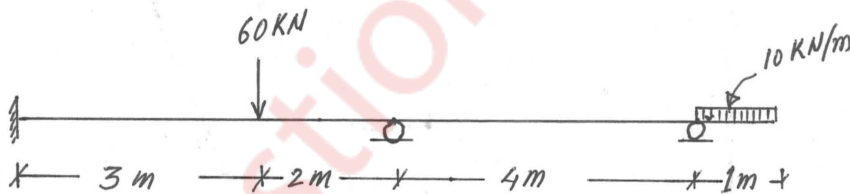

(i)   (ii)

   (b) Derive the slope deflection equation for continuous beam subjected to sinking   04
   of support.
   (c) Determine shape factor for isosceles triangular section having base 'b' and   07
        height 'h'
   (d) Explain stiffness factor, carry over moment and distribution factor.   03

2. (a) Draw BMD and SFD for continuous beam shown below using Clapeyrons   08
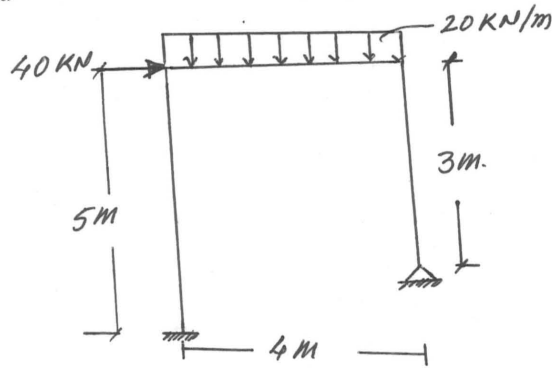   theorem.

   (b) Analyze the frame given below using slope deflection method. Draw BMD   12
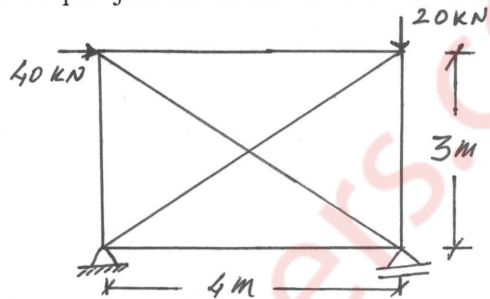

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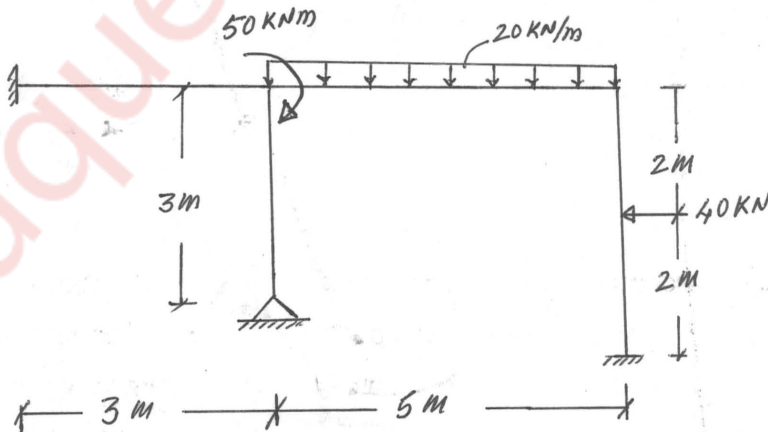
3. Analyse the frame shown, using Moment distribution method or Kani's method — 20


4. (a) Determine forces in each member of pin jointed frame as shown. Use force method. A=200 mm², E=200GPa. — 10

(b) Work out the vertical deflection of point C due to change in temperature as indicated. Take thickness of each member 400 mm. and $\alpha_t = 12 \times 10^{-6}/^{\circ}$ C E=200 GPa — 07
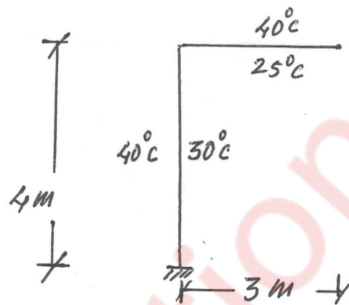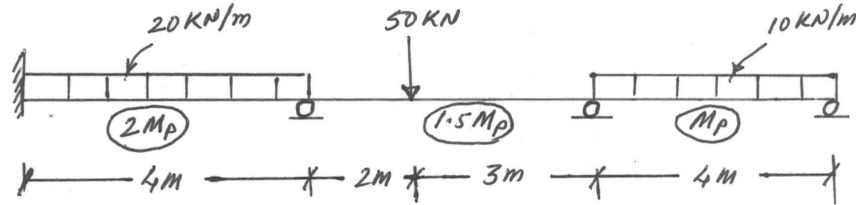

(c) State the assumptions made theory of plastic analysis. — 03

5. (a) Analyse the portal frame shown below, using stiffness matrix OR Flexibility Matrix method. Draw BMD and deflected shape. — 16
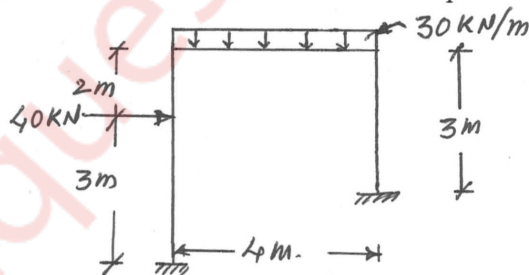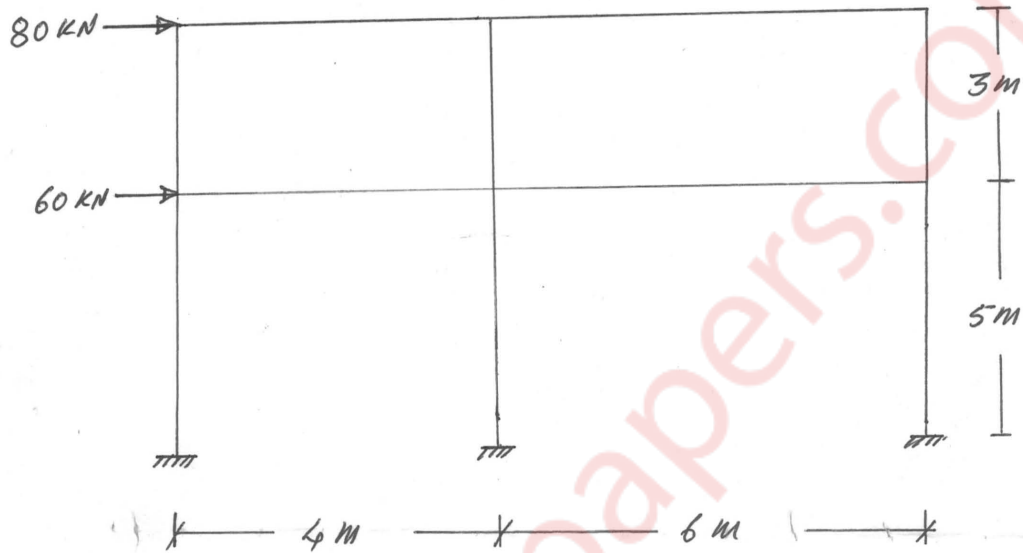

(b) State the advantage and disadvantage of indeterminate structure — 04

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6. (a) Find plastic moment of resistance for beam shown in figure. 08

(b) Using the approximate method analyse the building frame subjected to horizontal forces as shown in figure. Also draw BMD. 12

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