QP Code: **31034**

(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) Figures to the right indicate full marks.

1. (a) Explain the following terms: 10

   (i) Carry over factor and Distribution factor

   (ii) Shape factor and load factor

   (iii) Relative stiffness and modified stiffness

   (iv) Flexibility coefficient and stiffness coefficient

   (v) Plastic hinge and mechanism

   (b) Determine shape factor of diamond section of the beam as shown in figure. 04
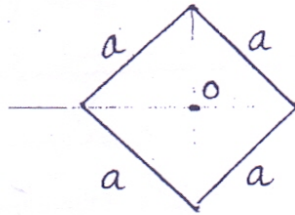
   (c) Determine the degree of static and kinematic indeterminacy of the following 06
   structures. Neglect axial deformation in flexural members and indicate joint
   displacement,
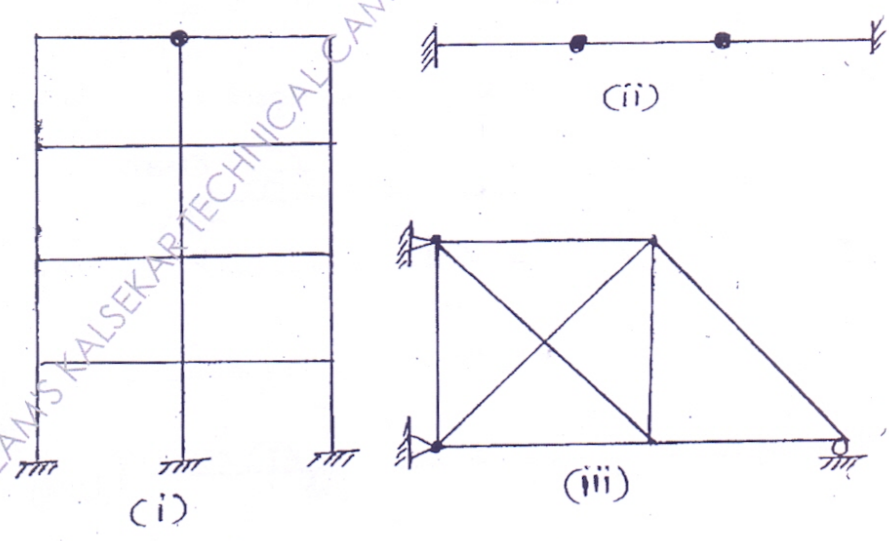
[TURN OVER

2. (a) The members of a steel bent frame are subjected to temperature variation as   06
shown in fig. Determine the vertical deflection at free end 'C' considering axial
deformation in member. Take depth of each member as 500 mm and
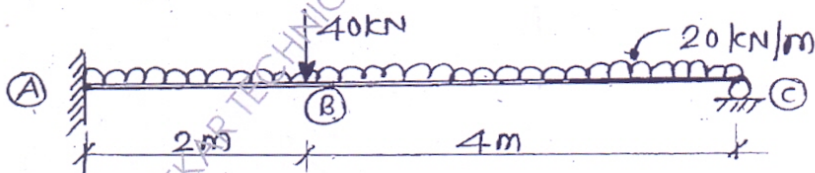$\alpha = 12 \times 10^{-6}/°C$.
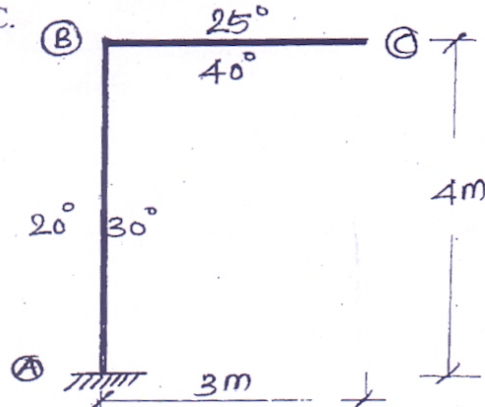
(b) Develop the stiffness matrix for prismatic member AB with reference to the   06
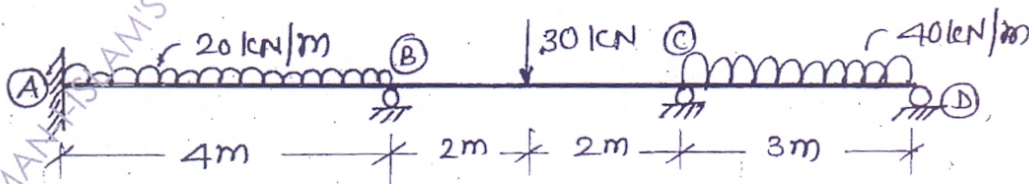co-ordinates as shown in fig.
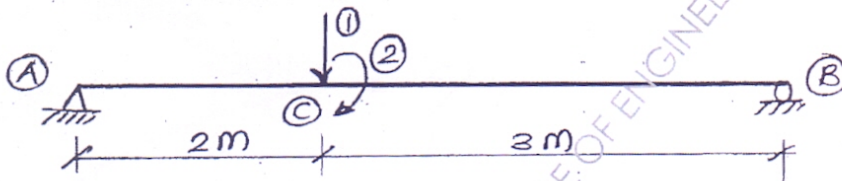
(c) Analyse the beam loaded as shown in fig. by Theorem of three moments. Draw   08
BMD.
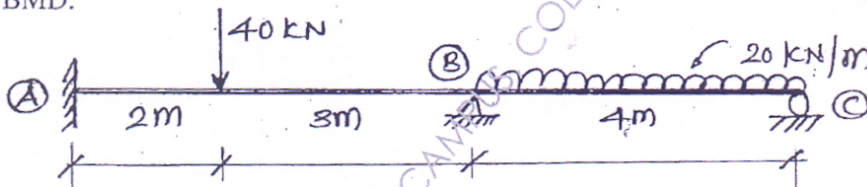
3. (a) Analyse the beam loaded as shown in fig. by Flexibility method and draw BMD.   '10
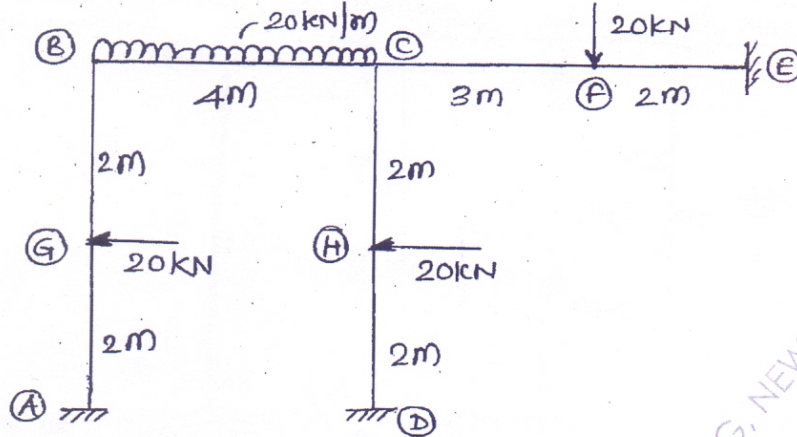

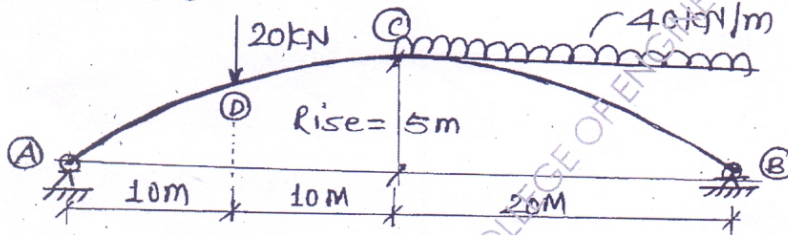(b) Analyse the beam loaded as shown in fig. by Stiffness method and draw BMD.   10
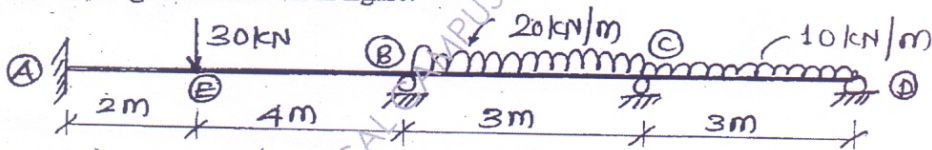

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4. (a) Analyse the rigid jointed plane frame as shown in figure, using stiffness method 12 or by MDM. Also draw SFD, BMD and deflected shape.
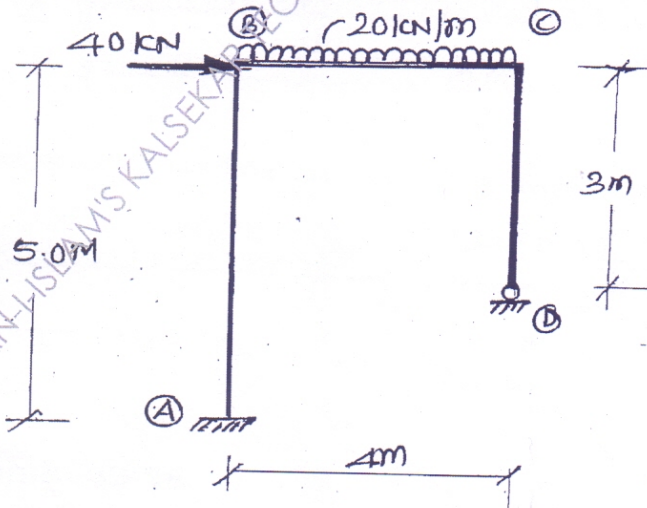

(b) Find the reactions at supports and draw BMD for a two hinged parabolic arch 08 loaded as shown in figure.

5. (a) Calculate the plastic moment carrying capacity required for the continuous beam 08 with working load as shown in figure.
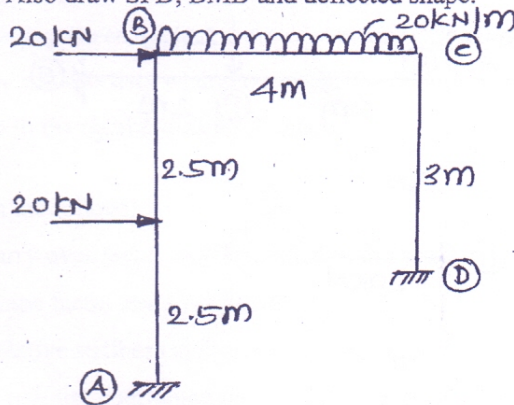

(b) Analyse the rigid jointed plane frame as shown in figure, using Flexibility 12 method. Also draw SFD, BMD and deflected shape.
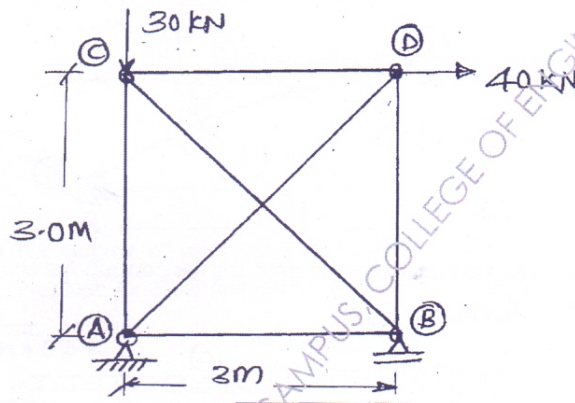

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6. (a) Analyse the rigid jointed plane frame as shown in figure, using Slope deflection   12
        method. Also draw SFD, BMD and deflected shape.

    (b) Using Force method, analyse the pin jointed plane frame loaded and supported as   08
        shown in figure. Take AE = Constant for all members.