Code No: **R31015**

R10

Set No. 1

III B.Tech I Semester Supplementary Examinations, October/November - 2016
STRUCTURAL ANALYSIS – II
(Civil Engineering)

Time: 3 hours   **Max. Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks
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1 a) Derive an expression for the displacement of a three-hinged arch crown, subjected to change of temperature. [7M]
   b) A 3-hinged arch of span 10m and rise 2.5m carries a point load of 10kN at 2.5m from left end and UDL of 60kN/m on right half of the span. Determine the horizontal thrust. [8M]

2 a) A two hinged circular arch rib has a span of 30m & rise of 3m. The rib section is uniform throughout with an overall depth of 0.7m. Neglecting all effect except those due to bending, the bending stress at the crown due to a temperature changes 30K. Take $E=2 \times 10^5 N/mm^2, \alpha = 11 \times 10^{-6}$ per 1K [8M]
   b) Derive an equation for the horizontal thrust in a two-hinged arch. [7M]

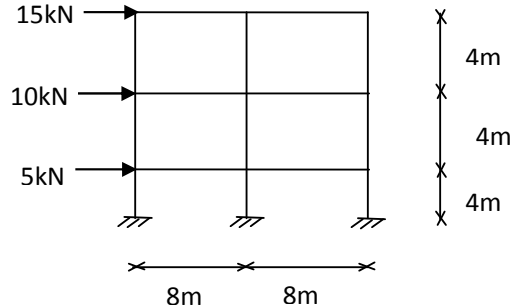3 a) Analyse the frame as shown in figure-1 by Cantilever method. [8M]

15kN →

4m

10kN →

4m

5kN →

4m

8m   8m

Fig:1

   b) Explain the Portal method for analyzing a building frame subjected to horizontal force. [7M]

4 a) Show that the values of maximum positive and negative bending moment due to a rolling concentrated load on a two-hinged stiffening girder are same. [9M]
   b) A cable of span 120m and central of 12m is carrying a load of 20kN/m of horizontal length. Calculate the change in horizontal tension, when the temperature rises through 20^0F. Take $\alpha = 6 \times 10^{-6}$ per ^0F. [6M]

5 a) Explain the procedure for finding out the fixed end moments in beams with a sinking supports. [7M]
   b) A portal frame ABCD is fixed at A and hinged at D. The members AB and CD are of 4m length and BC is of 3m length. Find the moments at A,D if a horizontal force of 10kN is acting at B. [8M]

6 a) State the principle of Kani's method? [5M]

   b) A continuous beam ABCD consists of three span and is loaded as shown in figure-2. [10M]
      Ends A and D are fixed .Determine the bending moments at supports using kani's
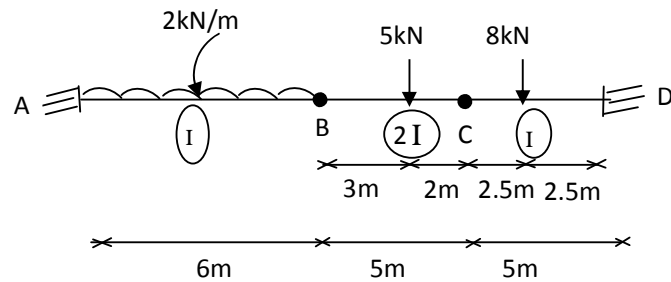   method, also plot the BMD.

Fig:2

7 a) What is the relation between flexibility and stiffness matrix? [6M]

   b) Analyze the continuous beam shown in figure-3 by the flexibility method and draw the [9M]
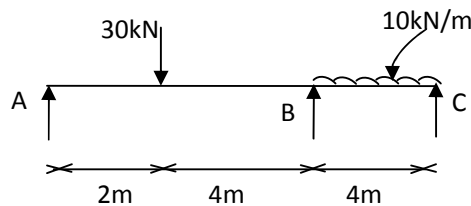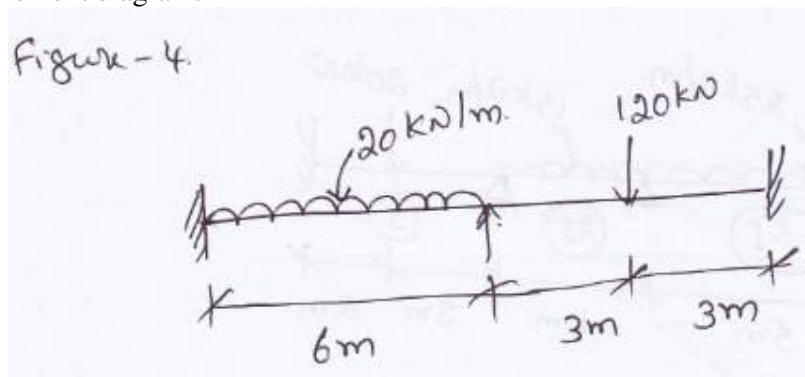   bending moment diagram.

Fig:3

8 a) Write the element stiffness matrix for a beam element. [5M]

   b) Analyze the continuous beam shown in figure-4 by the stiffness method and draw the [10M]
      bending moment diagram.

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