Code No: R1631013 **R16** SET - 1

III B. Tech I Semester Supplementary Examinations, October/November - 2020

STRUCTURAL ANALYSIS – II

(Civil Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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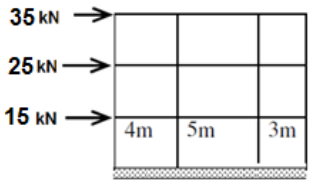
PART –A

1. a) Contrast between cable and arch. [2M]
   b) Define the rotation contribution factor and what it's maximum value at a joint? [2M]
   c) Define carry over factor and distribution factor. [2M]
   d) What is the dominant nature force in cables? Mention its characteristics. [3M]
   e) What are the assumptions in Portal method of analysis in relation lateral loads? When does this method is most suitable multi storied structures? [3M]
   f) What is the relation between flexibility and stiffness? Mention their units also. [2M]

PART -B

2. a) A three-hinged parabolic arch has a span of 24 m and a rise to the central hinge of 4 m. The arch is loaded with two vertical 20 kN loads symmetrically situated on either side of the central hinge at 3 m horizontally from the hinge. Calculate the support reactions. Find the position and magnitude of maximum positive bending moments occurs in the arch. [7M]
   b) A steel two-hinged circular arch rib has a span of 30 m and a rise of 3 m. The rib section is uniform throughout with an overall depth of 0.7 m, neglecting all effects except those due to bending, find, from first principles, the bending stress at the crown due to a temperature changeof 30^0 K. Take E= 2×10^5 N/mm^2 and $\alpha = 11\times10^{-6}$ per 1K. Find the max change in bending stress due to rise in temperature. [7M]

3. a) Explain the Cantilever method for analyzing a building frame subjected to horizontal forces with an example. [7M]
   b) A three storey building frame with 3 m each floor height is under horizontal loading as shown in figure. Analyze the frame for forces in Top storey using Portal method and Assume necessary data. [7M]



4. a) A cable ABC of uniform cross section is used to span a distance of 40 m. The cable is subjected to uniformly distributed load of 10 kN/m run. The left support 'A' is below the right support 'B' by 2 m and the lowest point on the cable 'C' is located below left support 'A' by 1 m. Solve for the reactions at the supports. Solve for the maximum and minimum values of tension in the cable. [7M]
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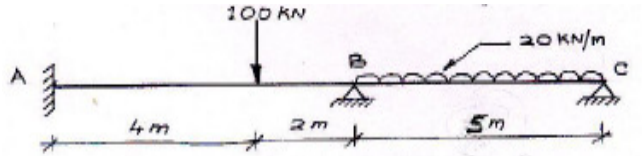
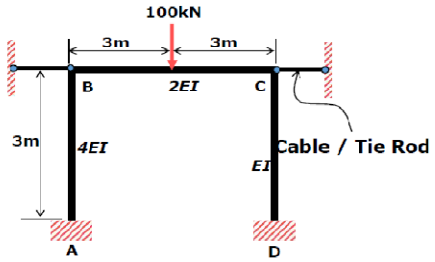
b) A bridge cable is suspended from towers 80 m apart and carries a load of 30 kN/m on the entire span. If the maximum sag is 8 m. Calculate the maximum tension in the cable. If the cable is supported by saddles which are stayed by wires inclined at 30^0 to the horizontal. Determine the forces acting on the tower. If the same inclination passes over a pulley determine the forces on the towers. [7M]

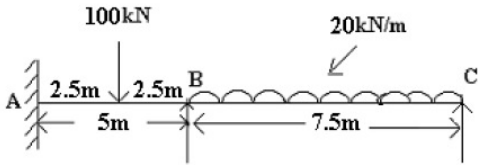
5. a) Analyze two span continuous beam for only support moments shown below by using the Moment Distribution Method: [7M]



b) Determine the final moment for frame ABCD shown below: [7M]

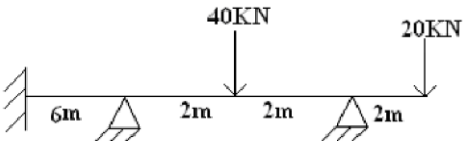


6. a) Analyse the two-span continuous beam for only support moments, which is loaded as shown in figure by the Kani's method, if the moment of inertia of span AB=I while that of BC = 3I. [7M]

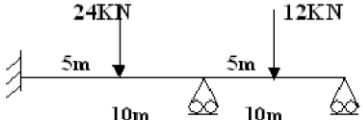


b) Explain Kani's method for frames with side sway. [7M]

7. a) Analyse the continuous beam shown in the figure using flexibility method. EI is constant. [7M]



b) Analyse the continuous beam shown in figure using displacement method. EI is constant. [7M]



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