

## III B. Tech I Semester Regular Examinations, October/November - 2018

## STRUCTURAL ANALYSIS – II

(Civil Engineering)

Time: 3 hours

Max. Marks: 70

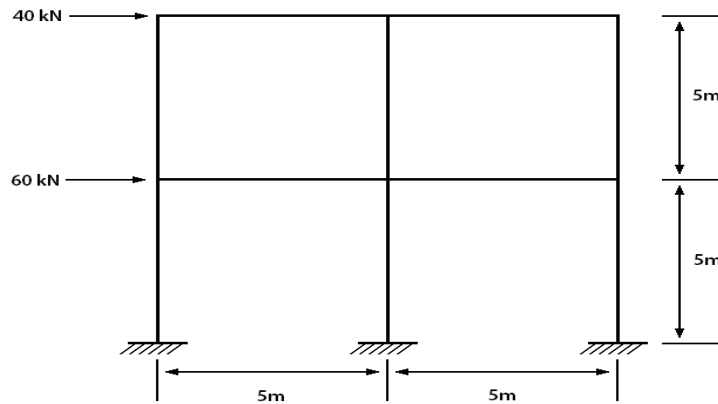
- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)  
 2. Answer **ALL** the question in **Part-A**  
 3. Answer any **FOUR** Questions from **Part-B**

PART - A

1. a) Distinguish between two hinged and three hinged arches. [2M]
- b) What are the different approximate methods for lateral load analysis? [2M]
- c) What are the temperature stresses in a cable? [2M]
- d) What is substitute frame analysis? [3M]
- e) What is the settlement of supports in Kani's method? [3M]
- f) What are different Matrix methods explain. [2M]

PART - B

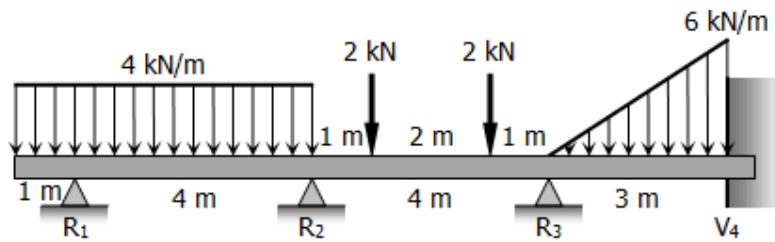
2. A three hinged parabolic arch hinged at the crown and springing has a horizontal span of 12m and a central rise of 2.5m. it carries a udl of 30 kN/m run over the left hand half of the span. Calculate the resultant at the end hinges. [14M]
3. Analyse the frame using Portal Method [14M]



4. a) Deduce an expression for general cable theorem? [10M]
- b) What are stiffening girders? Discuss. [4M]



5. Compute the moments over the supports of the beam shown in Figure below: [14M]



6. Analyze a continuous beam having a 3- bays of Span 3 m each by Kani's' method. [14M]
7. Explain the matrix approach to structural analysis of continuous beams. [14M]

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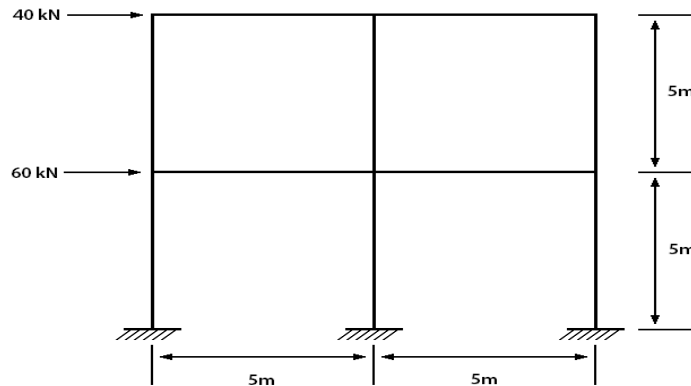
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PART - A

1. a) What is a Two Hinged Arch? [2M]
- b) Mention two assumptions in cables and suspension bridges. [2M]
- c) Differentiate between cantilever and portal method. [2M]
- d) Write the formulae for sinking of supports in Moment Distribution method. [3M]
- e) What are the displacements for sway and without sway in Kani's method? [3M]
- f) What are the characteristics of stiffness method? [2M]

PART - B

2. A 3-hinged arch is circular, 25 m in span with a central rise of 5m. It is loaded with a concentrated load of 10 kN at 7.5m from the left hand hinge. Find the  
 i) Horizontal thrust ii) Reaction at each end hinge  
 iii) Bending moment under the load [14M]
3. Analyze the frame by Cantilever method [14M]



4. A three hinged suspension girder bridge has a span of 300m over the supports at same level. It has a central dip of 30m. The girder carries three point loads of 20kN, 30kN and 40kN acting at 45m, 90m and 160m respectively from the left end. Draw the B.M.D. [14M]
5. Derive the equation of moment distribution. [14M]
6. Analyze a two bay portal frame by Kani's method. [14M]
7. Distinguish between Flexibility method and Stiffness method. [14M]

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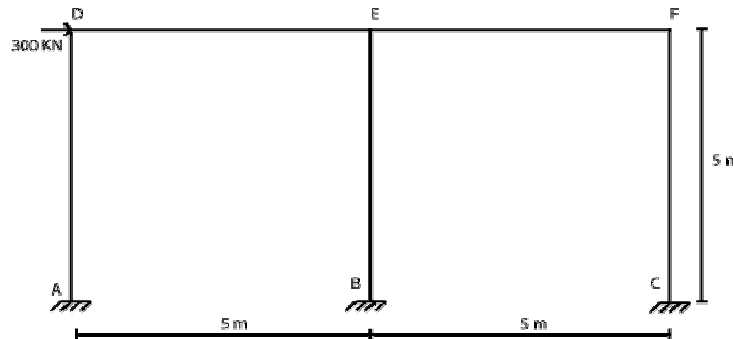
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1. a) What is a statically indeterminate arch? [2M]
- b) Write any two assumptions made in the analysis of cables. [2M]
- c) What are the assumptions of Cantilever method? [2M]
- d) Define a distribution factor. [3M]
- e) Mention any two advantages of Kani's method over moment distribution method. [3M]
- f) What are the characteristics of flexibility method? [2M]

**PART -B**

2. A three hinged parabolic arch has a span of 12m. The central rise of the arch is 4m. It is loaded with a uniformly distributed load of intensity 2 kN/m at the left 5m length. i) Calculate the maximum positive and negative bending moments. [14M]  
ii) Calculate the bending moment, normal thrust and shear at 3m and 9m from left end.
3. Analyse the frame using Portal method. [14M]



4. A three hinged suspension girder bridge has a span of 250m over the supports at same level. It has a central dip of 30m. The girder carries three point loads of 30kN, 35kN and 45kN acting at 35m, 80m and 150m respectively from the left end. Draw the B.M.D. [14M]
5. Analyze the portal frame by moment distribution method. Draw the bending moment diagram and sketch the deflected shape of the structure. The two columns of AB and CD of 54m height with I, Beam BC of span 5m, with 2I. The beam BC carries an udl of 15 kN/m. The supports at A and D are fixed [14M]
6. What are the steps involved in the analysis of a porter frame by Kani's method? [14M]
7. Explain the matrix approach to structural analysis of continuous beams. [14M]

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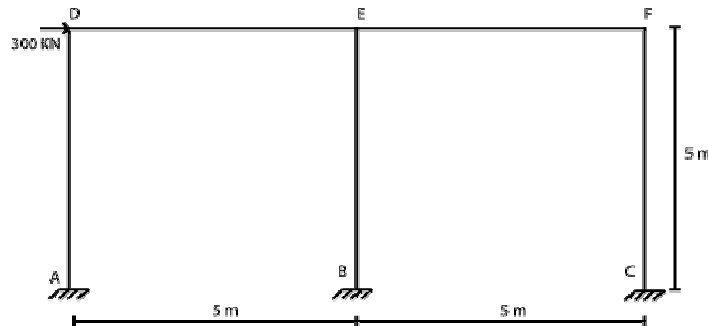
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**PART -A**

1. a) Write about rib shortening and temperature stresses. [2M]
- b) What are the assumptions of Portal method? [2M]
- c) What are the characteristics of a cable? [2M]
- d) Write about stiffness factor and carry over factor. [3M]
- e) What is a rotational factor at a joint? [3M]
- f) Differentiate between flexibility method and stiffness method. [2M]

**PART -B**

2. Derive the expression for normal thrust, radial shear and horizontal thrust for a two hinged circular arch. [14M]
3. Analyse the frame by using Cantilever method. [14M]



4. A cable hangs between two supports at a distance 140m apart. One end of the support is 4m above the other. The cable is loaded with a udl of 1 kN/m. The sag of the cable from higher end is 6m. Find the horizontal thrust and the maximum tension in the cable. [14M]
5. Using moment distribution method analyze the two span continuous beam. The moment of inertia of AB = I while that of BC = 2I. The ends A and C are Fixed. Sketch the B.M. and S.F. diagram. Span AB carries a concentric load of 40 kN with a span of 8m and span BC carries an udl of 30 kN/m over a span of 10m. [14M]
6. Analyze the portal frame using Kani's procedure. The two columns of AB and CD of 6m height, Beam BC of span 10m, with EI constant. The column CD carries an udl of 30 kN/m. The supports at A and D are fixed. [14M]
7. Discuss the flexibility and stiffness method respect to continuous beam. [14M]

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