Code No: R1622015 **R16** SET - 1

II B. Tech II Semester Regular Examinations, April - 2018
STRUCTURAL ANALYSIS-I
(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

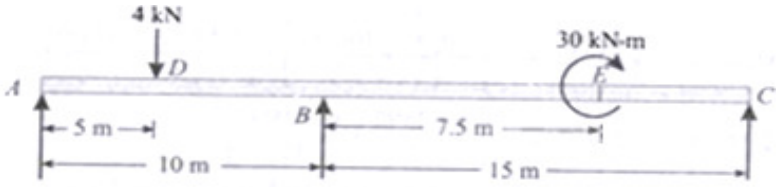
1. a) What do you understand by the term prop? (2M)
   b) What are the advantages of fixed beams? (2M)
   c) State Claypeyron's Three Moment theorem. (3M)
   d) Define slope deflection method. (2M)
   e) Derive the expression of strain energy due to axial loading. (3M)
   f) What do you understand by the terms "through type" trusses and "deck type trusses"? (2M)

PART -B

2. Derive an expression for the prop reaction in a cantilever carrying a u.d.l over the entire span and propped at the free end. (14M)

3. A fixed beam AB of 3m span is subjected to a point load of i5kN at a distance of span. Find the fixing moments and deflection of the beam under the load. Take EI = 2 x 10^3kN-m^2 (14M)

4. A continuous beam ABC of constant moment of inertia is simply supported at A .The beam carries a central point load of 4kN and clockwise central couple of moment 30kN-m in span BC as shown in the figure. (14M)



5. A continuous beam ABC is fixed at A and simply supported at B and C. The span AB is 6m and carries a uniformly distributed load of 10 kN/m. The span BC is 4m and carries uniformly distributed load of 30 kN/m. Determine the fixed end moments by Slope Deflection method. (14M)

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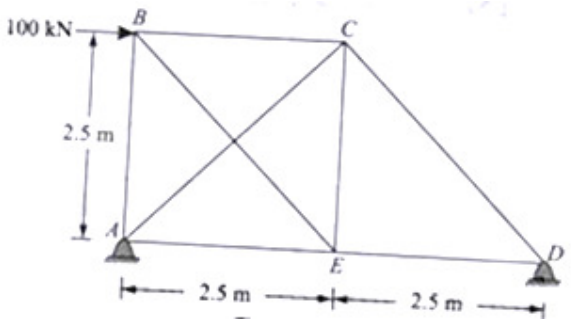
6. Determine the forces in the members AC and BE of a pin jointed truss shown in the figure. Assume cross sectional area of each member to be 15 x 10^{-4} m^2 (14M)



7. A girder of span 16m is subjected to a dead load of 30kN/m .Calculate the portion of the girder for which shear force changes sign, when an equivalent distributed load of 60 kN/m crosses the girder. (14M)

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STRUCTURAL ANALYSIS-I
(Civil Engineering)

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2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1. a) Define sinking of prop. How does it differ from a rigid prop? (2M)
   b) Draw the bending moment diagrams of fixed beams with different loadings. (2M)
   c) Write the steps involved in Claypeyron's Three Moment theorem. (3M)
   d) State the assumptions made in the slope deflection methods. (2M)
   e) Derive the expression of strain energy due to bending moment. (2M)
   f) Write the assumptions on which the influence lines for the trussed bridges are drawn. (3M)

PART -B

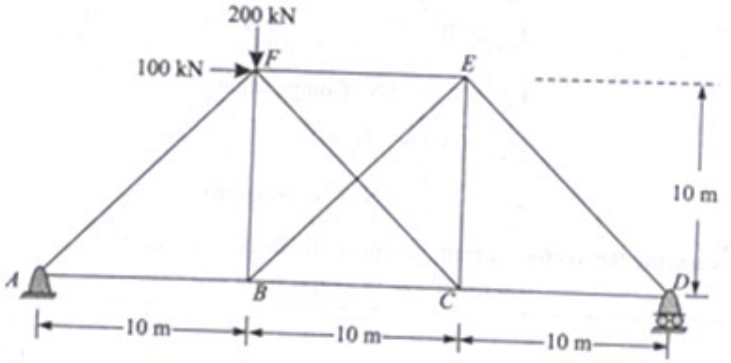
2. Derive an expression for the prop reaction in a simply supported beam carrying a u.d.l over the entire span and a prop at the mid span.. (14M)

3. A fixed beam AB of span 6m is carrying a uniformly distributed load of 4kN/m over the left half span. Find the fixing moments and support reactions. (14M)

4. Explain the theorem of three moments (14M)

5. A simply supported beam ABC is continuous over two pans AB and BC of 6m and 5m respectively. The span AB is carrying a uniformly distributed load of 20kN/m and span BC is carrying a point load of 50kN at a distance of 2m from B. Find the support moment at B. Also draw the bending moment diagram. Use slope deflection method. (14M)

6. Find the forces in the various members of the truss shown in the figure. The ratio of length to cross sectional area for all the member is same. The frame is pinned at A and rests on roller at D. (14M)



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7. a) State the position of a uniformly distributed load for a maximum bending moment and shear force when it crosses girder of smaller than that of load. (12M)

   b) Define focal length. (2M)

Code No: R1622015 **R16** SET - 3

II B. Tech II Semester Regular Examinations, April - 2018
STRUCTURAL ANALYSIS-I
(Civil Engineering)

Time: 3 hours Max. Marks: 70

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2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1. a) Differentiate between cantilever and propped cantilever. (2M)
   b) If a fixed beam AB carries a central load P, what is the value of maximum deflection? (3M)
   c) What is a continuous beam? Explain with figure. (2M)
   d) Explain why the use of slope deflection method is not encouraged in modern design offices? (2M)
   e) Derive the expression of strain energy due to shear force. (2M)
   f) Define the term opposite joint. What important rule does it play in drawing the influence line diagram? (3M)

PART -B

2. A cantilever of length l carries a point load W at its free end. It is popped at a distance of l/4 from the free end. Find out the prop reaction. (14M)

3. A fixed beam of 2m span is carrying a point load of 50kN at its mid span. Find the fixing moments and deflection of the beam under the load. (14M)
   Take EI = 2 x 10^3kN-m^2

4. Prove the Clapeyron's theorem of Three Moments. (14M)

5. A continuous beam ABC is fixed at A and simply supported at B and C. The span AB is 8m and carries a uniformly distributed load of 15 kN/m. The span BC is 5m and carries uniformly distributed load of 40 kN/m. Determine the fixed end moments by Slope Deflection method. (14M)

6. Derive Castigliano's first theorem (14M)
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7. Describe the procedure for drawing the influence lines for the forces in the vertical and diagonal members of a truss? How does it differ from the bottom chord horizontal members? (14M)

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II B. Tech II Semester Regular Examinations, April - 2018
STRUCTURAL ANALYSIS-I
(Civil Engineering)

Time: 3 hours Max. Marks: 70

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2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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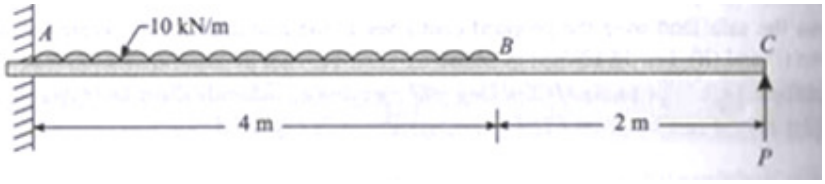
PART –A

1. a) Write the steps involved in finding a prop reaction (3M)
   b) If a fixed beam AB carries an eccentric load P, what is the value of maximum deflection? (3M)
   c) State Three Moment theorem. (2M)
   d) Write the steps involved in slope deflection method. (2M)
   e) State Castigliano's first theorem. (2M)
   f) What do you understand by the word rolling loads? (2M)

PART -B

2. A cantilever ABC is fixed at A and propped at C is loaded as shown in the figure. Find the reaction at C. (14M)



3. A fixed beam AB of span 6m is subjected to two point loads of 20kN and 15kN at a distance of 2m and 4m from A. Calculate the fixing moments at A and B. (14M)

4. How can you apply the theorem of three moments for a fixed beam ?Discuss with example (14M)

5. A simply supported beam ABC is continuous over two pans AB and BC of 8m and 6m respectively. The span AB is carrying a uniformly distributed load of 20kN/m and span BC is carrying a point load of 60kN at a distance of 2m from B. Find the support moment at B. Also draw the bending moment diagram. Use slope deflection method. (14M)

6. Discuss the Maxwell's theorem for redundant frames (14M)

7. Draw the influence line diagram for a Pratt Truss with parallel chords. (14M)

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