Code No: RT22016 **R13** SET - 1

II B. Tech II Semester Regular/Supplementary Examinations, April/May-2017
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 **THREE** Questions from **Part-B**

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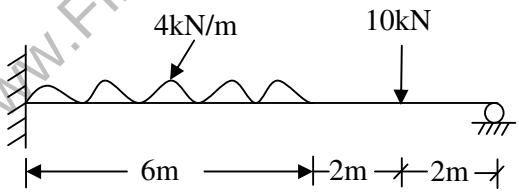
PART – A

1. a) A propped cantilever of length 'L' carries a concentrated load 'W' at its mid-span. Find the reaction at the prop.
   b) Find the moment at the left hand support, if a fixed beam of span 'L' is sunk by an amount 'Δ' at the right hand support.
   c) Define a continuous beam.
   d) Write the expression M_{AB} in terms of fixed moments, slopes θ_A, θ_B and settlement Δ.
   e) Derive the expression for strain energy of a straight prismatic bar of length L and cross-sectional area A, if it is subjected to a bending M.
   f) Construct influence line for bending moment at a section x of a simple beam of span L.
   (4M+2M+4M+4M+4M+4M)

PART – B

2. A propped cantilever beam is shown in figure. Calculate the prop Reaction and also draw the BM & SF diagrams. (16M)



3. A fixed beam of span 6 m is subjected a UDL of 5 kN/m on the left half of the span and a point load of 15 kN at the middle of the right half of the span. Draw the S.F. and B.M. diagrams. (16M)
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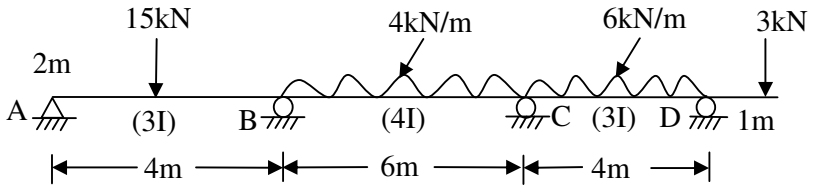
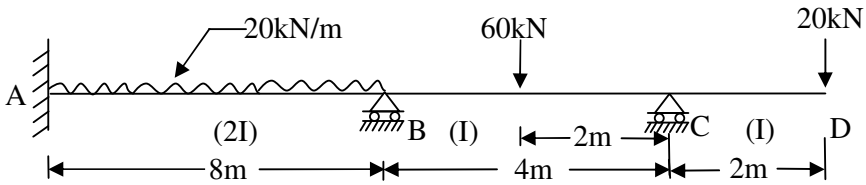
Code No: RT22016 **R13** SET - 1

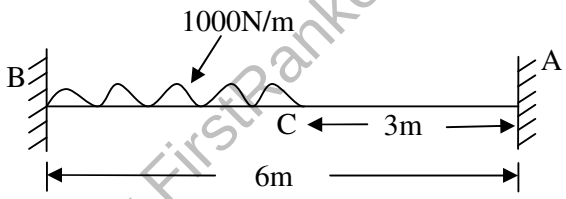
4. Analyze the continuous beam shown in figure, using three-moment equation. Draw S.F and B.M diagrams. (16M)



5. Analyse the beam ABCD shown in figure by Slope-Deflection method and draw bending moment diagram. (16M)



6. Determine the Reaction at A and the moment at B use strain Energy method. (16M)



7. Draw the Influence line diagram for reactions of a simply supported beam of 12 m span. Also draw the influence line diagrams for Shear force and bending moments at quarter span and mid-span sections (16M)

Code No: RT22016 **R13** SET - 2

II B. Tech II Semester Regular/Supplementary Examinations, April/May-2017
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 **THREE** Questions from **Part-B**

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PART – A

1. a) A propped cantilever beam of span 6m due to a point load of 6kN at the mid span. Find the prop reaction.
   b) A fixed beam of span 6 m is subjected a UDL of 5 kN/m over the entire span. Find the net moment at the center of span.
   c) Define a continuous beam.
   d) Write the expression M_{BA} in terms of fixed moments, slopes θ_A, θ_B and settlement Δ.
   e) State the theorem of minimum potential energy.
   f) Determine the maximum positive shear force at a section 1.5 m in a simple beam of span 4m, when a point load of 15 kN rolls across the beam. (4M+4M+2M+4M+4M+4M)

PART – B

2. A cantilever of length 6m carries a u.d.l of 2 KN/m over a length of 4m starting from the fixed end. The cantilever is propped rigidly at the free end. If the value of $E=2x10^5$ N/mm^2 and $I=10^8$ mm^4 then determine: a) Reaction at the rigid drop, b) The deflection at the centre of the cantilever and c) Magnitude and position of maximum deflection (16M)

3. A fixed beam of span 8 m is subjected to a linearly varying load of 8 kN/m from one support to 6kN/m to the other support. Find the support reactions and moments. Draw the shear force and bending moment diagrams. (16M)

4. Two point loads of 8 kN and 4 kN spaced 3 m apart cross a girder of 15 m span, the smaller load leading from left to right. Construct the maximum S.F. and B.M. diagrams, stating the positive and amount of absolute maximum bending moment. (16M)
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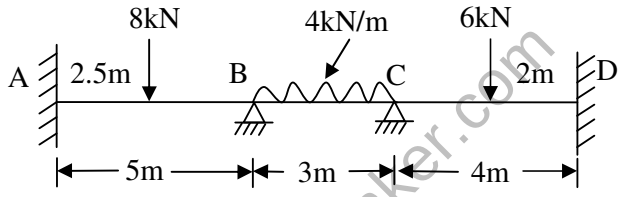
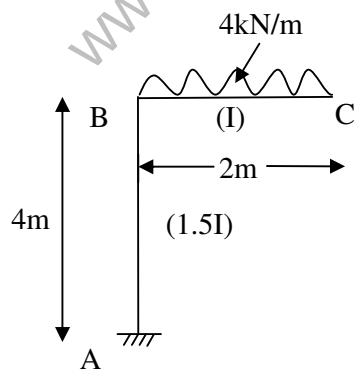
Code No: RT22016 **R13** SET - 2

5. A continuous beam ABC consists of two spans AB of length 4m, and BC of length 3m. The span AB carries a point load of 100 KN at its middle points. The span BC carries a point load of 120 KN at 1m from C. The end A is fixed and the end C is simply supported. Find
   The moments at the supports
   The reactions at the supports and
   Draw the B.M diagram
   Use Clapeyron's theorem of three moments. (16M)

6. A continuous beam ABCD 12 m long is fixed at A and D, and is loaded as shown in figure. Analyze the beam completely if the following moments take place simultaneously (i) the end A yields, turning through 1/250 radians in a clock-wise direction (ii) end B sinks 30 mm in downward direction, (iii) end C sinks 20 mm in downward direction. The beam has constant $I=33.20x10^5$ mm^4 and $E=2x105$ N/mm^2. Use slope-deflection method. (16M)



7. Determine the horizontal and vertical component of deflection at the Point 'C' of the frame shown in figure. Take $E=200x10^3$ N/mm^2 and $I=6x10^7$ mm^4. Use Strain Energy method. (16M)



Code No: RT22016 **R13** SET - 3

II B. Tech II Semester Regular/Supplementary Examinations, April/May-2017
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 **THREE** Questions from **Part-B**

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PART – A

1. a) A propped cantilever beam of span 5 m is loaded with a UDL of 15 kN/m on the entire span. Find the prop reaction.
   b) A fixed beam of span 6 m is subjected to a point load of 5 kN at the one-third of span from the left end. Find the moments at the supports.
   c) Write Clapeyron's theorem of three moment's equation with usual notations.
   d) Write the expression M_{AB} in terms of fixed moments and slopes θ_A, θ_B.
   e) Derive the expression for strain energy of a straight prismatic bar of length L and cross-sectional area A, if it is subjected to an axial force, F.
   f) Determine the bending moment at a section 1.5 m in a simple beam of span 4 m, when a point load of 15 kN rolls across the beam. (4M+4M+4M+3M+3M+4M)

PART – B

2. Find the maximum bending moment and locate the point of inflection for a propped cantilever beam of span 5 m due to a uniformly varying load, whose intensity is 5 kN/m at the fixed support and 2 kN/m at the simple support. (16M)

3. A fixed beam of 6 m span carries a uniformly distributed load of 12 kN/m run over the whole span. The level of right hand support sinks by 8 mm below that the left hand end. Take $E=2.10\times10^8 kN/m^2$ and $I=4.50\times10^{-5}\ m^4$. Find (i) Support moments, (ii) Support reactions, and (iii) Deflection at the centre. (16M)

4. Two wheel loads of 16 and 8 kN at a fixed distance of 2 m, cross a beam of 10 m span. Draw the Influence Line for B.M and S.F for a point 4 m from left support, and find the max. B.M and S.F at that point. (16M)
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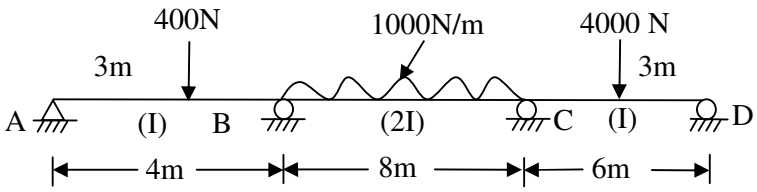
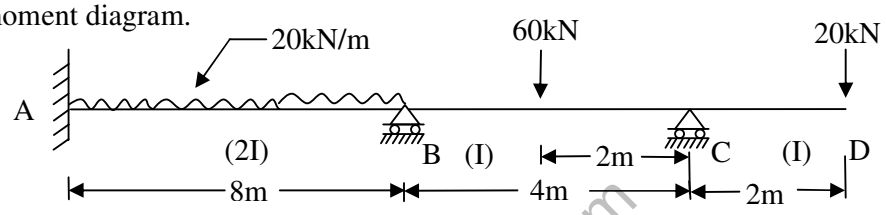
Code No: RT22016 **R13** SET - 3

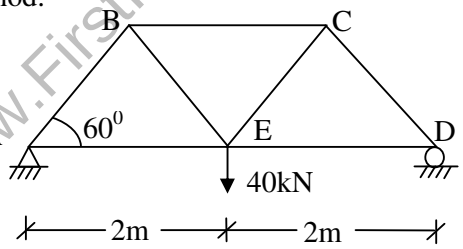
5. A continuous beam ABCD 18 m long is loaded as shown in figure. During loading support B sinks by 10 mm. Find support moments and plot shear force and bending moment diagrams for the beam. Take E = 20 kN/mm^2 , I = 8x10^6 mm^4. (16M)



6. Analyse the beam ABCD shown in figure by Slope-Deflection method and draw bending moment diagram. (16M)



7. Determine the vertical deflection of Joint 'E' for the truss shown in figure.
Take A=500x10^{-6} m^2, E=200x10^6 kN/m^2 are constant for all members.
Use Strain Energy method. (16M)



Code No: RT22016 **R13** SET - 4

II B. Tech II Semester Regular/Supplementary Examinations, April/May-2017
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 **THREE** Questions from **Part-B**

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PART – A

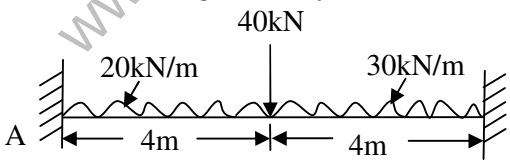
1. a) A propped cantilever beam of span 5 m is loaded with a UDL of 15 kN/m on the entire span. Find the prop reaction and moment at the fixed end.
   b) A fixed beam of span 6 m is subjected a UDL of 5 kN/m over the entire span. Find the moments at the supports.
   c) Write Clapeyron's theorem of three moment's equation with usual notations.
   d) Write the expression M_{BA} in terms of fixed moments and slopes θ_A,θ_B .
   e) Derive the expression for strain energy of a straight prismatic bar of length L and cross-sectional area A, if it is subjected a shear V.
   f) Construct influence line for a shear at a section x of a simple beam of span L.

(4M+4M+4M+3M+4M+3M)

PART – B

2. A Propped cantilever AB of span L fixed at A and simply supported at B carries a concentrated load 'P' at one third point from the fixed support. Find the reactions at the supports. Also find also the maximum deflection of the beam. EI is constant. (16M)

3. A fixed beam is shown in figure, analyze the beam and draw the SF and BM diagram (16M)



4. Four point loads 100, 120, 150 and 80 KN spaced equally 2 m apart crosses a girder of 25 m span from left to right with 100 KN load leading. Calculate the maximum BM at a section 5 m from the left hand support and absolute max BM. (16M)
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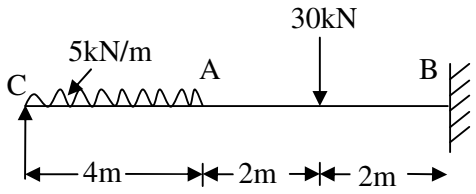
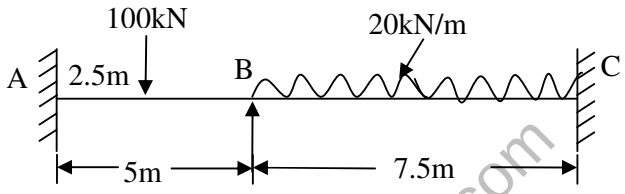
Code No: RT22016 **R13** SET - 4

5. Draw the Shear force and bending moment diagram for the beam shown in figure.
Use Clapeyron's theorem of three moments. EI=1x10^5 N/mm^2. (16M)



6. Anlayse the two-span continuous beam loaded a s shown in figure, by slope-deflection method, if the moment of inertia is span AB is I and that of span BC is 3I. Sketch the B.M and SFD
(16M)



7. Determine the vertical deflection of Joint 'E' for the truss shown in figure.
Take A=300x10^{-6} m^2, E=200x10^{6}kN/m^2 are constant for ball members.
Use Strain Energy method. (16M)