Code No: R22016 **R10** SET - 1

II B. Tech II Semester Supplementary Examinations Dec – 2012
STRUCTURAL ANALYSIS - I
(Civil Engineering)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. Find the support moment for the propped cantilever loaded as shown in Figure 1 if the support rotates clockwise by 0.002 radians. EI= 1.2×10^6 kgm^2

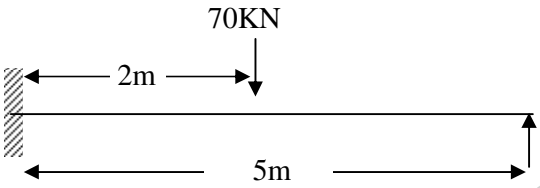

Figure 1

2. Find fixed end moments for the fixed beam shown in Figure 2

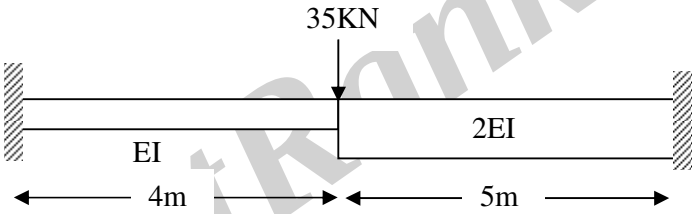

Figure 2

3. Solve the continuous beam in Figure 3 by using theorem of three moments.

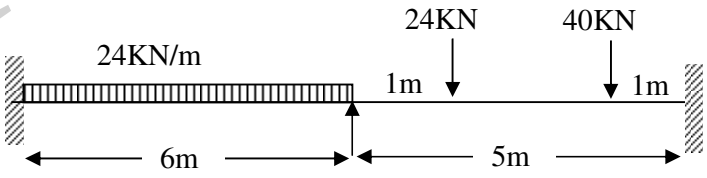

Figure 3
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4. Evaluate the bending moment and shear force diagrams of beam in Figure 4 by slope deflection method.

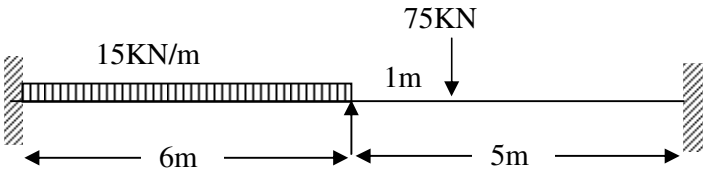

Figure 4

5. A simply supported beam of span 8 meters is loaded with three concentrated loads of 15KN, 25KN and 35KN at a distance 2m, 4m and 6m respectively from right hand end. It also carries a uniformly distributed load of 20kN/m throughout the span. Find position and magnitude of maximum deflection and calculate Maximum Shear Force.

6. A System of five loads 60kN, 120kN, 120kN, 120kN and 40kN crosses a beam of 15m span with 60kN leading the distance between the loads are 2.4m, 3.0m, 2.4m and 1.8m respectively. Find Maximum Bending Moment at the center of the span. Also find the absolute Maximum Bending Moment on the beam.

7. a) Explain the terms Static Indeterminacy, Kinematic Indeterminacy and Degree of Indeterminacy.

   b) Give two examples each of Statically Indeterminate and Kinematic Indeterminate structures. Calculate degree of indeterminacy in each of the cases.

8. Explain the following

   a) Sinking of Supports and its effects on the structure.

   b) Castigliano's First theorem with an application.

Code No: R22016 **R10** SET - 2

II B. Tech II Semester Supplementary Examinations Dec – 2012
STRUCTURAL ANALYSIS - I
(Civil Engineering)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. Find the support moment for the propped cantilever loaded as shown in Figure 1 if the support rotates clockwise by 0.002 radians. EI= 1.5×10^6 kgm^2

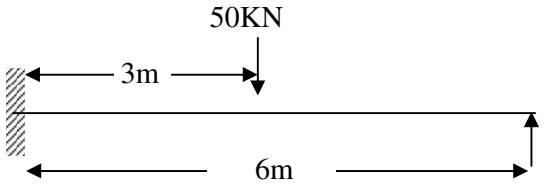

Figure 1

2. Find fixed end moments for the fixed beam shown in Figure 2

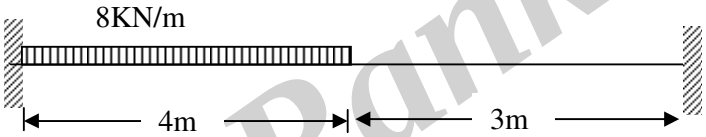

Figure 2

3. Solve the continuous beam in Figure 3 by using theorem of three moments.

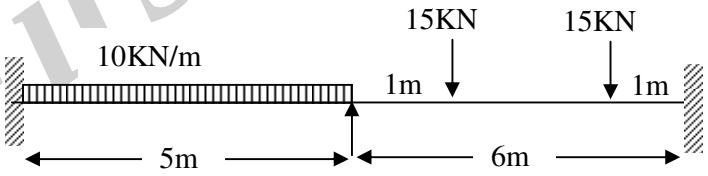

Figure 3

4. A continuous beam is built in at A and it is carried over rollers at B and C with spans of AB and BC being 10m. The beam carries a uniformly distributed load of 7.5KN/m over AB and a point load of 80KN over BC 2.5m from the support B, which sinks by 10mm. Values of E and I are 2 x 10^5 N/mm^2 and 2 x 10^9mm^4. Calculate the support moments and draw bending moment diagram giving critical values. Use Slope deflection method.
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Code No: R22016 **R10** SET - 2

5. A uniformly distributed load of 22kN/m and 20m long crosses a girder of span 16m. Calculate the Maximum Shear force and Bending Moment at 0m, 4m, 8m, 12m from the left end support and construct Diagrams.

6. A simply supported beam of span 8 meters is loaded with three concentrated loads of 20KN, 30KN and 40KN at a distance 2m, 4m and 5m respectively from right hand end. Find position and magnitude of maximum Shear Force and Bending Moment.

7. An indeterminate frame is shown in Figure 4, Take AE is constant for all the members. Find the final forces in all the members. Use Energy theorem.

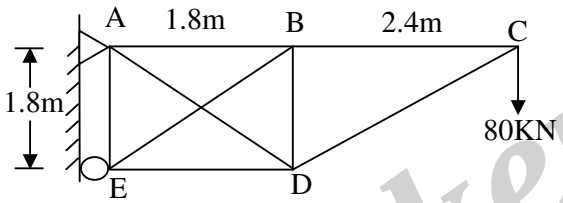

Figure 4

8. Explain the following
   a) Effect of Sinking in Fixed Beams
   b) Indeterminate Trusses

Code No: R22016 **R10** SET - 3

II B. Tech II Semester Supplementary Examinations Dec – 2012
STRUCTURAL ANALYSIS - I
(Civil Engineering)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. Find the support moment for the propped cantilever loaded as shown in Figure 1 if the support rotates clockwise by 0.003 radians. EI= 1.5×10^6 kgm^2

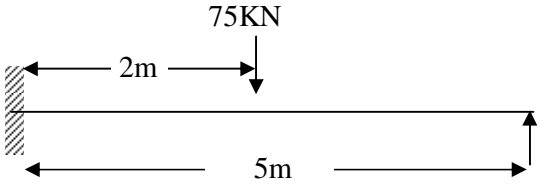

Figure 1

2. Find fixed end moments for the fixed beam shown in Figure 2

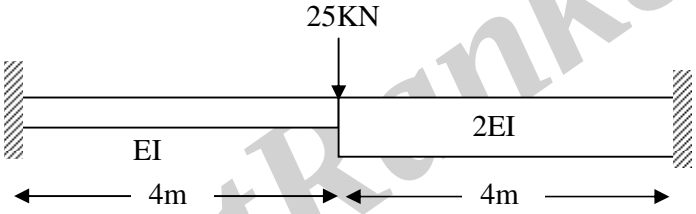

Figure 2

3. Solve the continuous beam in Figure 3 by using theorem of three moments.

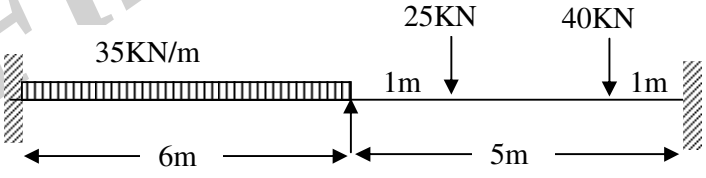

Figure 3

4. A continuous beam is built in at A and it is carried over rollers at B and C with spans of AB and BC being 10m. The beam carries a uniformly distributed load of 7.5KN/m over AB and a point load of 40KN over BC 3.5m from the support B, which sinks by 10mm. Values of E and I are 2 x 10^5 N/mm^2 and 2 x 10^9mm^4. Calculate the support moments and draw bending moment diagram giving critical values. Use Slope deflection method.
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Code No: R22016 **R10** SET - 3

5. A uniformly distributed load of 25kN/m and 20m long crosses a girder of span 12m. Calculate the Maximum Shear force and Bending Moment at 0m, 3m, 6m, 9m from the left end support and construct Diagrams.

6. A System of five loads 75kN, 150kN, 150kN, 75kN and 50kN crosses a beam of 15m span with 75kN leading the distance between the loads are 2.4m, 2.4m, 2.4m and 1.8m respectively. Find Maximum Bending Moment at the center of the span. Also find the absolute Maximum Bending Moment on the beam.

7. A frame is shown in Figure 4. Take AE is constant for all the members. Find the final force in all members. Use Energy theorem.

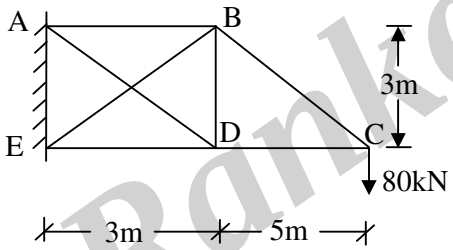

Figure 4

8. Explain the following
   a) Influence lines for forces in the Members of Warren Truss
   b) Indeterminate Trusses

Code No: R22016 **R10** SET - 4

II B. Tech II Semester Supplementary Examinations Dec – 2012
STRUCTURAL ANALYSIS - I
(Civil Engineering)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. A horizontal cantilever beam of length 'L' and of Uniform Cross section carries a UDL of 'w' per unit length for the full span. The cantilever is supported by a rigid prop at a distance kL from the fixed end, the level of the beam at the prop being the same as that of the fixed beam. Evaluate K in terms of 'L' for the condition, that the Bending Moment at the prop is equal to the bending moment at the fixed end. Also determine the reaction at the prop and draw Shear force and Bending Moment Diagram.

2. Find fixed end moments for the fixed beam shown in Figure 1

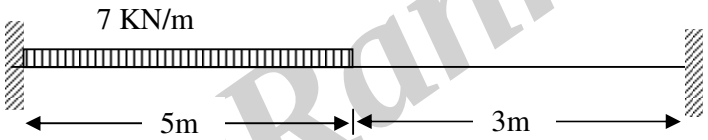

Figure 1

3. Solve the continuous beam in Figure 2 by using theorem of three moments.

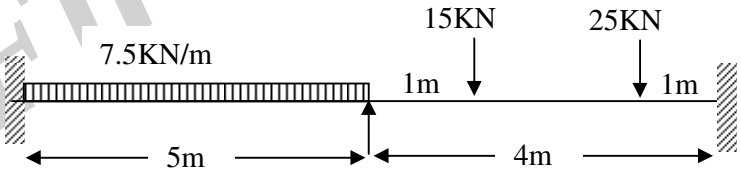

Figure 2

4. Evaluate the bending moment and shear force diagrams of beam in Figure 3 by slope deflection method.

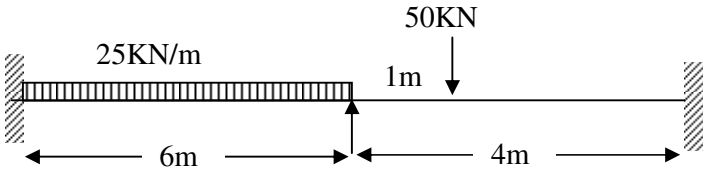

Figure 3
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Code No: R22016 **R10** SET - 4

5. A simply supported beam of span 8 meters is loaded with three concentrated loads of 5KN, 10KN and 15KN at a distance 2m, 4m and 6m respectively from right hand end. It also carries a uniformly distributed load of 7.5kN/m throughout the span. Find position and magnitude of maximum deflection and calculate Maximum Shear Force.

6. A simply supported beam of span 8 meters is loaded with three concentrated loads of 15KN, 30KN and 45KN at a distance 2m, 4m and 5m respectively from right hand end. Find position and magnitude of maximum Shear Force and Bending Moment.

7. A frame is shown in figure 4, take EB as redundant. Take AE is constant for all the members. Find all member forces. Use Strain Energy method.

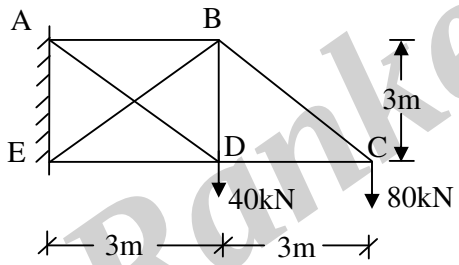

Figure 4

8. Explain the following

a) Influence lines for forces in the Members of Pratt Truss

b) Castigliano's First theorem with applications of Simple Beams.