Code No: 09A50108 | R09 | SET-1

B. Tech III Year I Semester Examinations, December-2011
ADVANCED STRUCTURAL ANALYSIS
(CIVIL ENGINEERING)

Time: 3 hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks

---

1. Analyse the portal frame shown in Fig.1 using Moment Distribution Method. Draw the elastic curve. [15]

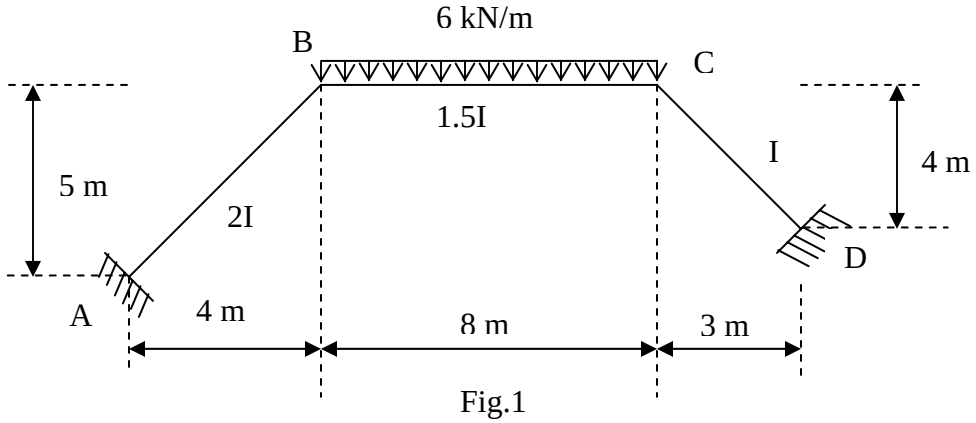

Fig.1

2. Analyze the continuous beam shown in Fig.2 using Strain Energy Method, and draw shear force and bending moment diagrams. Assume constant EI throughout the beam. Locate and find the distances of the points of contra flexure from supports. Draw elastic curve. [15]

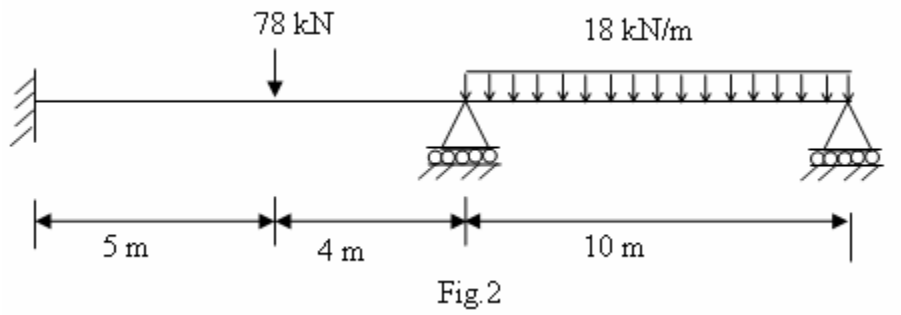

Fig.2

3.a) Draw the influence diagram for reaction at support for a simply supported beam.
b) A rolling uniformly distributed load (udl) of length 8 m crosses a simply supported beam. What is the length of the udl to the left of the section, whose distance from the left support is 0.4 times the span for maximum bending moment when (i) the span is 8 m; (ii) the span is 12 m. [7+8]

4. A two-hinged parabolic arch has a span of 28 m and central rise of 5 m. It is loaded with a udl of 6 kN/m on the left 9 m length. Calculate the bending moment at 6 m from the left support using influence lines. [15]

5. Analyse the continuous beam using Flexibility method, shown in Fig.3, and draw shear force and bending moment diagrams. Assume constant EI throughout the beam. Locate and find the distances of the points of contraflexure from supports. Draw elastic curve. [15]

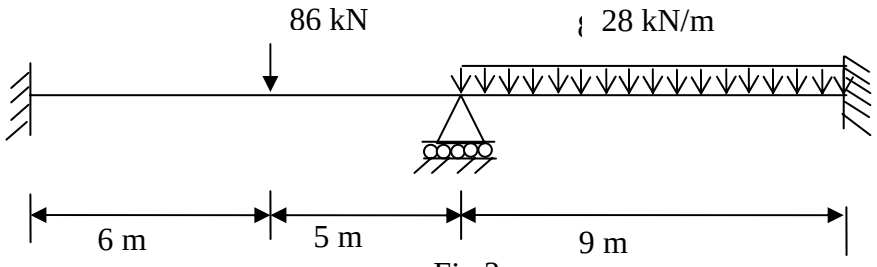

Fig.3

6. Determine the forces in the members of the truss shown in Fig.4, using Stiffness method. All the members have equal cross-sectional areas of 1180 mm^2. E=207GPa. [15]

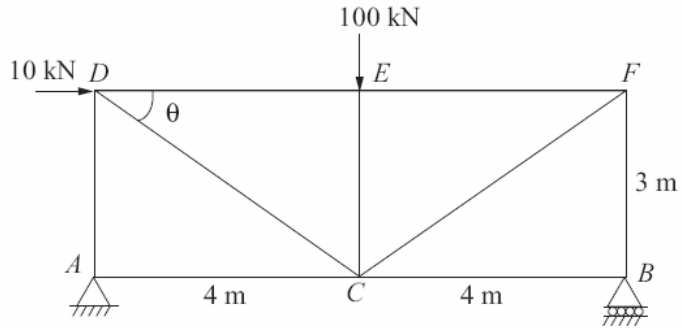

Fig.4

7. Analyse the frame shown in Fig.5 by Stiffness method. Draw the bending moment diagram and sketch elastic curve. Cross-sectional area of all columns is equal.[15]

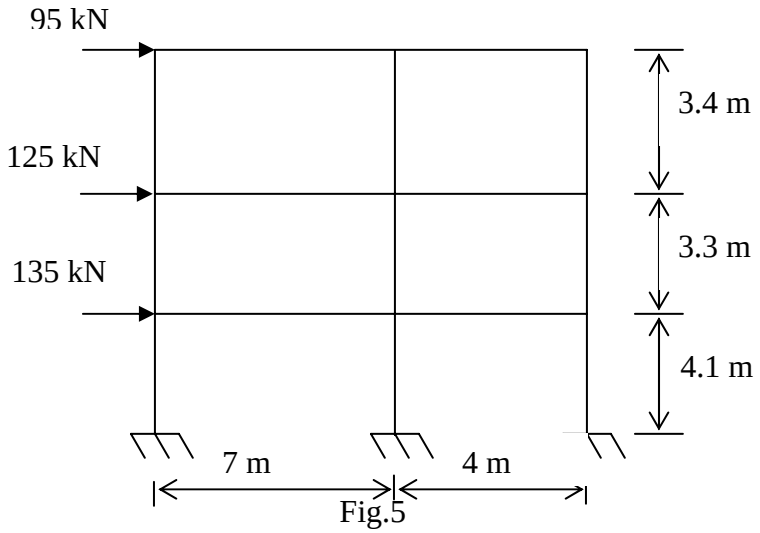

Fig.5

8.a) What do you mean by a plastic hinge?

b) A T-section consists of 10 mm web and 12 mm thick flange. Depth of the web is 100 mm. Width of the flange is 90 mm. Find the shape factor based on plastic analysis.

c) Determine the shape factor for a triangular section having base width ‘b’ and height ‘h’, shown in Fig.6. [15]

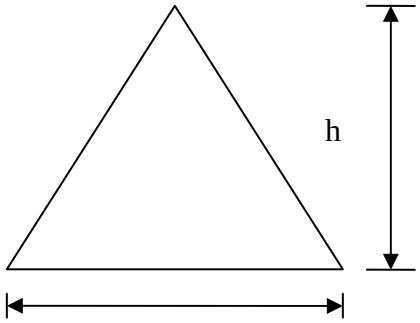

Fig.6

--ooOoo--

Code No: 09A50108 | R09 | SET-2

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD
B. Tech III Year I Semester Examinations, December-2011
ADVANCED STRUCTURAL ANALYSIS
(CIVIL ENGINEERING)

Time: 3 hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks

---

1. Analyse the portal frame shown in Fig.1 using Moment Distribution Method. Draw the elastic curve. [15]

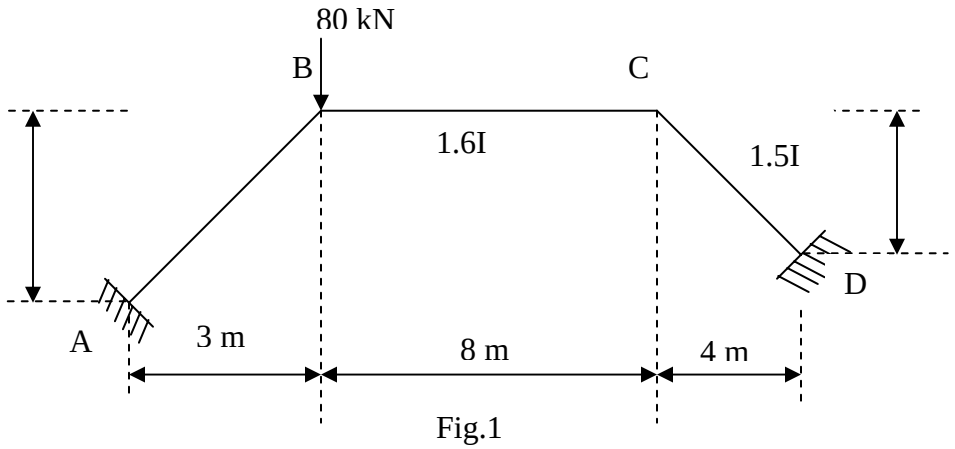

Fig.1

2. Analyze the continuous beam shown in Fig.2 using Strain Energy Method, and draw shear force and bending moment diagrams. Assume constant EI throughout the beam. Locate and find the distances of the points of contra flexure from supports. Draw elastic curve. [15]

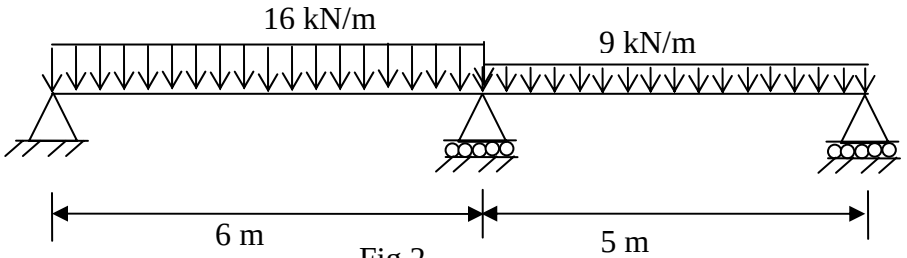

Fig.2

3.a) Draw the influence diagram for reaction at support for a simply supported beam.
b) A rolling uniformly distributed load (udl) of length 6 m crosses a simply supported beam. What is the length of the udl to the left of the section, whose distance from the left support is 0.4 times the span for maximum bending moment when (i) the span is 6 m; (ii) the span is 10 m. [7+8]

4. A three-hinged parabolic arch has a span of 25 m and central rise of 4 m. It is loaded with a udl of 5 kN/m on the left 9 m length. Calculate the bending moment at 5 m from the left support using influence lines. [15]

5. Analyse the continuous beam using Flexibility method, shown in Fig.3, and draw shear force and bending moment diagrams. Assume constant EI throughout the beam. Locate and find the distances of the points of contraflexure from supports. Draw elastic curve. [15]

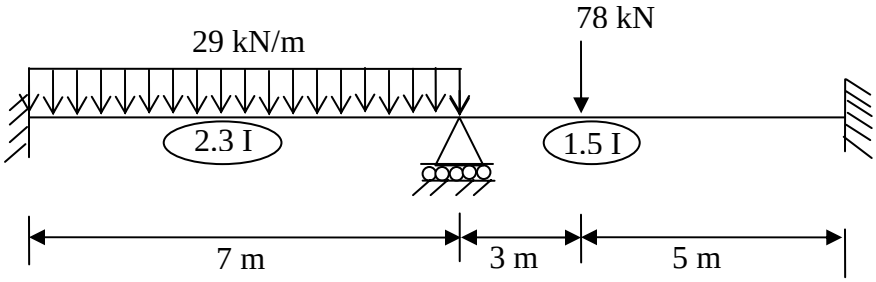

Fig.3

6. Determine the forces in the members of the truss shown in Fig.4. using Stiffness method. All the members have equal cross-sectional area of 1240 mm^2. E=206GPa. [15]

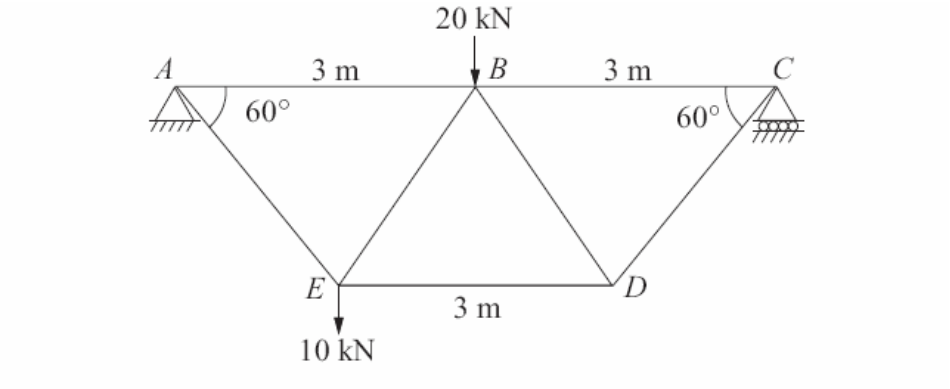

Fig.4

7. Analyse the frame shown in Fig.5 by stiffness method. Draw the bending moment diagram and sketch elastic curve. Cross-sectional area of all columns is equal. [15]

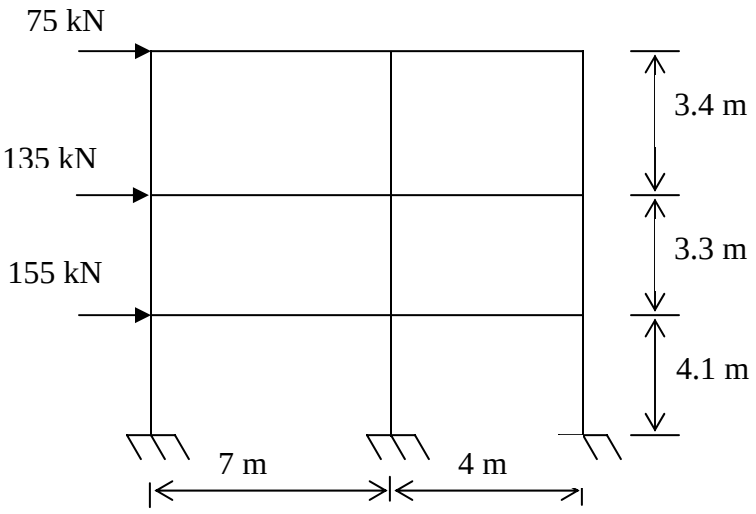

Fig.5

8.a) A Channel section consists of 8 mm thick web and 12 mm thick flange. Depth of the web excluding the flange thickness is 200 mm. Width of the flange is 100 mm. Detremine the shape factor.

b) A continuous beam has uniform cross-section. If the collapse just occurs under the loads as shown in Fig.6. It has uniform plastic moment capacity M_p. Determine the value of plastic moment for design. [7+8]

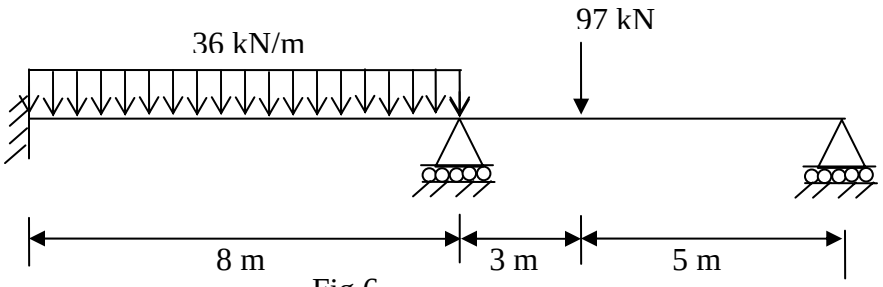

Fig.6

--ooOoo--

Code No: 09A50108 | R09 | SET-3

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD
B. Tech III Year I Semester Examinations, December-2011
ADVANCED STRUCTURAL ANALYSIS
(CIVIL ENGINEERING)

Time: 3 hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks

---

1. Analyse the portal frame shown in Fig.1 using Moment Distribution Method. Draw the elastic curve. [15]

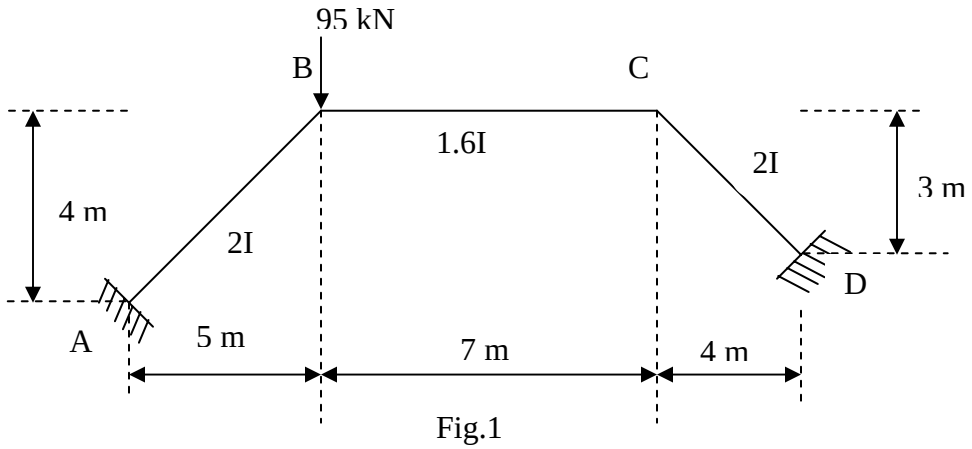

Fig.1

2. Analyse the continuous beam shown in Fig.2 using Strain Energy Method, and draw shear force and bending moment diagrams. Assume constant EI throughout the beam. Locate and find the distances of the points of contraflexure from supports. Draw elastic curve. [15]

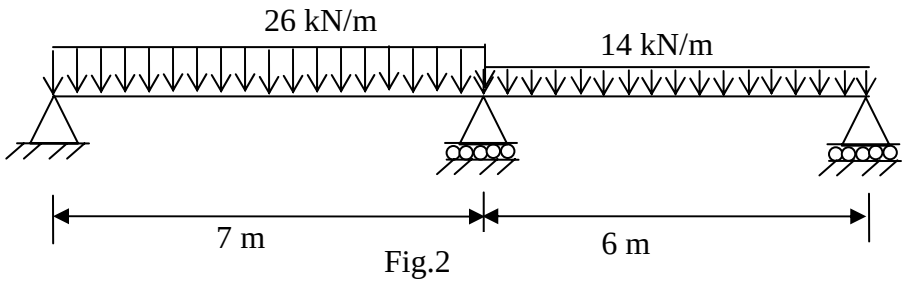

Fig.2

3.a) Draw the influence diagram for reaction at support for a simply supported beam.

b) A rolling uniformly distributed load (udl) of length 9 m crosses a simply supported beam. What is the length of the udl to the left of the section, whose distance from the left support is 0.5 times the span for maximum bending moment when (i) the span is 9 m; (ii) the span is 14 m. [7+8]

4. A two-hinged parabolic arch has a span of 33 m and central rise of 5 m. It is loaded with a udl of 7 kN/m on the left 9 m length. Calculate the bending moment at 8 m from the left support using influence lines. [15]

5. Analyse the continuous beam using Flexibility method, shown in Fig.3, and draw shear force and bending moment diagrams. Assume constant EI throughout the beam. Locate and find the distances of the points of contra-flexure from supports. Draw elastic curve. [15]

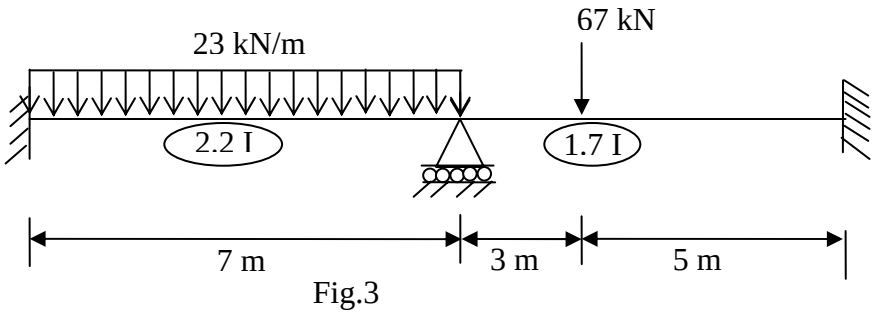

Fig.3

6. Determine the forces in the members of the truss shown in Fig.4. using Stiffness method. All the members have equal cross-sectional area of 1150 mm^2. E=210GPa. [15]

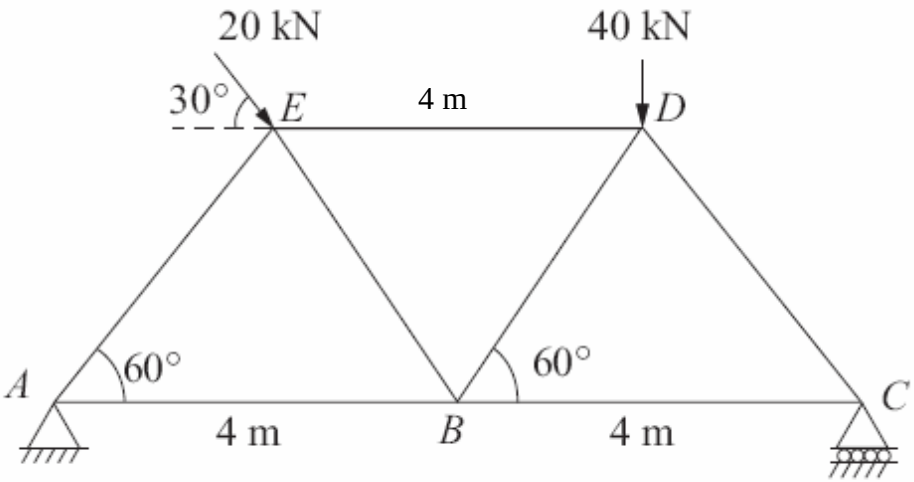

Fig.4

7. Analyse the frame shown in Fig.5 by stiffness method. Draw the bending moment diagram and sketch elastic curve. Cross-sectional area of all columns is equal. [15]

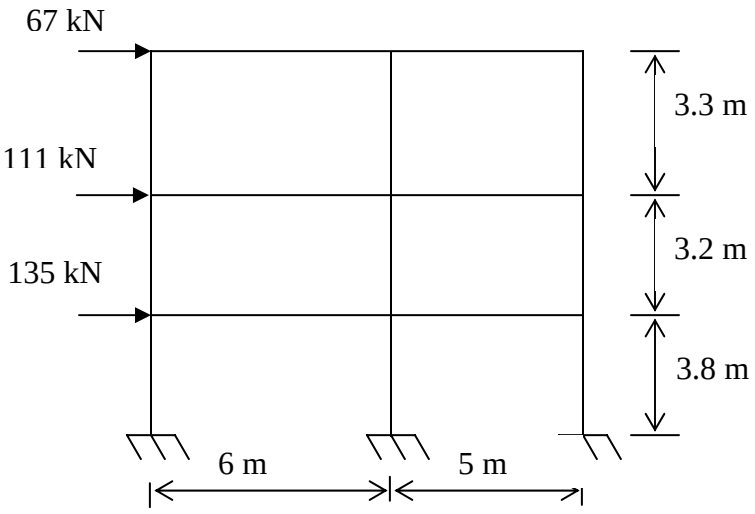

Fig.5

8.a) A Channel section consists of 14 mm thick web and 16 mm thick flange. Depth of the web excluding the flange thickness is 280 mm. Width of the flange is 160 mm. Detremine the shape factor.

b) A continuous beam has uniform cross-section. If the collapse just occurs under the loads as shown in Fig.6. It has uniform plastic moment capacity M_p. Determine the value of plastic moment for design. [7+8]

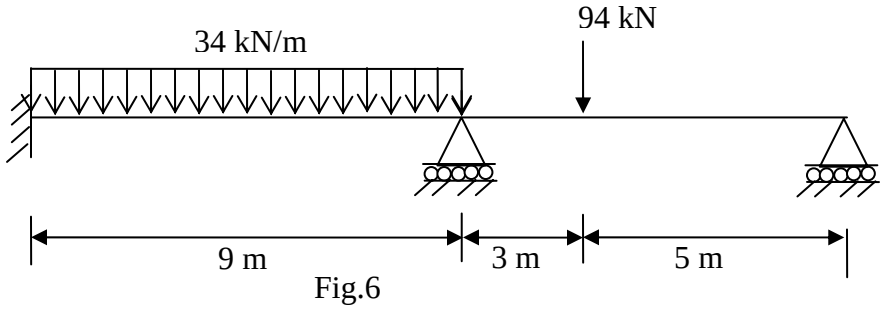

Fig.6

--ooOoo--

Code No: 09A50108 | R09 | SET-4

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD
B. Tech III Year I Semester Examinations, December-2011
ADVANCED STRUCTURAL ANALYSIS
(CIVIL ENGINEERING)

Time: 3 hours **Max. Marks: 75**

Answer any five questions
All questions carry equal marks
---

1. Analyse the portal frame shown in Fig.1 using Moment Distribution Method. Draw the elastic curve. [15]

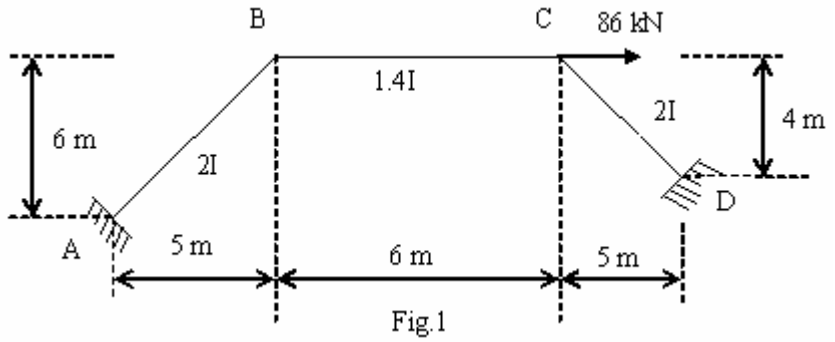

Fig.1

2. Analyse the continuous beam shown in Fig.2 using Strain Energy Method, and draw shear force and bending moment diagrams. Assume constant EI throughout the beam. Locate and find the distances of the points of contra-flexure from supports. Draw elastic curve. [15]

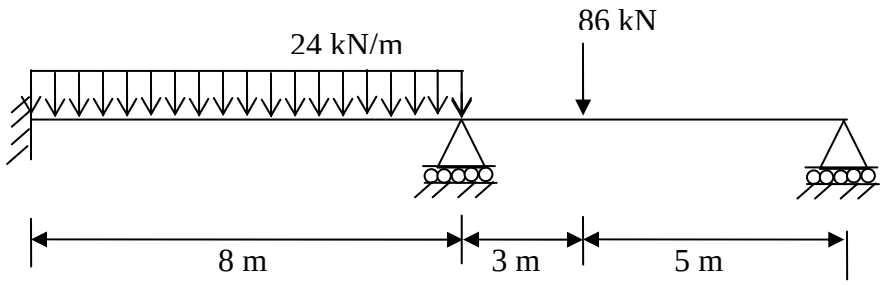

Fig.2

3.a) Define Influence Line.
b) A uniformly distributed load of 52 kN/m of 6 m length crosses a girder of span 40 m, left to right. With the help of influence lines, determine the values of shear force and bending moment at 14 m from the left support, when the head of the load is 6 m from the left support. [7+8]

4. A two-hinged parabolic arch has a span of 20 m and central rise of 4 m. It is loaded with a udl of 4 kN/m on the left 8 m length. Calculate the bending moment at 5 m from the left support using influence lines. [15]

5. Analyse the continuous beam using Flexibility method, shown in Fig.3, and draw shear force and bending moment diagrams. Assume constant EI throughout the beam. Locate and find the distances of the points of contra-flexure from supports. Draw elastic curve. [15]

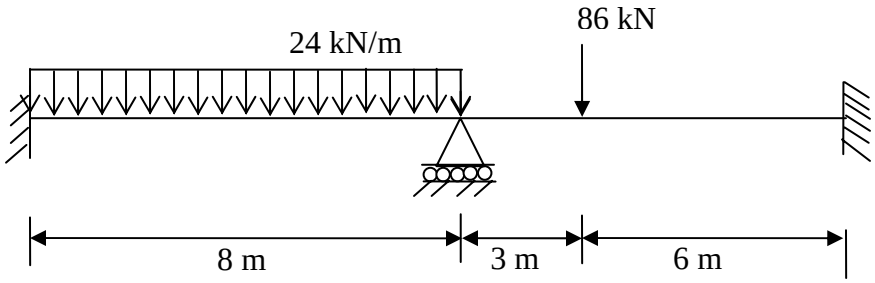

Fig.3

6. Determine the forces in the members of the truss shown in Fig.4. Using Stiffness method. All the members have equal cross-sectional areas of 1240 mm^2. E = 205GPa. [15]

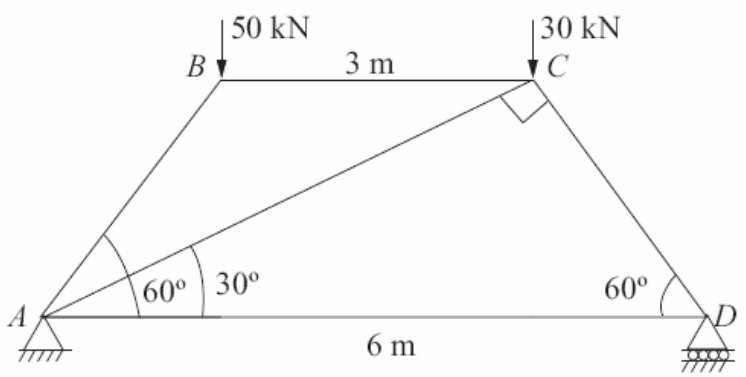

Fig.4

7. Analyze the frame shown in Fig.5 by Stiffness method. Draw the bending moment diagram and sketch elastic curve. Cross-sectional area of all columns is equal. [15]

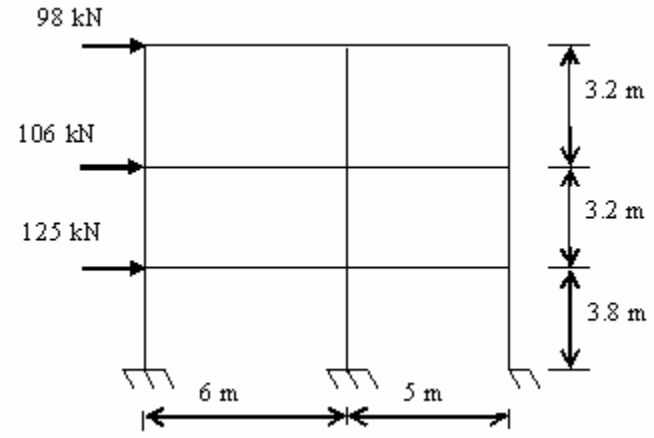

Fig.5

8.a) A T-section consists of 10 mm web and 12 mm thick flanges. Depth of the web is 160 mm. Width of the flange is 140 mm. Find the shape factor based on plastic analysis.

b) A continuous beam has uniform cross-section. If the collapse just occurs under the loads as shown in Fig.6. It has uniform plastic moment capacity M_p. Determine the value of plastic moment for design. [7+8]

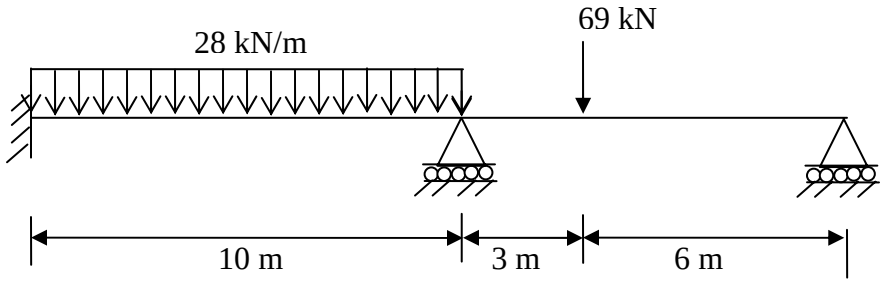

Fig.6

--ooOoo--