Code: 9A01403

1

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April / MAY 2012

STRUCTURAL ANALYSIS - I

(Civil Engineering)

Time: 3 hours Max Marks: 70

Answer any FIVE questions

All questions carry equal marks

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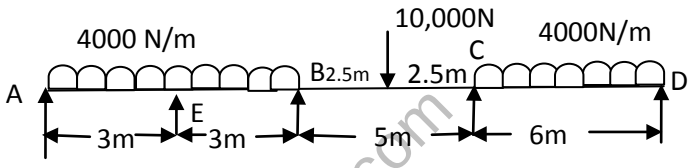
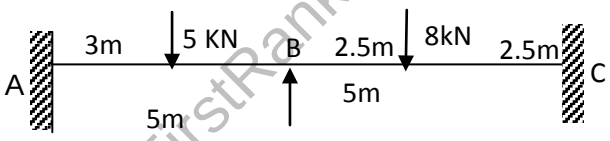
1 A fixed beam AB of span 10m is carrying a u.d.l. of 6KN/m over the left half of the span. Find the fixing moments and support reactions. Draw BMD and SFD.

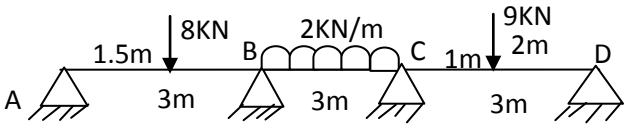
Beam AEBCD shown in figure is supported at A, B, C, D and hinged at E. Plot BMD. Use theorem of three moments



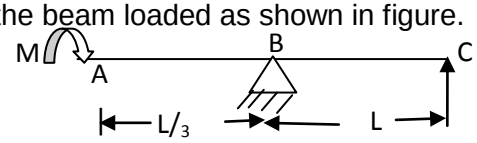
3 Analyze the continuous beam shown in figure using slope deflection method. Plot BMD.



4 Analyze the continuous beam shown in figure by moment distribution method. The support A settles by 10mm, B settles by 30mm and C settles by 20mm. Take I= 2.4 x10^6mm^4, E = 2x10^5 N/mm^2. Plot BMD.



5 Using Castiglione's first theorem, determine the deflection and rotation of the overhanging end A of the beam loaded as shown in figure.



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6 Two point loads of 4KN and 6KN spaced 6m apart cross a grider of 16m span, the 4KN load leading from left to right. Construct the maximum S.F and B.M diagram, stating the absolute maximum values.

7 Four wheel loads of 6, 4, 8 and 5KN cross a girder of 20 m span, from left to right followed by u.d.l of 4 KN/m and 4m long with the 6KN load leading. The spacing between the loads in the same order are 3m, 2m and 2m. The head of the u.d.l. is at 2m from the last 5KN load. Using influence lines, calculate the S.F and B.M. at a section 8m from the left support when the 4KN load is at centre of the span.

8 Write short notes on:
(a) Influence lines for shear force and bending moment.
(b) Internal and external indeterminacies.

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(Civil Engineering)

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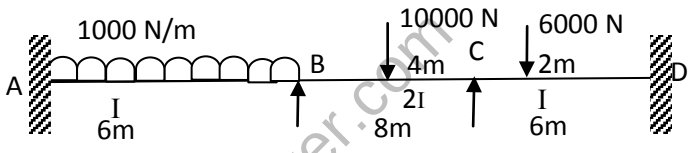
*****

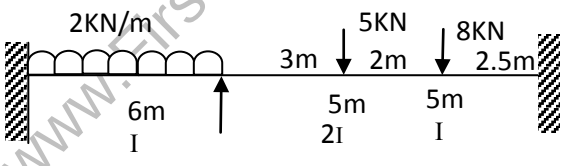
1 A beam AB of uniform section and 6m span is built-in at the ends. A uniformly distributed load of 3KN/m runs over the left half of the span and there is in addition a concentrated load of 4KN at right quarter. Determine the fixing moments at the ends and the reactions. Draw BMD and SFD.

2 Analyze the continuous beam shown in figure using theorem of three moments. During loading support B sinks by 1cm. Draw BMD, E = $2x10^4$ N/mm^2.

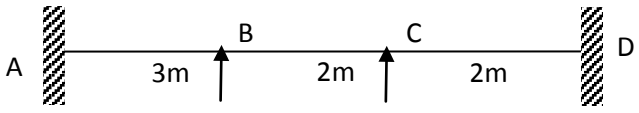


I BC = 2 I_{CB} = 2 I_{CD} = 30,000 cm^4.

3 Analyze the continuous beam shown in figure using slope deflection method. Plot BMD.



4 Analyze the continuous beam shown in figure by moment distribution method. Support B settler by 30mm. Take E = $2x10^5$ N/mm^2 and I= $3x10^6$ mm^4. Plot BMD.



5 Calculate the central deflection and the slope at ends of a simply supported beam carrying a u.d.l. w per unit length over the whole span. Use castiglianos first theorem.

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6 Two point loads of 4KN and 6KN spaced 6m apart cross a girder of 12 m span, the 4 KN load leading from left to right, construct maximum S.F and B.M. diagram, stating the absolute maximum values.

7 A beam ABC is supported at A, B and C, and has a hinge at D distant 3 from A, AB = 2m and BC=10m. Draw the influence lines for:
(i) Reactions at A, B and C, (ii) S.F. at a point just to the right of B.
Hence if a u.d.l of intensity 2KN/m and length 3m travels from left to right, calculate above quantities from which influence lines are drawn.

8 Write short notes on:
(a) Strain energy due to bending moment.
(b) Indeterminate structures.

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B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April / MAY 2012

STRUCTURAL ANALYSIS - I

(Civil Engineering)

Time: 3 hours Max Marks: 70

Answer any FIVE questions

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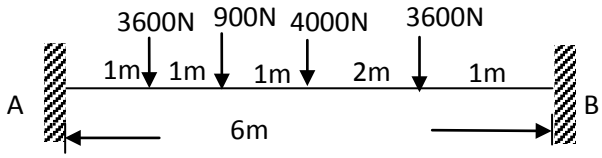
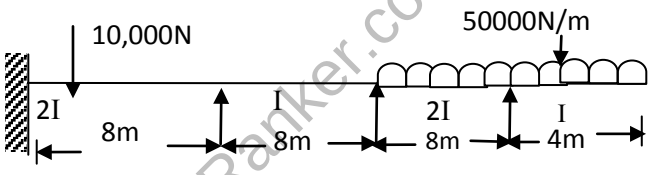
*****

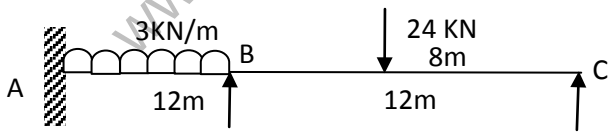
1 Find the fixed end moments and plot SFD and BMD diagram for the beam loaded as shown in figure.



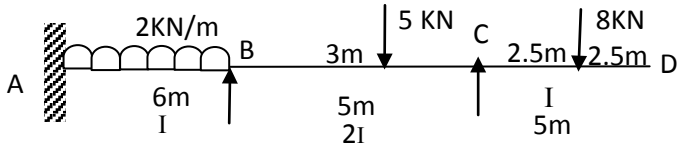
2 Analyze the continuous beam shown in figure using theorem of three moments. Draw BMD.



3 Analyze the continuous beam shown in figure using slope deflection method. The support B sinks by 0.03m.
E = 200 GPa, I = 0.2 x 10^{-3} M^2. Draw BMD and SFD.



4 Analyze the continuous beam shown in figure using moment distribution method, if there is no support at the end D. Plot BMD.



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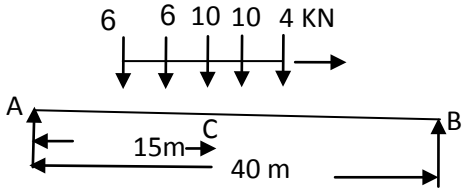
5 (a) State and prove the first theorem of castigliano.

(b) Find the deflection at the free end of a cantilever of length l carrying a u.d.l. ω per unit run over the whole span. Assume uniform flexural rigidity.

6 The system of concentrated load shown in figure rolls from left to right across a beam simply supported over a span of 40 m, the 4KN load leading, for a section 15m from the left hand support, determine:
(i) The maximum bending moment (b) The maximum shear force



7 Explain how to draw the influence lines to find the reactions at the supports and the bending moment in detail.

8 Write short notes on:

(a) Static and kinematic indeterminacies.

(b) Strain energy due to axial load.

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B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April / MAY 2012

STRUCTURAL ANALYSIS - I

(Civil Engineering)

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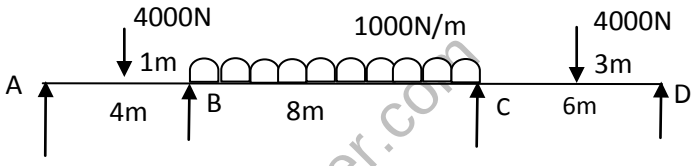
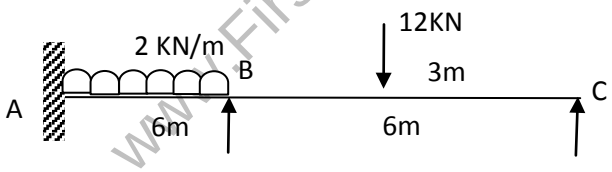
*****

1 A fixed beam AB of span 6m is carrying a u.d.l. of 4 KN/m over the left half of the span. Find the fixing moments and support reaction. Draw BMD and SFD.

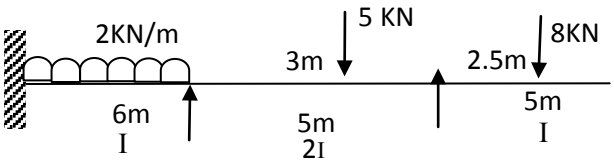
2 Analyze the continuous beam shown in figure using theorem of three moments. During loading support B sinks by 1 cm. Plot SFD and BMD. I = 8000 cm^4 E= $2x10^4$ N/mm^2.



3 Evaluate the bending moment and shear force diagram of the beam shown in figure using slope deflection method.



4 Analyze the continuous beam shown in figure using moment distribution method. Plot the BMD.



5 Derive the expression for:
(i) Strain energy due to axial load and (ii) Strain energy due to flerural loading.

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6 A uniformly distributed load of 1 KN per meter run, 6m long crosser a girder of 16m span. Construct maximum S.F and B.M. diagram and calculate the values at sections at 3m, 5m and 8m from the left hand support.

7 The following system of the wheel loads crosses a span of 25m.

Wheel load (kN)	16	16	20	20	20
Distance between centre (m)	3	3	4	4	

Find the maximum value of bending moment and shearing force in the span.

8 Write short notes on:

(a) Castigliono's first theorem.

(b) Internal and external indeterminacies in trusses.

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