Code: 9A01403

1

B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

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 beam AB of uniform section and 6 m span is built at the ends. A u.d.l of 30 kN/m runs over left half of the span and there is an additional concentrated load of 40 kN at right quarter. Determine the fixed end moments at the ends and the reaction. Draw BMD & SFD.

2 Analyze the continuous beam shown in figure by Clapeyrou's theorem of three moments. Draw BMD and SFD

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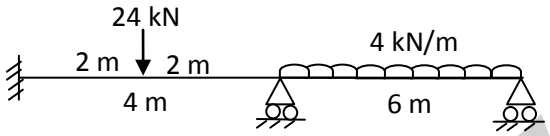
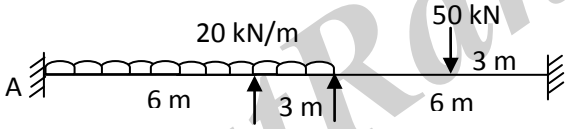
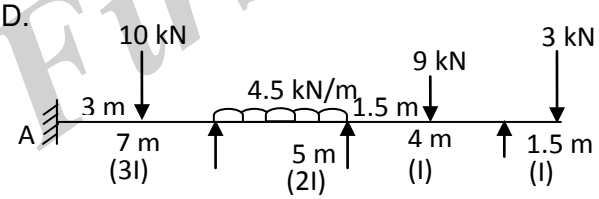


3 Analyze the continuous beam shown in figure by the slope deflection method. Support B sinks by 10 mm. Take E = 2 x 10^5 N/mm^2, I = 16 x 10^7 mm^4. Draw BMD & SFD.



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



5 (a) Find the deflection at the free end of a cantilever carrying a concentrated load the free end using strain energy method.

(b) A simply supported beam carries a point load P eccentrically on the span. Find the deflection under the load sing strain energy method.

6 A u.d.l of 20 kN/m and 20 m long crosser a girder of span 16 m. Calculate the maximum shear force and bending moment at 0, 4, 8, 12 and 16 m from the left end support and construct the diagrams.

7 Explain the influence liner for a uniformly distributed load longer than the span. Draw the figures.

8 Explain the solution of trusses with up to two degrees of internal and external indeterminacies.

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STRUCTURAL ANALYSIS - I

(Civil Engineering)

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Answer any FIVE questions

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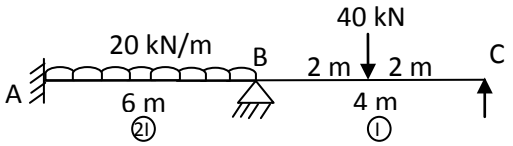
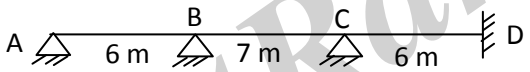
1 A fixed beam of span 6 m carries point loads 20 kN and 15 kN at distances 2 m and 4 m from the left end. Find the fixed end moments and the reactions at the supports. Draw BMD & SFD.

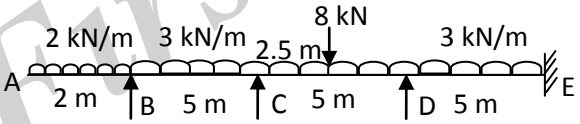
2 Analyze the continuous beam shown in figure by theorem of three moments. Draw SFD & BMD.



3 Analyze the continuous beam shown in figure by slope deflection method. Draw BMD. Take E = 2 x 10^5 MPa ; I = 4 x 10^7 mm^4.



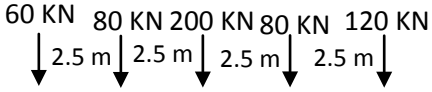
4 Analyze the continuous beam shown in figure using moment distribution method. Draw BMD.



5 (a) State and derive Castigliano's first theorem.

(b) Explain the application of Castigliano's first theorem to pin jointed frames.

6 A train of 5 wheel loads as shown in figure crosses a simply supported bridge of span 22.5 m. Calculate the maximum +ve and –ve shear force values at the centre of the span and the absolute maximum bending moment anywhere in the span.



7 Explain in detail the influence lines for a single concentrated load. Draw the figures.

8 Write short notes on:

(a) Kinematic indeterminacy.

(b) Advantages and disadvantages of fixed beams.

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B.Tech II Year II Semester (R09) Regular & Supplementary Examinations, April/May 2013

STRUCTURAL ANALYSIS - I

(Civil Engineering)

Time: 3 hours Max. Marks: 70

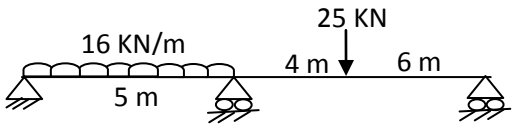
Answer any FIVE questions

All questions carry equal marks

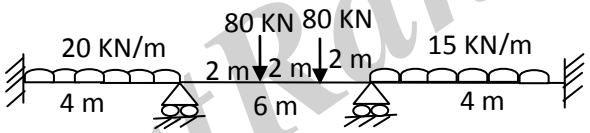
*****

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

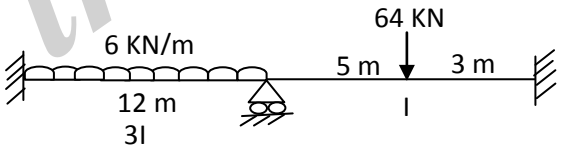
2 Analyze the continuous beam by the theorem of three moments. Draw SFD & BMD.



3 Analyze the continuous beam loaded as shown in figure, by the slope deflection method. Draw BMD. Given $2I_{AB} = I_{BC} = 2I_{CD} = 2I$



4 Analyze the continuous beam resting on unyielding supports as shown in figure. Also determine the effect due to a vertical downward settlement of 48/EI at support B.



5 Derive the expression for:
(a) Strain energy due to axial load.
(b) Strain energy due to bending.

6 A u.d.l of 5 KN/m, covering a length of 15 m, crosses a girder of span 50 m. Find the values of maximum shear force and bending moment at a section 10 m from the left-hand support.

7 A u.d.l of 50 KN/m of 6 m length crosses a girder of span 40 m from left to right. With the help of influence line, determine the values of shear force and bending moment at a point 12 m from left support. When the head of the load is 16 m from the left support?

8 Write short notes on:
(a) Indeterminate structures.
(b) Uses and application of influence lines.

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STRUCTURAL ANALYSIS - I

(Civil Engineering)

Time: 3 hours Max. Marks: 70

Answer any FIVE questions

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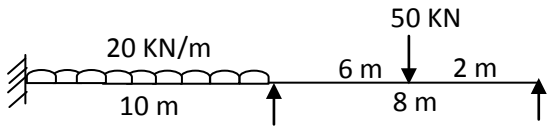
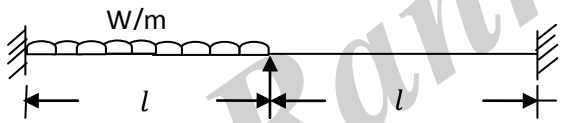
1 A fixed beam AB of span 6 m is subjected to a concentrated couple of 30 KN/m applied at a section C, 4 m from the end A. Find the end moments from first principles and draw BMD and SFD.

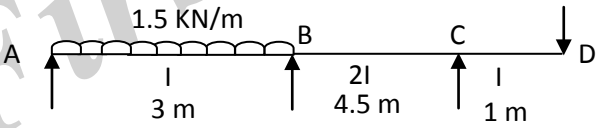
2 Analyze the continuous beam shown in figure by theorem of three moments. Draw SFD & BMD.



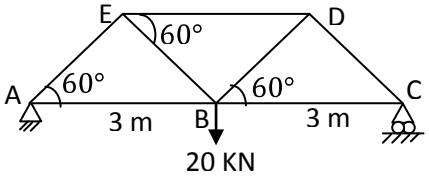
3 Analyze the two span continuous beam loaded as shown by slope deflection method. Draw BMD & SFD.



4 Analyze the continuous beam shown in figure using moment distribution method. Draw BMD and SFD.



5 Calculate the vertical deflection components of joint B of the thus shown in figure by strain energy method. Area of each member in 500 x 10^{-6} m^2, E = 200 x 10^6 kN/m^2.



6 Two point loads of 120 kN and 160 kN spaced 5 m apart, cross a girder of 25 m span from left to right with the 120 kN load leading. Construct the maximum shear force and bending moment diagram stating the absolute maximum values.

7 Explain the influence lines for two concentrated loads. Draw the figures showing all the values.

8 Write short notes on:

(a) Static indeterminacy.

(b) Castigliano's theorem for indeterminate structures.

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