Code: 13A01505

R13

B.Tech III Year I Semester (R13) Regular Examinations December 2015

STRUCTURAL ANALYSIS – II

(Civil Engineering)

Time: 3 hours Max. Marks: 70

PART – A

(Compulsory Question)

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1 Answer the following: (10 X 02 = 20 Marks)

(a) Distinguish between pin jointed and rigid jointed structures

(b) Differentiate the statically determinate structures and statically indeterminate structures

(c) Under what conditions will the bending moment in an arch be zero throughout

(d) Explain rib-shortening in the case of arches

(e) What are the assumptions made in slope-deflection method

(f) What are the advantages of Continuous beam over simply supported beam

(g) Mention the situations where in sway will occur in portal frames

(h) Give the assumptions for fully plastic moment of a section

(i) A T-section consists of 20 mm web and 20 mm thick flange. Depth of the web is 180 mm. Width of the flange is 120 mm. Find the shape factor based on plastic analysis.

(j) A rigid frame is having totally 10 joints including support joints. Out of slope-deflection and moment distribution methods, which method would you prefer for analysis? Why?

PART – B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

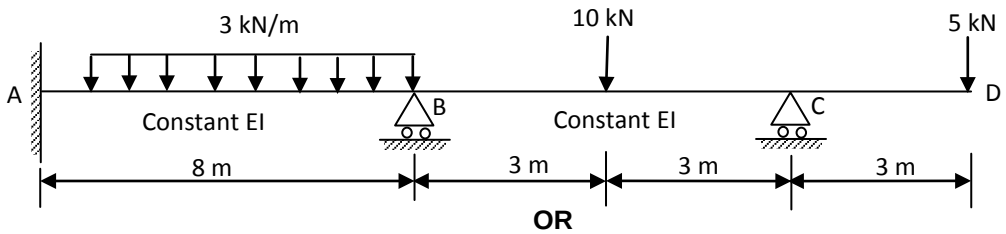
2 A three hinged parabolic arch has a span of 60 m and central rise of 8 m. It is subjected to a point load of 40 kN at a distance of 10 m from left support and a u.d.l of 10 kN/m over right half span. Calculate the location and magnitude of maximum bending moment. Also calculate the radial shear, normal thrust and bending moment under 40 kN load.

OR

3 A three hinged parabolic arch of span 40 m and rise 8 m carries concentrated loads of 200 kN and 150 kN at distances of 8 m and 16 m from left end and an u.d.l of 50 kN/m on the right half of the span. Determine the horizontal thrust. Also calculate the radial shear, normal thrust and bending moment at a distance of 8 m from left end.

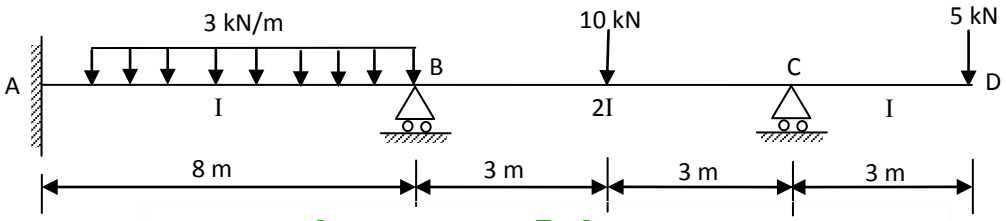
UNIT – II

4 Analyze the continuous beam shown in figure below, using slope deflection method. Draw shear force and bending moment diagram for the continuous beam.



OR

5 Analyze the continuous beam shown in figure below, using moment distribution method. Draw shear force and bending moment diagram for the continuous beam.



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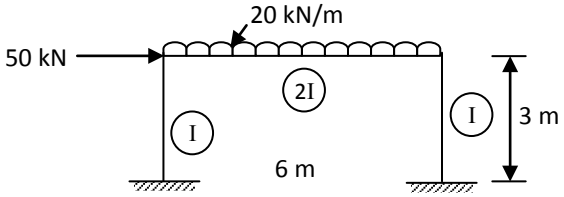
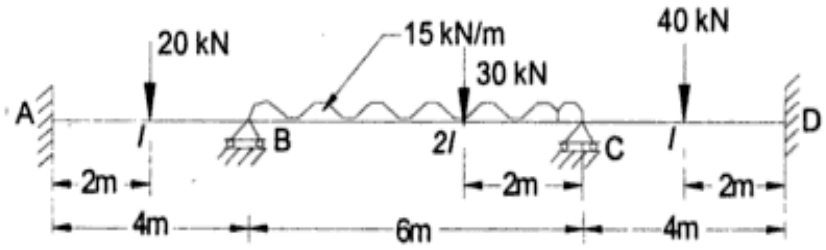
UNIT – III

6 Using Kani's method, analyze the portal frame shown in figure below.



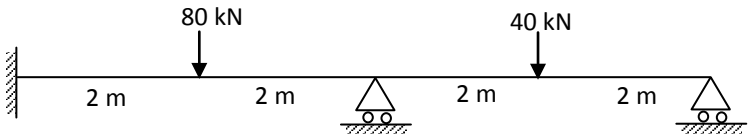
OR

7 Using Kani's method, analyze the continuous beam shown in figure below.



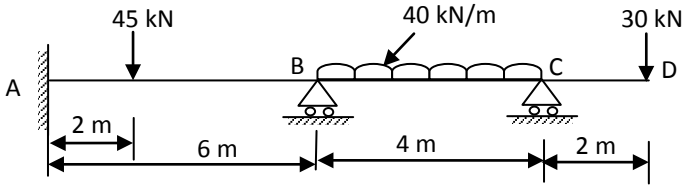
UNIT – IV

8 Analyze the beam given in below, by flexibility method. Take EI as constant. The beam undergoes settlement of supports B and C by 10/EI and 5/EI respectively. Draw the bending moment diagram.



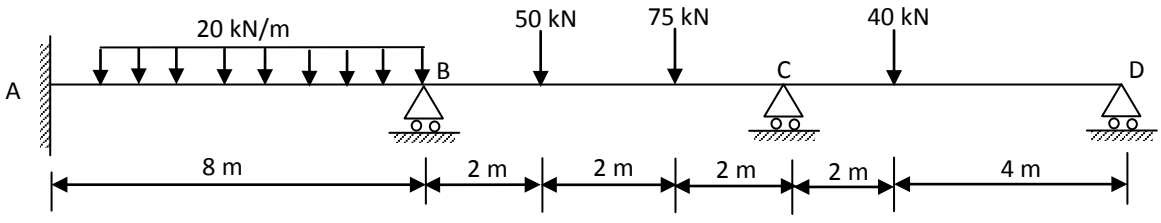
OR

9 Analyze the continuous beam in given below, by stiffness method. Draw the bending moment diagram. Take AB = 2I, BC = CD = I.



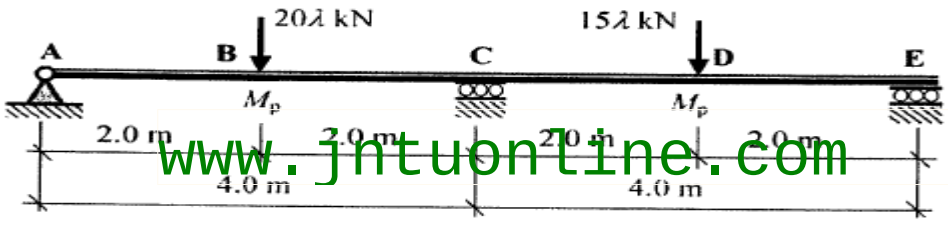
UNIT – V

10 Find the required value of plastic moment capacity at collapse load for the continuous beam shown in figure below. Take load factor as 2. Take AB= 2 M_P ; BC =1.5M_P ; CD = M_P



OR

11 Determine the plastic moment capacity of a continuous beam shown in figure below. Take λ= 1.7.



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