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Reg. No. : | \ | | | | | | | | | |

Question Paper Code: 55101

B.E./B.Tech. DEGREE EXAMINATION, NOV 2019

Fifth Semester

Civil Engineering

15UCE501 -STRUCTURAL ANALYSIS-I

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. Deficient frames are same as CO1- R

   (a) Redundant frames (b) Perfect frames (c) Portal frames (d) None of the above

2. Second theorem of Castiglione may be used to find reaction in a CO2- R

   (a) Propped beam (b) Continuous beam (c) Fixed beam (d) None of the above

3. Which of the following method is a displacement method CO3- R

   (a) Slope deflection (b) Moment distribution

   (c) Kani's method (d) Five centered arch Column analogy

4. Which of the following methods of structural analysis is a force method? CO4- R

   (a) Slope deflection method (b) Column analogy method

   (c) Moment distribution method (d) Kani's method

5. A two-hinged semi-circular arch of radius R carries a concentrated load W at the crown. The horizontal thrust is CO5- R

   (a) $\frac{W}{2\pi}$ (b) $\frac{W}{\pi}$ (c) $\frac{2W}{3\pi}$ (d) $\frac{4W}{3\pi}$

PART – B (5 x 3= 15 Marks)

6. Define perfect frame with an example CO1 R

7. Write the slope deflection equation. CO2 R

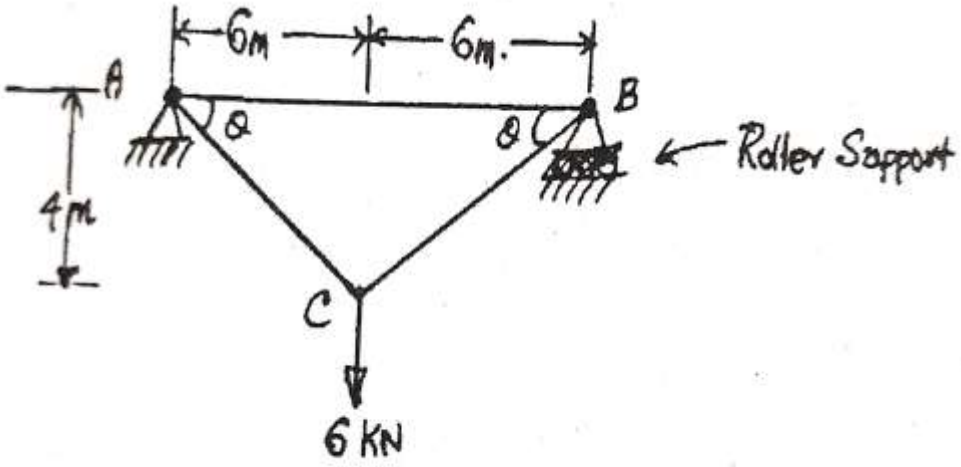
8. Write the final moment in moment distribution method. CO3 R

9. Explain influence lines. CO4 R

10. Give the applications of two hinged arches. CO5 R

PART – C (5 x 16= 80Marks)

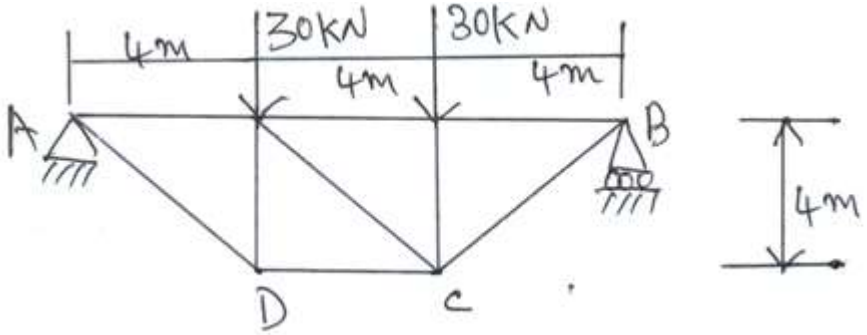
11 (a) Determine the vertical and horizontal displacements of the point C of the pin jointed frame shown in fig 1. The cross sectional area of AB is 125 mm^2, and of AC and BC 175 mm^2, each . Take E = $2x10^5$ N/ mm^2. CO1- App (16)



Or

(b) The steel truss shown in fig is anchored at A and supported on rollers at B. If the truss is so designed that, under the given loading , al, tension members are stressed to 110 N / mm^2, and all compression members to 85N/ mm^2, find the vertical deflection of the point C . CO1 App (16)

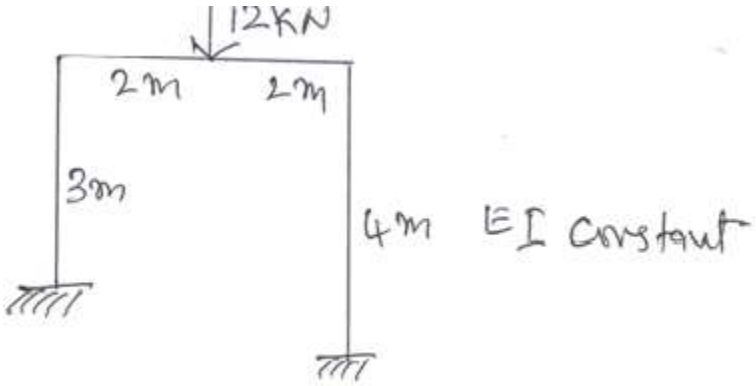
Take E = $2x10^5$ N/ mm^2.



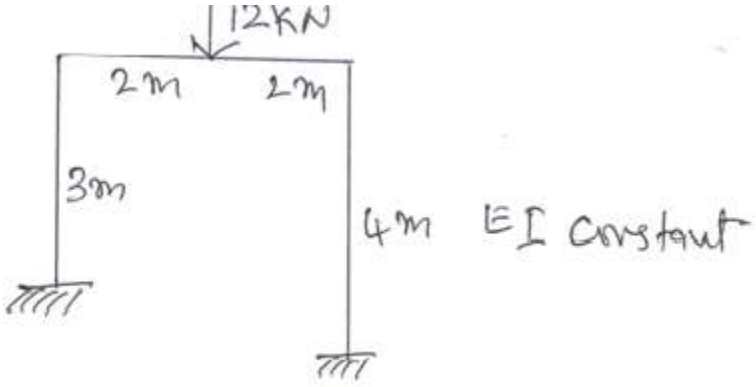
12. (a) A continuous beam ABC consists of AB and BC of 5m length in each. Both the ends of the beams are fixed . The span carries a point load of 15KN at its middle point. The span BC carries a point load of 25KN at its middle point . Find the moments and reactions at the supports. Assume the beam is of uniform section. Use slope deflection method. CO2 App (16)

Or

(b) Analyse the portal frame shown in fig by slope deflection method CO2- App (16)



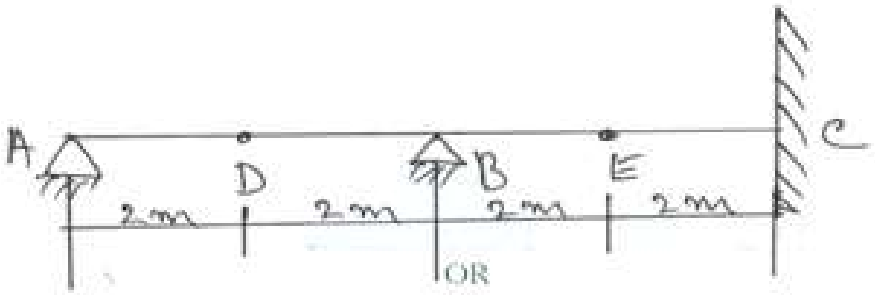
13. (a) Analyse the portal frame shown in fig by moment distribution method. CO3- Ana (16)



Or

(b) A beam ABC 16m long, fixed at A and C and continuous over support B, carries a UDL of 3KNN/m over a span AB and a point load of 10KN at mid span BC. Span AB = 8m and span BC = 8m . EI is constant throughout. Analyse the beam using moment distribution method. CO3- Ana (16)

14 (a) A two span ABC has internal hinges at D and E as shown in fig Using Muller Breslau influence theorem , sketch the influence lines for Reaction at A , B and C — CO4 U — (16)



OR

Or

(b) A live load of 15KN/m, 5m long moves on a girder simply supported on a span of 13m. Find the maximum bending moment that can occur at a section 6m from the left end. — CO4 Ana — (16)

15 (a) A symmetrical three hinged circular arch has a span of 13m and a rise of central hinge of 3m . It carries a vertical load of 15KN from the left end. Find the — CO5- U — (16)

(i) Reactions at the supports.

(ii) Magnitude of the thrust at the springing

(iii) Bending moment at 5m from the left hinge and

(iv) The maximum positive and negative bending moment

Or

(b) A two hinged parabolic arch of span 25 m and a rise 5m carries a uniformly distributed load of 38KN/m, covering a distance of 10m from the left end. Find the horizontal thrust , reactions at the hinges and the maximum negative moment. — CO5- U — (16)