C **Reg. No. :** | | | | | | | | | | |

Question Paper Code: 55101

B.E./B.Tech. DEGREE EXAMINATION, APRIL 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. A stable structure will not CO1-R

   (a) stable (b) strong (c) topple (d) stiff

2. The slope deflection method is ideally suited for the analysis of CO2-R

   (a) Continuous beams (b) rigid joined frame (c) both a & b (d) None of these

3. Which of the following does not fall in the category of displacement method? CO3-R

   (a) Method of consistent deformation (b) Equilibrium method

   (c) Moment distribution method (d) Stiffness method

4. According to Muller Breslau principle, _____ is removed from the structure. CO4-R

   (a) reaction (b) support (c) restraint (d) shear

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

   (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. State the principle of virtual work and give its applications. CO1-R

7. List the moments considered in slope deflection method and brief any one. CO2-U

8. Write a note on fixed end moment. CO3-U

9. What are influence lines? CO4-U

10. Give the applications of two hinged arches. CO5-U

PART – C (5 x 16= 80Marks)

11. (a) A simply supported beam of span 6m is subjected to a concentrated load of 45KN at 2m from the left support. Calculate the deflection under the load point. Take E = 200 X 10^6 KN/m^2 and I = 14.0 X 10^{-6} m^4. CO1-App (16)

Or

(b) Determine the deflection at centre of the beam and slope at the end A of the beam shown in Fig 2. Take E=200x10^6 kN/m^2 and I= 13x$10^{-6}$$m^4$. Use the principle of virtual work. CO1-App (16)

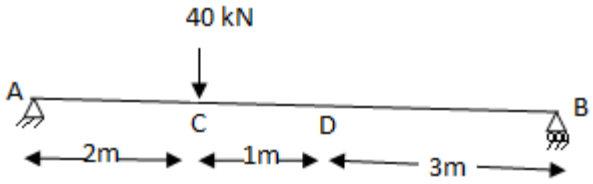
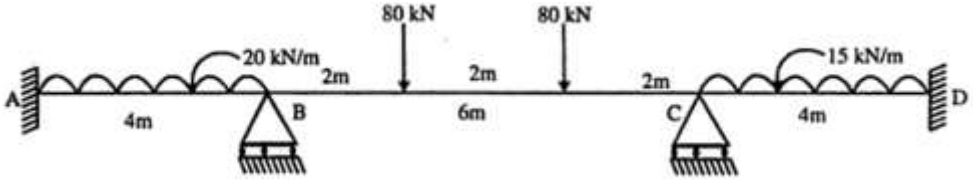


Figure.2

12. (a) Analyse the beam by slope deflection method and draw the bending moment diagram. Take IAB = ICD = I, IBC = 2I. CO2-App (16)

(16)



Or

Or

(b) Analyse the portal frame shown in Fig.3. Take I1:I2:I3=3:2:1 by using slope deflection method. CO2-App (16)

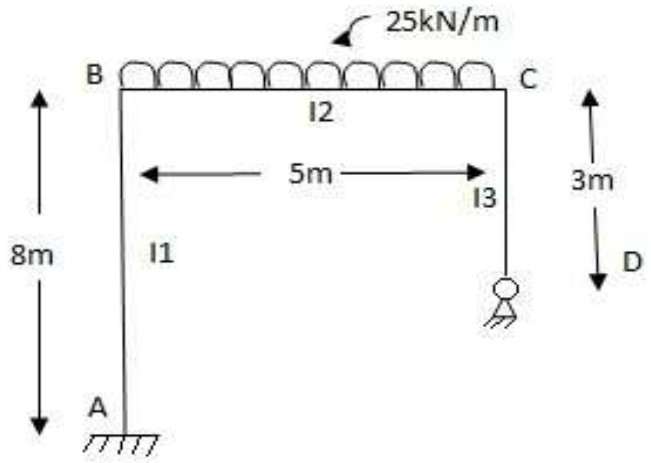
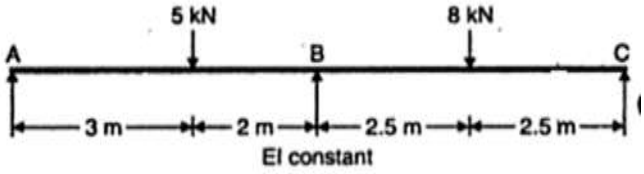


Figure.3

13. (a) Solve the beam shown in fig. by moment distribution method and draw the Bending Moment Diagram CO3-App (16)



Or

(b) A Continuous beam ABCD consists of three spans with fixed supports on both ends and simple supports at B and C. Span AB=7m, BC=6m and CD=6m. An uniformly distributed load of 3kN/m acts on AB. A point load of 6kN acts at 3m from B. A point load of 9kN acts at the mid span of CD. Flexural rigidities are I, 2I and I for AB, BC and CD respectively. Determine the Bending moments at the supports, using moment distribution method. CO3-App (16)

14. (a) A simply supported beam of 15m span is subjected to an UDL of 5kN/m (self weight) and an UDL of 12kN/m (live load) acting for 6m length travelling from right to left. Draw the ILD for shear force and bending moment at a section 10m from the right end. Use these diagrams to determine the maximum shear force and bending moment at this section. CO4-App (16)

Or

	(b)	Two point loads of 100kN and 200kN spaced 3m apart cross girder of span 12m from left to right with the 100kN loading. Draw the ILD for shear force and Bending moment and find the values of maximum shear force and bending moment at a section 4m from the left hand support. Also evaluate the absolute maximum bending moment due to the given loading system.	CO4-App	(16)
15.	(a)	A parabolic three hinged arch carries a UDL of 15kN/m over the left half of the span. The span of the arch is 18m and the central rise is 2.8m. Determine the resultant reaction at the supports. Find also the bending moment, normal thrust and radial shear at a section 4.5m from the left support.	CO5-App	(16)
		Or		
	(b)	A three hinged circular arch of span 16m and rise 4m is subjected to two point loads of 100KN and 80KN at the left and right quarter span points respectively. Find the reactions at supports. Find also the bending moment, radial shear and normal thrust at 6m from left support.	CO5-App	(16)