

USN

--	--	--	--	--	--	--	--	--	--

15CV652

Sixth Semester B.E. Degree Examination, Dec.2018/Jan.2019 Matrix Method of Structural Analysis

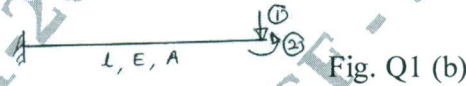
Time: 3 hrs.

Max. Marks: 80

**Note: 1. Answer any FIVE full questions, choosing one full question from each module.
2. Assume any missing data, if any.**

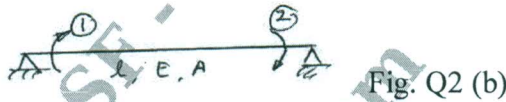
Module-1

- 1 a. Explain static and kinematic indeterminacy with examples. (06 Marks)
- b. From first principles, develop flexibility matrix for beam element shown in Fig. Q1 (b) for the co-ordinates shown. (10 Marks)



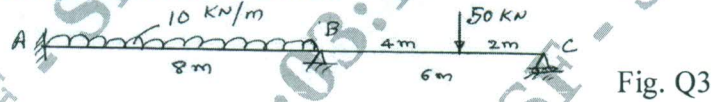
OR

- 2 a. Explain (i) Principle of superposition. (ii) Equilibrium and compatibility conditions. (06 Marks)
- b. From first principles, develop stiffness matrix for beam element shown in Fig. Q2 (b) for the co-ordinates shown. (10 Marks)



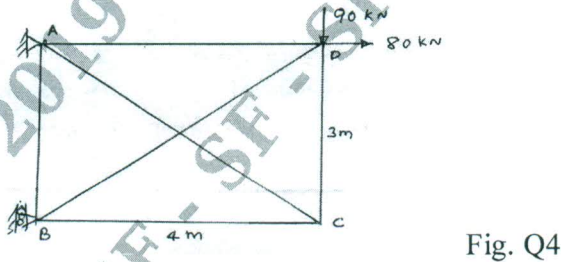
Module-2

- 3 Analyse the continuous beam loaded shown in Fig. Q3 by force transformation matrix method. Draw BMD and SFD. EI is constant. (16 Marks)



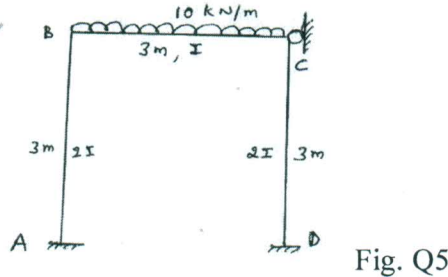
OR

- 4 Find the member forces of the truss shown in Fig. Q4 by force transformation matrix method. AE is constant for all the members. (16 Marks)



Module-3

- 5 Analyse the portal frame shown in Fig. Q5 by displacement transformation matrix method. Draw BMD. (16 Marks)



Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

OR

- 6 Analyse the continuous beam by stiffness matrix method using transformation approach. Refer Fig.Q 6. Draw SFD. (16 Marks)

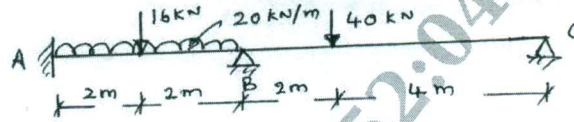


Fig. Q6

Module-4

- 7 A pin jointed rectangular frame is shown in Fig. Q7. The bar AD is the last to be added and is short by 0.1 cm. Find the forces in the members when it is forced into position. The sectional area of each of the side bar is 3 cm² and each of diagonal bar is 1.5 cm². Take $E = 1300 \text{ N/mm}^2$. (16 Marks)

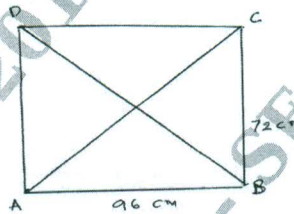


Fig. Q7

OR

- 8 The two hinged portal frame shown in Fig. Q8 is subjected to a rise in temperature of 50°C. Determine the moment induced at B and C due to change in temperature $\alpha = 1.2 \times 10^{-5} / ^\circ\text{C}$, $EI = 186875 \text{ KN-m}^2$ (16 Marks)

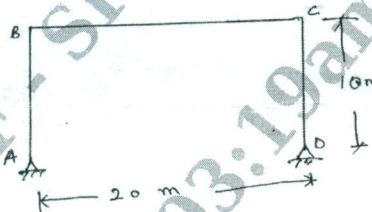


Fig. Q8

Module-5

- 9 Analyse the beam shown in Fig. Q9 by direct stiffness method. Draw BMD. (16 Marks)

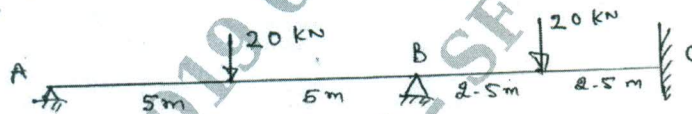


Fig. Q9

OR

- 10 Determine the forces in all the members of truss shown in Fig. Q10 by direct stiffness method. (16 Marks)

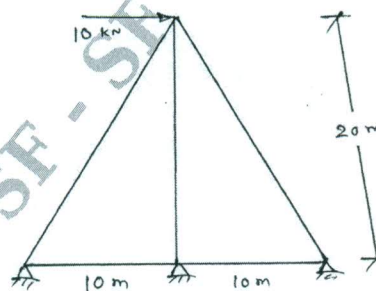


Fig. Q10
