

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER-V (NEW) EXAMINATION – WINTER 2020

Subject Code:3150614

Date:03/02/2021

Subject Name:Structural analysis-II

Time:10:30 AM TO 12:30 PM

Total Marks: 56

Instructions:

1. Attempt any FOUR questions out of EIGHT questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

	Marks
Q.1 (a) Define portal frame. Discuss the causes of sway in a portal frame.	03
(b) Define: 1) Distribution Factor 2) Relative stiffness	04
(c) Analyse the two storey portal frame shown in figure-1. Consider UDL Value=3 KN/Meter.	07
Q.2 (a) Discuss the uses of slope deflection method.	03
(b) Derive shear equation in the case of analyzing the portal frame with side sway.	04
(c) Analyse the beam shown in figure-2 by slope deflection method. Also plot BMD.	07
Q.3 (a) Discuss framed structures and enlist the types of framed structures.	03
(b) Discuss actions and displacements.	04
(c) Write the differences between Stiffness Method and Flexibility Method.	07
Q.4 (a) State and prove the Castigliano's 1 st Theorem.	03
(b) Calculate the central deflection for a simply supported beam of length 'l' subjected to udl 'w' throughout its span using Castigliano's 1 st Theorem.	04
(c) Analyse the beam shown in figure-3 by Flexibility Method.	07
Q.5 (a) Discuss Castigliano's 2 nd Theorem.	03
(b) Determine the reactions at the supports for a propped cantilever beam of length 'l' subjected to a udl 'w' throughout its span using principle of minimum strain energy.	04
(c) For a cantilever beam, show that stiffness and flexibility matrices are reciprocal to each other.	07
Q.6 (a) What is influence line diagram? What is the significance of influence line diagram?	03
(b) State Mullar Breslau's principle.	04
(c) Draw the influence line diagrams for support reactions V_a and V_b for a propped cantilever beam shown in figure-4.	07
Q.7 (a) Calculate the deflection at the free end of a cantilever beam subjected to udl using Castigliano's 1 st Theorem.	03
(b) Discuss Castigliano's 2 nd Theorem to solve an indeterminate truss.	04
(c) Draw the Influence line diagram for Reactions at the supports and shear force and bending moments at any section C for a simply supported beam.	07
Q.8 (a) Discuss limitations of Castigliano's 1 st Theorem.	03
(b) Write the characteristics of ILD for statically indeterminate structures.	04

(c) A train of loads shown in figure-5 crosses a simply supported girder

07

of span 18m from left to right. Calculate maximum SF and BM at section 8m from left.

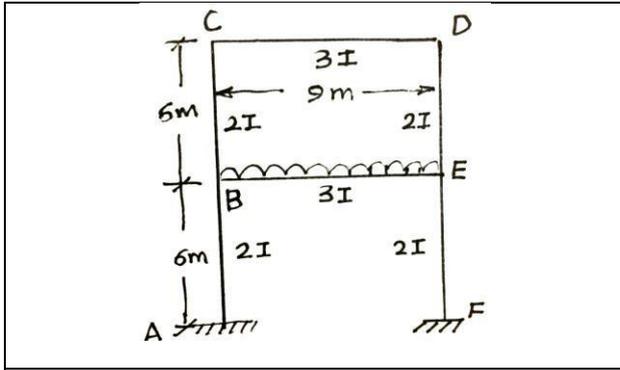


Figure-1

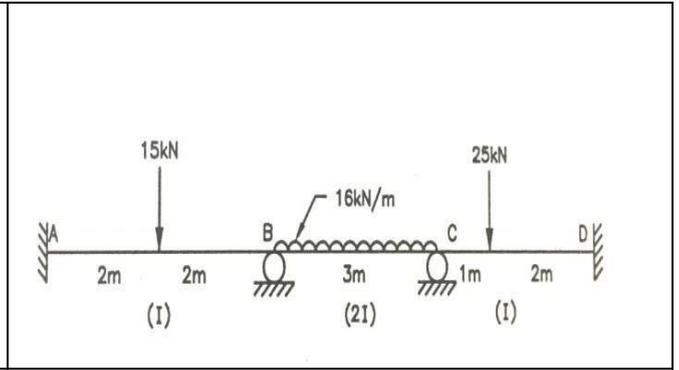


Figure-2

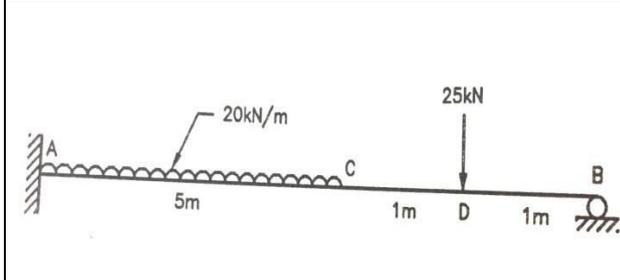


Figure-3

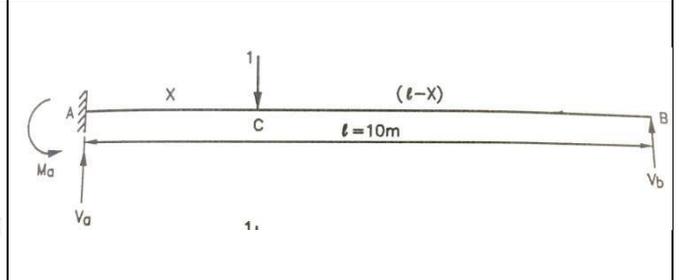


Figure-4

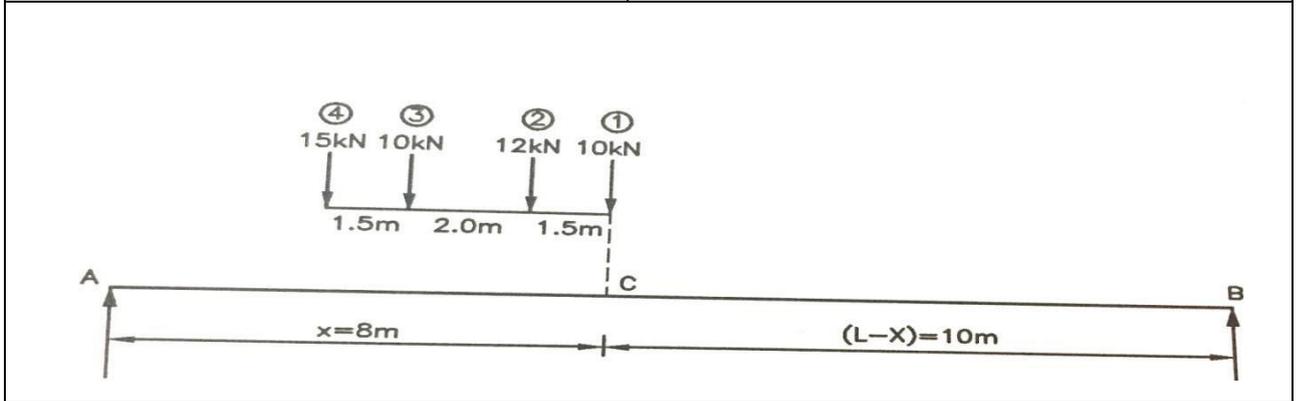


Figure-5