

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-V (NEW) EXAMINATION – WINTER 2018

Subject Code:2150608

Date:20/11/2018

Subject Name:Structural Analysis-II

Time: 10:30 AM TO 01:00 PM

Total Marks: 70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

		MARKS
Q.1	(a) Explain with illustrations the characteristics of flexibility / stiffness matrices.	03
	(b) Derive slope and deflection method equations from first fundamentals.	04
	(c) Analyse the beam as shown in fig.-1 by Moment Distribution Method and draw BMD.	07
Q.2	(a) Explain causes of side-sway in plane frame with illustrations.	03
	(b) A two span simple support continuous beam ABC having AB=5 m and BC = 6m. The span AB is loaded by a point load at centre by 50kN and span BC is loaded by a UDL of 20kN/m over entire span. Analyze the beam by moment distribution method and draw BMD.	04
	(c) Analyse the beam shown in fig.-3 by slope-deflection method and draw BMD. Take EI=constant.	07
	OR	
	(c) Analyse the beam shown in fig.-3 by flexibility method and draw BMD.	07
Q.3	(a) Obtain slope-deflection equations for the beam shown in fig.-2.	03
	(b) Calculate the stiffness matrix for the beam shown in fig.-2.	04
	(c) For a two span simple support continuous beam ABC having AB=5m and BC=5m, calculate the ILD ordinates for R_A at every 1m interval.	07
	OR	
Q.3	(a) (i) Define influence line diagram. (ii) Construct Influence Line Diagrams for Reaction (R_A) and bending moment at 2 m from free end for a cantilever beam AB fixed at A and having span 5m.	03
	(b) A UDL of intensity 16 kN/m, 5 m long moving on a beam of 10 m span. Find maximum bending moment at a section 4m from left support.	04
	(c) Three point loads 90 kN, 75 kN and 55 kN equally spaced 3m respectively, cross a girder of 30 m span from left to right, the 55 kN load leading. Calculate absolute maximum bending moment in the beam and its location.	07
Q.4	(a) Explain Castigliano's both theorems.	03
	(b) Calculate the slope at free end B for a cantilever beam AB having length 5m and loaded by a UDL of 30 kN/m over whole span using energy principle.	04

- (c) Fig.-4 shows simply supported beam AB having varying moment of inertia. It is subjected to an eccentric load. Calculate deflection under the load using energy principle. 07

OR

- Q.4** (a) Write and explain Muller Breslau's principal. 03
 (b) Calculate deflection at B for a cantilever beam AB, fixed at A and free at B, and is acted upon by a UDL of 45 kN/m over whole span using unit load method. Take $EI = \text{constant}$. Consider length of $AB = 3\text{m}$. 04
 (c) A propped cantilever beam of span 7m has fixed support at left end and roller support at right end is loaded by a UDL of 25kN/m up to 3m from left support. Analyze the beam by energy principle and draw BMD. 07
- Q.5** (a) Calculate slope-deflection equations for the portal frame as shown in fig.-5. 03
 (b) Choosing M_A and M_B as redundants, find flexibility matrix for a fixed beam having span of 8m. Take $EI = \text{Constant}$. 04
 (c) Analyze the portal frame as shown in fig.-5 by flexibility matrix method and draw BMD. 07

OR

- Q.5** (a) Define: Stiffness, Distribution Factor, Carry Over Factor. 03
 (b) Find distribution factors for the beam shown in fig.-6. 04
 (c) Analyze the beam as shown in fig.-6 by stiffness matrix method. 07

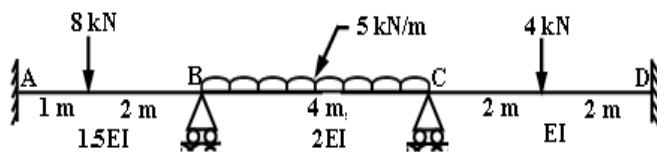


Fig.-1

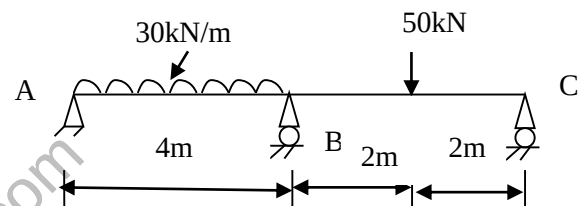


Fig.-2

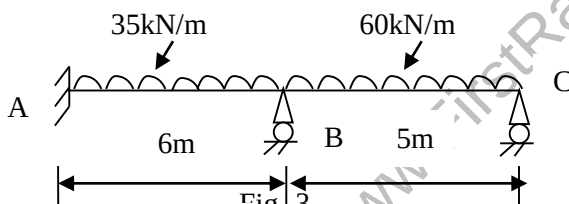


Fig.-3

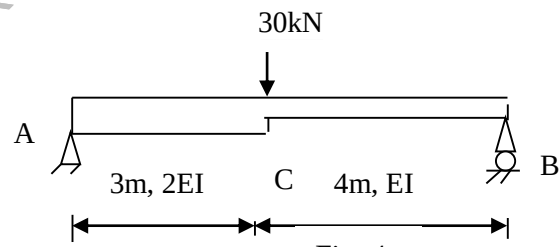


Fig.-4

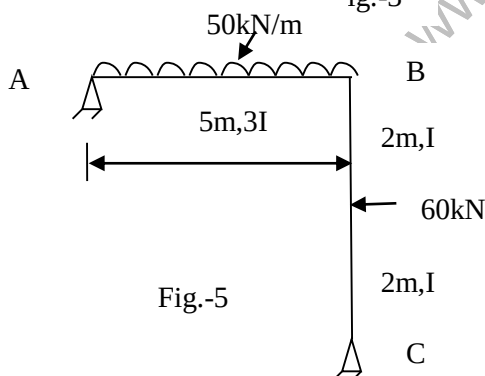


Fig.-5

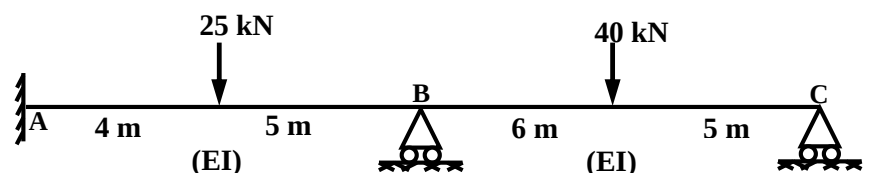


Fig.-6

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