

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-V(New) • EXAMINATION – WINTER 2016

Subject Code:2150608

Date:22/11/2016

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	Answer the following:	14
	1 Explain stiffness.	
	2 Differentiate between carry over factor and distribution factor.	
	3 Define flexibility.	
	4 In a fixed beam of length L if one end sinks by δ , what are the moments and reactions induced at both the ends.	
	5 Explain influence line diagram for a beam.	
	6 Write Castigliano's first theorem.	
	7 Explain rolling loads.	
	8 Differentiate between maximum bending moment at a section and absolute maximum bending moment anywhere in the section due to rolling loads.	
	9 Write Muller-Breslau's principle.	
	10 In a fixed end beam AB of length L, if end B rotates by an angle θ , what are the reactions and moments obtained at both the ends.	
	11 Draw ILD of a moment at fixed end for a cantilever beam AB having length 4m.	
	12 Why stiffness method is more suitable for computer programming?	
	13 Write fixed end moments for beam shown in fig.-1.	
	14 Explain strain energy with illustration.	
Q.2	(a) Explain causes of side-sway in plane frame with illustrations.	03
	(b) Analyse the beam shown in fig.-2 by moment distribution method. Take EI=constant.	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 stiffness 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 propped cantilever beam AB, fixed at A and having roller support at B, of span 5m, draw ILD for R_B. Calculate ordinates of ILD at every 1m interval.	07
	OR	
Q.3	(a) Discuss the criteria to determine the absolute maximum bending moment and its location for a simply supported beam under rolling concentrated loads.	03
	(b) Draw ILD for R_A and M_A for a beam shown in fig.-4	04

	(c)	Three point loads 50 kN, 70 kN and 90 kN equally spaced 2m respectively, cross a girder of 25 m span from left to right, the 90 kN load leading. Calculate absolute maximum bending moment in the beam and its location.	07
Q.4	(a)	State and explain Castigliano's second theorem with example.	03
	(b)	Calculate deflection at free end B for a cantilever beam AB having length 5m and loaded by a UDL of 15 kN/m over whole span using energy principle.	04
	(c)	Fig.-5 shows simply supported beam AB having varying moment of inertia. It is subjected to an eccentric load. Calculate slope at A using energy principle.	07
OR			
Q.4	(a)	Calculate deflection at free end of a cantilever beam as shown in fig.-6 using unit load method. Take EI=constant.	03
	(b)	Choosing R_B and M_B as redundants, find flexibility matrix for beam shown in fig.-7, Take EI=Constant.	04
	(c)	Analyse the frame shown in fig.-8 by Castigliano's second theorem and draw BMD. Take EI=Constant.	07
Q.5	(a)	Calculate slope-deflection equations for the portal frame as shown in fig.-9.	03
	(b)	Obtain stiffness matrix for the portal frame as shown in fig.-9.	04
	(c)	Analyse the portal frame as shown in fig.-9 by flexibility method and draw BMD.	07
OR			
Q.5	(a)	Find distribution factors for the frame shown in fig.-10.	03
	(b)	Carry-out only non-sway analyses for portal frame shown in fig.-10 by moment distribution method.	04
	(c)	Analyse the portal frame as shown in fig.-10 by flexibility matrix.	07

.....

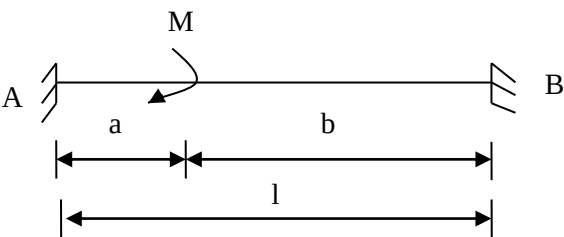


Fig.-1

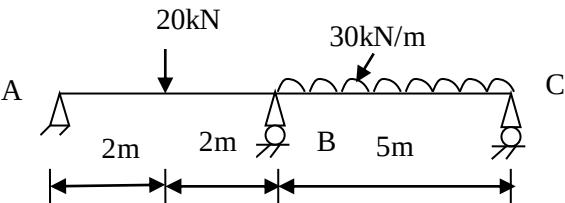


Fig.-2

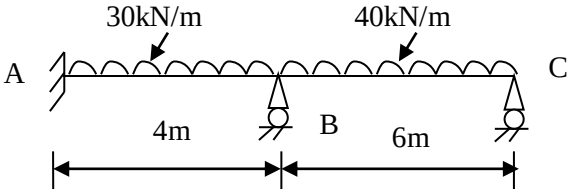


Fig.-3

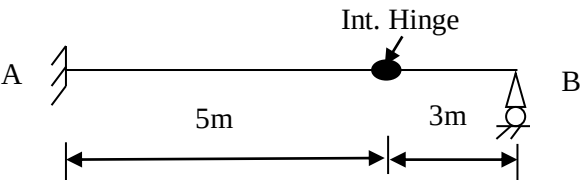


Fig.-4

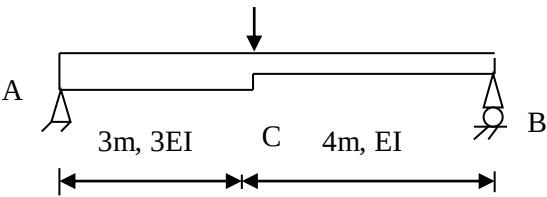


Fig.-5

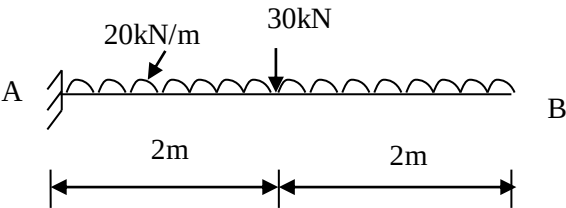


Fig.-6

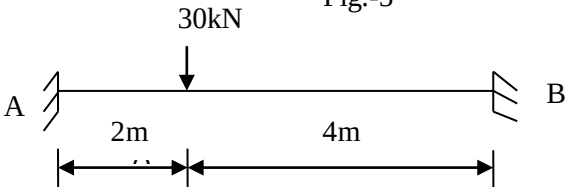


Fig.-7

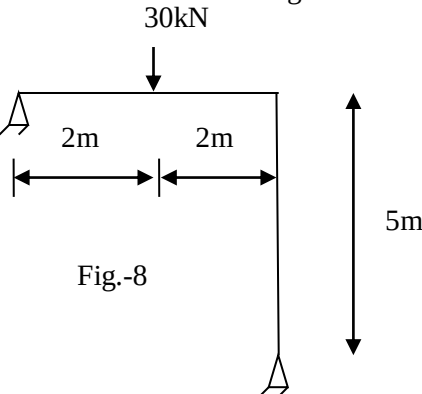


Fig.-8

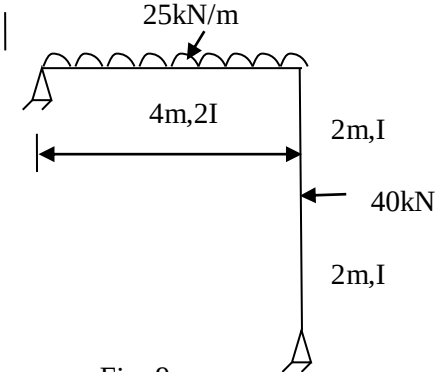


Fig.-9

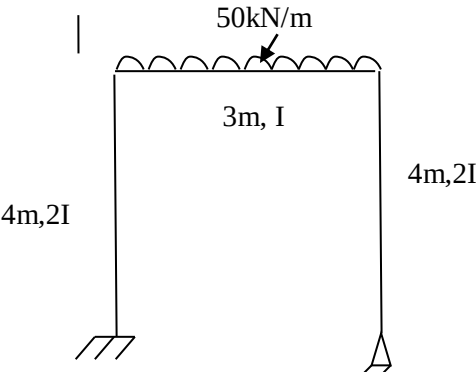


Fig.-10