Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV • EXAMINATION – WINTER • 2014

Subject Code: 140603 Date: 31-12-2014

Subject Name: Structural Analysis - II

Time: 02:30 pm - 05:00 pm Total Marks: 70

Instructions:

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

Q.1	**(a)**	Explain following terms in respect of moment distribution (i) Distribution factor (ii) Carry over factor	**04**
	(b)	Determine end moments for frame loaded as shown in fig. (i) using moment distribution method. Take EI = constant for all members.	**10**
Q.2	**(a)**	Determine fixed end moments for the fixed beam loaded as shown in fig. (ii). Take EI = costant.	**07**
	(b)	Determine horizontal and vertical displacements of point C for the frame loaded as shown in fig. (iii) using unit load method. Take EI = Constant	**07**
		OR	
	(b)	Find deflection and slope at the free end C for the frame loaded as shown in fig. (iii). Take EI = Constant	**07**
Q.3	**(a)**	Determine support reactions and plot SFD and BMD for the continuous beam ABC loaded as shown in fig. (iv), using theorem of three moments.	**07**
	(b)	Determine end moments for the beam ABC loaded as shown in fig. (v) using slope deflection method. Take EI = Constant	**07**
		OR	
Q.3	**(a)**	Determine support reactions for the propped cantilever beam loaded as shown in fig. (vi), using consistent deformation method.	**07**
	(b)	Determine end moments for the beam ABC loaded as shown in fig. (v) using moment distribution method.	**07**
Q.4	**(a)**	Determine rotation factors at joints B and C for the frame shown in fig. (i)	**04**
	(b)	Analyze and draw BMD for the frame ABC loaded as shown in fig. (vii) using theorem of least work.	**10**
		OR	
Q.4	**(a)**	Formulate only slope deflection equations in terms of fixed end moments, unknown rotations and unknown displacements for the beam ABC shown in fig. (iv)	**04**
	(b)	Determine final end moments for the frame loaded as shown in fig. (viii) using Kani's method. Take EI = constant for all members.	**10**
Q.5	**(a)**	Discuss the advantages and disadvantages of post tensioning as compare to pre tensioning for prestressed concrete members.	**04**
	(b)	A concrete beam prestressed with a parabolic tendon loaded as shown in fig (ix). The prestresing force in steel is 1500 kN. The beam is loaded with uniformly distributed load including self weight of 30 kN/m. Compute the extreme fiber stresses at the mid span of the beam at transfer and after application of live load. Also plot stress distribution diagram at mid span of beam.	**10**
		OR	
Q.5	**(a)**	Justify the need of high strength steel and concrete in prestressed concrete members.	**04**
	(b)	Plot influence line for vertical reaction at support A for the two span continuous beam shown in fig.(x) Compute ordinate at every 1 m interval. Also plot qualitative ILD for reaction at B and C.	**10**

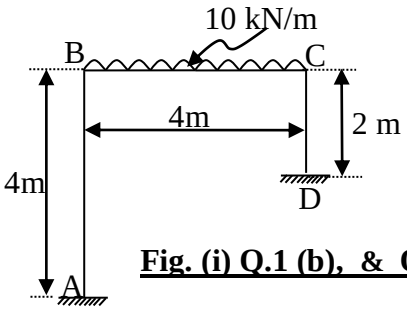


Fig. (i) Q.1 (b), & Q.4 (a)

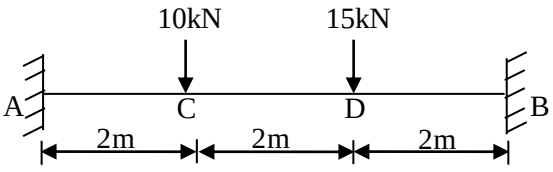


Fig. (ii) Q.2(a)

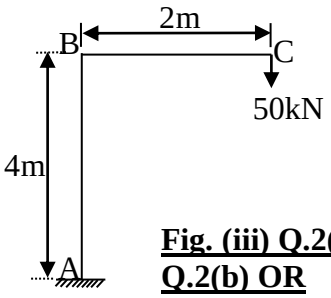


Fig. (iii) Q.2(b) & Q.2(b) OR

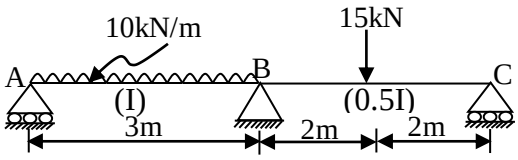


Fig. (iv) Q.3(a) & Q.4 (a) OR

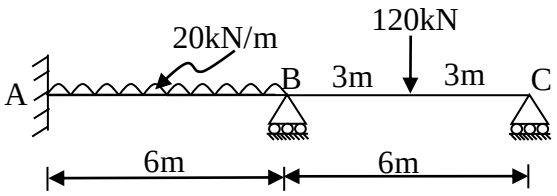


Fig. (v) Q.3(b) & Q.3 (b) OR

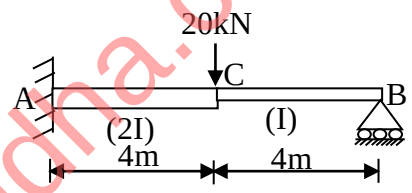


Fig. (vi) Q.3(a) OR

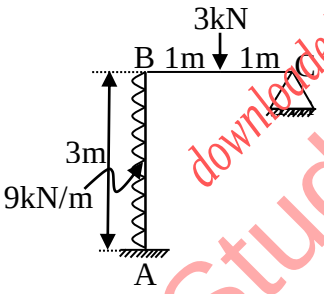


Fig. (vii) Q.4(b)

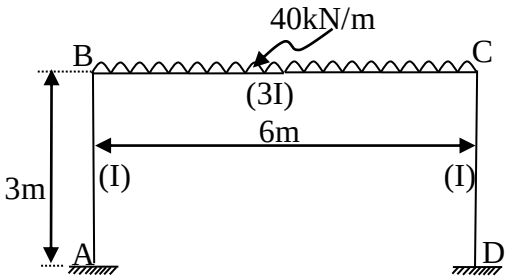
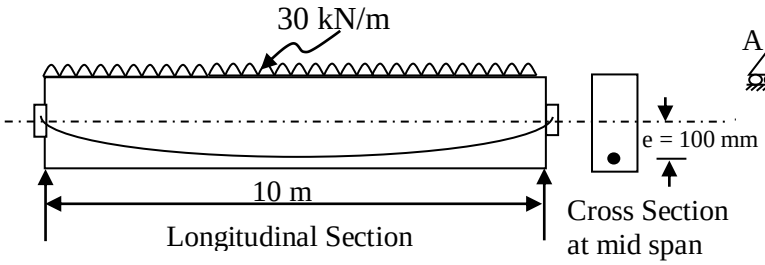


Fig. (viii) Q.4(b) OR



Cross Section
at mid span
300 x 600 mm

Fig. (ix) Q.5 (b)

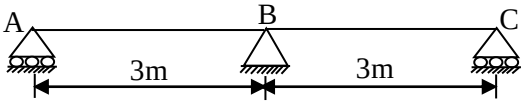


Fig. (x) Q.5(b) OR

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