Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V (NEW) EXAMINATION – SUMMER 2019

Subject Code: 2150608 Date: 03/06/2019

Subject Name: Structural Analysis-II

Time: 02:30 PM TO 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)**	State and explain Castigliano's first theorem.	**03**
	(b)	Using Castigliano's first theorem find deflection at free end of cantilever beam subjected to point load at free end.	**04**
	(c)	Compute support reactions of beam shown in fig. 1 applying Castigliano's theorem.	**07**
Q-2.	**(a)**	Enlist steps of unit load method to analyse indeterminate structures.	**03**
	(b)	Find the joint displacements at C of plane frame shown in fig.2 using unit load method.	**04**
	(c)	Analyse plane frame shown fig.3 by unit load method.	**07**
		OR	
	(c)	Find the joint displacement of a plane truss shown in fig.4 using unit load method.	**07**
Q-3.	**(a)**	Write assumptions made in slope deflection method.	**03**
	(b)	Determine the support moments using slope deflection method for the continuous girder shown in fig. 5.	**04**
	(c)	Determine the support moments using moment distribution method for the beam as shown in fig. 6. Also draw Bending Moment diagram.	**07**
		OR	
Q-3.	**(a)**	Explain stiffness factor and Distribution factor in Moment distribution method.	**03**
	(b)	Determine the support moments using moment distribution method for the continuous girder shown in fig. 5.	**04**
	(c)	Determine the support moments using slope deflection method for the beam as shown in fig. 6. Also draw Bending Moment diagram.	**07**
Q-4.	**(a)**	State and explain Muller Breslau principle for influence line.	**03**
	(b)	Draw qualitative shapes of influence lines for reactions in two bay- two storeyed fixed based portal frame.	**04**
	(c)	Draw influence line diagram for all reactions of propped cantilever having span 12m. Take interval of ordinate 2m.	**07**
		OR	

Q-4. **(a)** Explain the use of influence line diagram with a example. **03**

(b) A simply supported beam of span 32 m is loaded by train of six wheel loads each of equal magnitude 6 kN and separated by 2m distance. Calculate the maximum positive and negative shear force. **04**

(c) Draw influence line diagrams of reaction at B (R_B) and reaction at C (R_c) for a continuous beam ABC with both span length of 8 m having interval of 2 m using Muller Breslau principle. **07**

Q-5. **(a)** How size of flexibility matrix is decided? **03**

(b) Explain D_Q , D_{QL} , F, and Q in flexibility method. **04**

(c) Solve beam shown in fig.7 by flexibility matrix method. **07**

OR

Q-5. **(a)** Write assumptions made in matrix method of structural analysis. **03**

(b) Explain A_D, A_{DL} , S, and D in stiffness method. **04**

(c) Solve plane truss shown in fig.4 by stiffness method. **07**

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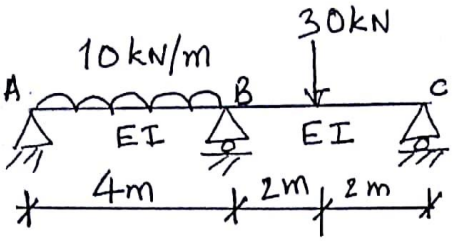

fig. 1

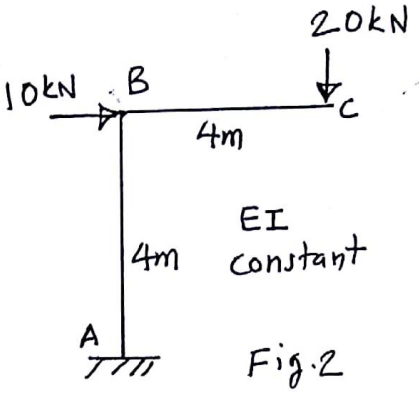

Fig. 2

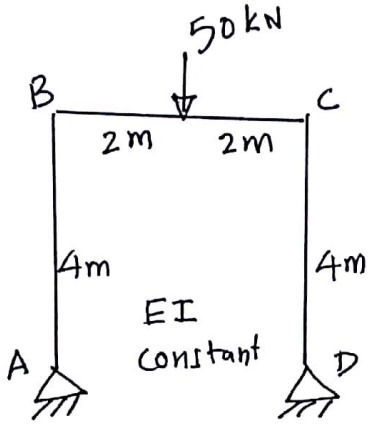

Fig. 3

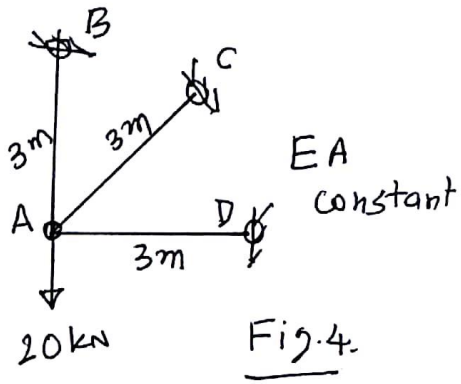

Fig. 4

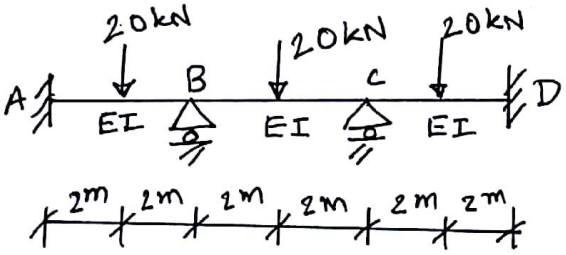

Fig. 5

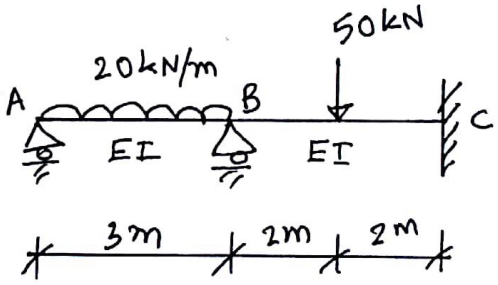

Fig. 6

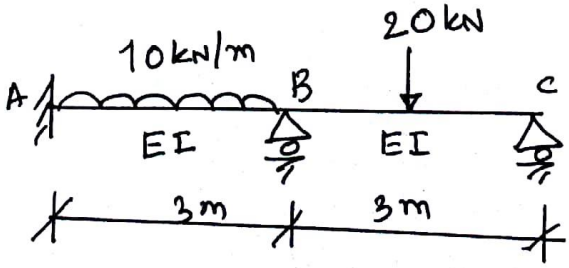

Fig. 7