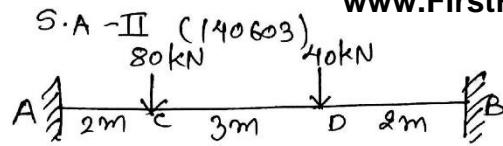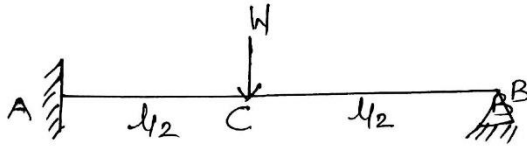# GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–IV(OLD) – EXAMINATION – SUMMER 2019

Subject Code:140603   **Date:20/05/2019**

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.
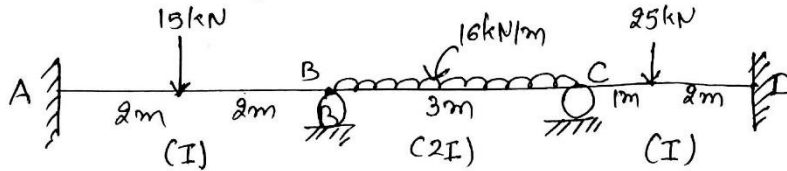3. Figures to the right indicate full marks.

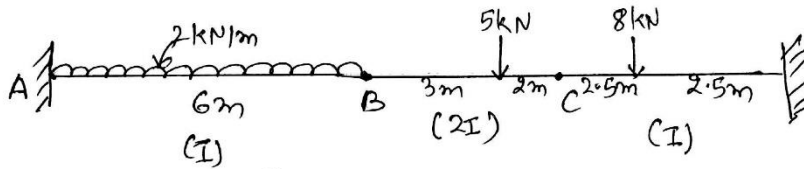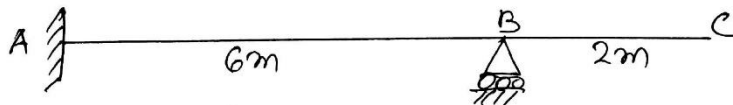|			
Q.1	**(a)**	Determine fixed end moments for the fixed beam loaded as shown in Fig. 1. Draw S.F.D. & B.M.D diagram also.	**07**
	(b)	Write short notes on different types of prestressing used in prestressed concrete giving merits and demerits of each. Also name the various losses occur in the prestressed concrete.	**07**
Q.2	**(a)**	State and explain Castigliano's theorems. Also explain minimum strain energy theorem.	**07**
	(b)	Determine support reactions for the propped cantilever beam loaded as shown in Fig. 2. Using consistent deformation method.	**07**
		OR	
	(b)	A simply supported prestressed concrete beam 10 m span, rectangular section 600×900 mm is subjected to prestressing force of 5600kN at an eccentricity of 200 mm below the centroid of section. Find top and bottom fibre stresses at transfer and after application of live load 80kN/m. Consider losses 15%. Draw stress distribution diagram at mid span.	**07**
Q.3		Analyse the beam shown in the Fig-3 by slope deflection method and draw S.F.D and B.M.D.	**14**
		OR	
Q.3		Analyse the beam shown in the Fig-4 by Kani's method and draw the bending moment diagram.	**14**
Q.4		Analyse the beam shown in Fig-3 by using Moment Distribution method and draw Shear Force and Bending Moment Diagrams.	**14**
		OR	
Q.4		Draw influence line diagrams for V_a, V_b, and M_a for a beam shown in Fig-5.	**14**
Q.5	**(a)**	State and explain Muller Breslau's principle. State the significance of influence line diagram in structural analysis.	**07**
	(b)	Determine the vertical and horizontal deflection for the truss shown in Fig-6 by Unit load method. Take $E=2\times10^5$ N/mm^2 and A=500mm^2	**07**
		OR	
Q.5	**(a)**	Determine deflection at the free end C of a beam ABC shown in Fig-7. Take $E=2\times10^5$ N/mm^2 and $I=2\times10^8$ mm^4 by Unit load method.	**07**
	(b)	Discuss the advantages and disadvantages of post tensioning as compare to pre tensioning for prestressed concrete members & Justify the need of high strength steel and concrete in prestressed concrete members.	**07**

S.A - II (140603)

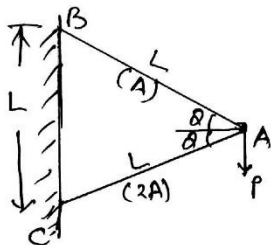80 kN   40 kN

A ⊢ 2m ↓C ── 3m ── ↓D 2m ┤B

Q-1(a)   (Fig : 1)

W
↓
A ⊢ ──ᴸ⁄₂── C ──ᴸ⁄₂── B

Q- 2(b)   (Fig : 2)

15 kN   16 kN/m   25 kN
↓   ↓   ↓
A ⊢ 2m ── 2m B ⌒⌒⌒ 3m ⌒⌒⌒ C ── 1m ── 2m ┤
        (I)   (2I)   (I)

Q-3 (Fig : 3) & same for Q-4.

2 kN/m   5 kN   8 kN
                  ↓   ↓
A ⊢ ⌒⌒ 6m ⌒⌒ B ── 3m ── 2m C 2.5m ── 2.5m ┤
      (I)   (2I)   (I)

Q-3 OR (Fig 4)

A ⊢ ────── 6m ────── B △ ── 2m ── C

Q-4 OR   (Fig : 5)

(Fig : 6) Q : 5(b)

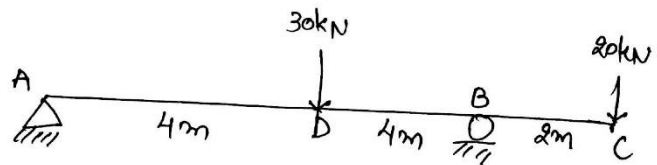   30 kN   20 kN
                  ↓   ↓
A △ ── 4m ── D ── 4m ── B ○ ── 2m ── C

Fig : 7. Q : 5(a) OR

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