Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V (Old) EXAMINATION – WINTER 2019

Subject Code: 150605 **Date: 25/11/2019**

Subject Name: Structural Analysis - III

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.**

Q.1	**(a)**	Explain with neat sketches the various mechanism of failure of plane frames in plastic analysis.	**07**
	(b)	Derive an expression for Meridional stress and Hoop stress develop in a spherical dome subjected to UDL.	**07**
Q.2	**(a)**	Find collapse load of fixed beam having length "L" and subjected to point load "W" acting at a distance "a" from left support and distance "b" from right support by static method and kinematic method.	**07**
	(b)	Explain type of domes with neat sketches and state their uses.	**07**
		OR	
	(b)	Explain technical aspects of difference between curved beam and usual beam.	**07**
Q.3	**(a)**	State the assumptions of Plastic theory.	**07**
	(b)	Derive formula of Fø, Mø and Tø at any section, for the quarter circular cantilever beam curved in plan, subjected to uniformly distributed load w per unit run throughout its length, with usual notations.	**07**
		OR	
Q.3	**(a)**	State uses of domes and beams curved in plan.	**07**
	(b)	Differentiate between stiffness method and flexibility method.	**07**
Q.4	**(a)**	Analyze the beam shown in **fig. 1** using stiffness method.	**07**
	(b)	State and explain static and kinematic theorem of plastic analysis.	**07**
		OR	
Q.4	**(a)**	List and explain the stresses in spherical dome.	**07**
	(b)	Analyze the frame as shown in **fig.2** by stiffness method and determine support moments only.	**07**
Q.5	**(a)**	Analyze the beam as shown in **fig.3** by flexibility method and determine moment at support A & B.	**07**
	(b)	Determine collapse load for a frame as shown in **fig.4** by kinematic method.	**07**
		OR	
Q.5	**(a)**	The conical dome has following details. 1) Span of Dome = 18 m 2) Rise = 3.0 m 3) LL or WL = 1.5 kN/m^2 4) Thickness of Dome = 100 mm. Calculate maximum meridional thrust and hoop force in the dome.	**07**
	(b)	A beam is quarterly curved in plan forming an arc of circle with radius 4.0 m. The beam carries LL of 2.0 kN/m and having 300 mm x 600 mm cross section. Draw SF, BM and TM. Take G = 0.4E for concrete.	**07**

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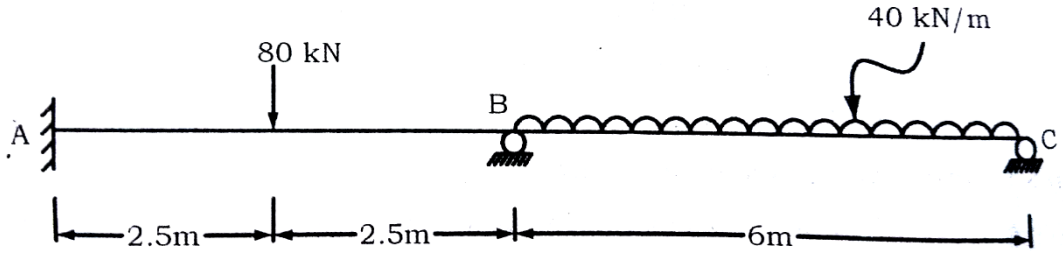

Fig.1 (Q.4 a)

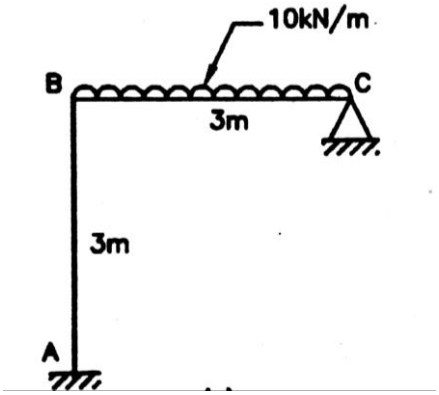

Fig.2 (Q.4 b OR)

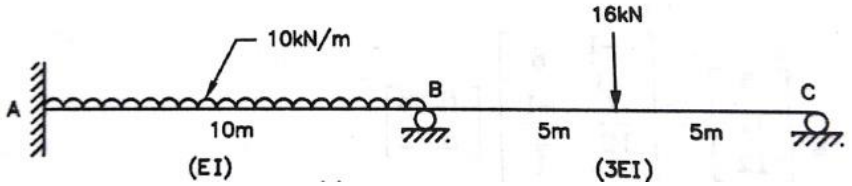

Fig.3 (Q.5 a)

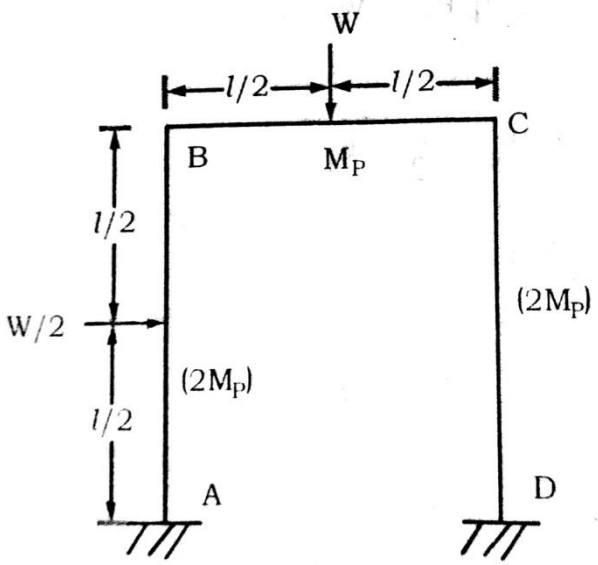

Fig.4 (Q.5 b)