Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

Subject code: 150605 **Subject Name: Structural Analysis- III**

Date:29/06/11 **Total Marks: 70** **Time:10:30 am to 1:00pm**

Instructions:

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

Q.1	**(a)**	Differentiate between stiffness method and flexibility method.	**07**
	(b)	Explain the terms. (i) shape factor (ii) collapse load	**07**
Q.2	**(a)**	Define 'dome'. Derive the expression for meridional thrust for a spherical dome subjected to uniformly distributed load.	**07**
	(b)	Develop stiffness matrix for the plane frame shown in fig.1 Neglect axial deformations.	**07**
		OR	
	(b)	Determine value of M_p for a plane frame loaded upto collapse load as shown in fig.1.	**07**
Q.3	**(a)**	Analyse the beam shown in fig. 2, by stiffness method.	**07**
	(b)	Analyse the beam shown in fig.2, by flexibility method. If support A and C are replaced by hinge supports.	**07**
		OR	
Q.3	**(a)**	A spherical dome has 6 m span and 1.25 m rise. It is subjected to load of 600 N/m^2, including self weight and a lantern load of 800 N at crown. Take thickness as 150 mm. Calculate stresses in the dome.	**07**
	(b)	A conical dome has 9 m span and 4.5 m rise. It has a thickness of 100mm.It is subjected to load of 4900 N/m^2,including self weight and a concentrated load at vertex of 9000 N. Calculate stresses in the dome.	**07**
Q.4	**(a)**	A curved beam circular in plan symmetrically supported on six columns has a radius of 5 m, carries uniformly distributed load of 70 kN/m, including self weight. Calculate S.F., B.M., T. M. at 10 ^{0} interval.	**07**
	(b)	Derive the expression for Mφ and Tφ for a curved beam fixed at ends.	**07**
		OR	
Q.4	**(a)**	Calculate the shape factor for hollow rectangular section having outer dimension 300 mm X 150 mm and thickness 10 mm.	**07**
	(b)	Determine the collapse load for the beam shown in fig.3.	**07**
Q.5	**(a)**	Develop flexibility matrix for the plane frame shown in fig.4.	**07**
	(b)	List and explain the stresses in spherical dome.	**07**
		OR	
Q.5	**(a)**	Differentiate between straight beam and curved beam.	**07**
	(b)	State and explain 'static theorem' and 'kinematic theorem' of plastic theory.	**07**

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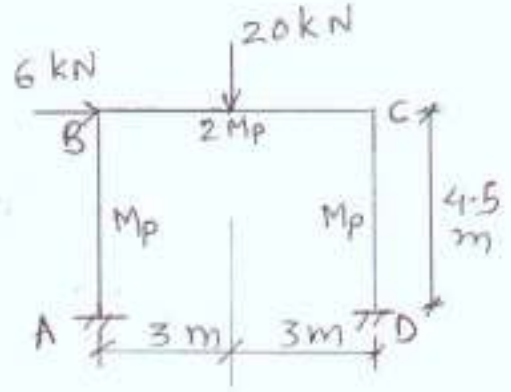
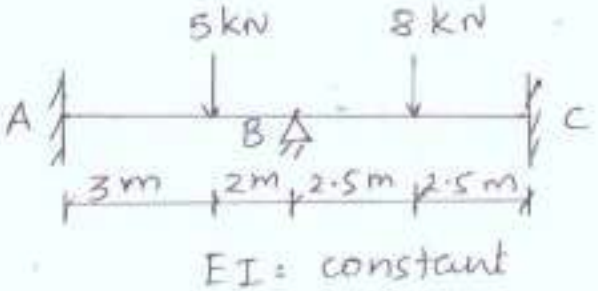


fig · 1
Q.2 (b) OR (b)



EI : constant

fig · 2
Q.3 (a) & (b)

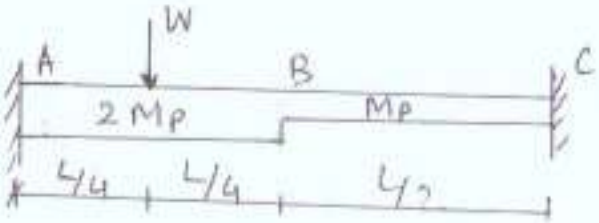
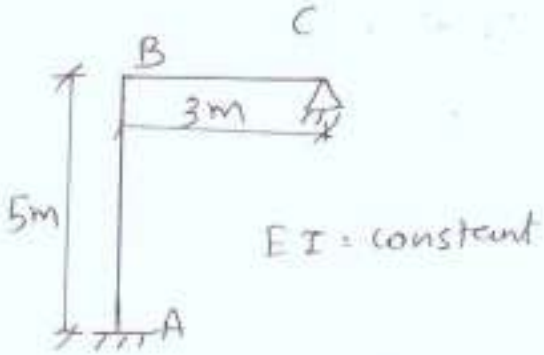


fig · 3
Q.4 · (b)



EI : constant

fig · 4
Q.5 (a)