Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME – SEMESTER I (OLD) – • EXAMINATION – SUMMER 2016

Subject Code: 711501N **Date:16/05/2016**

Subject Name: Matrix Analysis of Framed Structures

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.**
4. **Draw neat and clean figures with pencil only.**
5. **Assume AE = 8000 kN E = 20000 kN.m^2 and GJ = 16000 kN.m^2 until otherwise stated.**

Q.1		Analyze the beam (Figure 1) by stiffness matrix method and plot SF ï BM diagram also.	**14**
Q.2	**(a)**	Derive the member stiffness matrix for portal frame.	**07**
	(b)	Explain the nonlinear analysis in structural analysis with examples.	**07**
		OR	
	(b)	Derive the member stiffness matrix for grid member.	**07**
Q.3		Analyze the beam (Figure 1) by Flexibility matrix method and plot SF ï BM diagram also.	**14**
		OR	
Q.3		Analyze the portal frame (Figure 2) by Stiffness matrix method and plot bending moment diagram only.	**14**
Q.4		Analyze the plane truss (Figure 3) by Stiffness matrix method.	**14**
		OR	
Q.4		Analyze the portal frame (Figure 4) by Flexibility matrix method and plot bending moment diagram only.	**14**
Q.5		Analyze the Grid (Figure 5) by Stiffness matrix method.	**14**
		OR	
Q.5	**(a)**	Derive the transformation matrix for plane truss member.	**07**
	(b)	Derive the member stiffness matrix for a beam.	**07**

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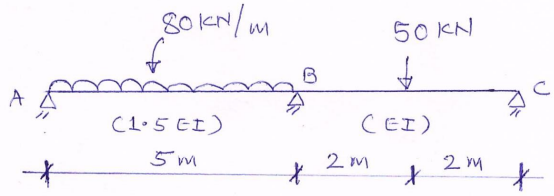
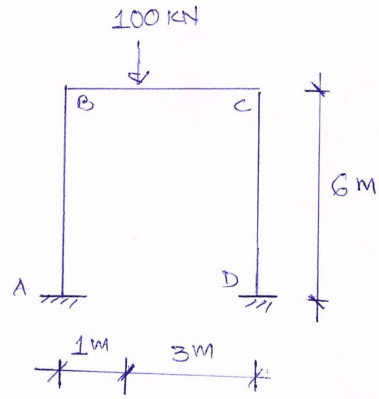


Figure 1

(Q-1 and Q-3)



(EI = constant)

Figure: 2 (OR Q-3)

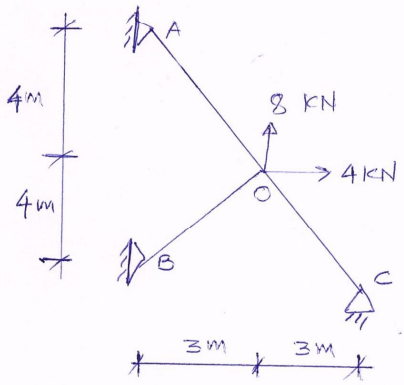


Figure: 3 (Q.4)

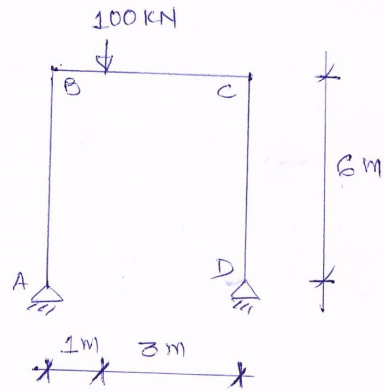
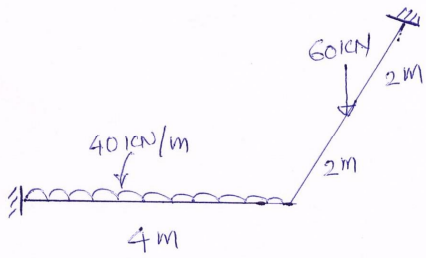


Figure 4 (OR - Q.4)



GJ and EI are constant

Figure: 5 (Q.5)