Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - SEMESTER–III EXAMINATION – SUMMER 2016

Subject Code:X30603 **Date:01/06/2016**

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)**	Analyze the beam as shown in figure-1 by Slope Deflection Method. Find the end moments of the beam and draw bending moment diagram.	**07**
	(b)	A hollow C.I Column whose outside diameter is 200 mm has a thickness of 20 mm. It is 4.5 m long and is fixed at both ends. Calculate the critical loads by Euler's theory and also by Rankine's theory. For cast iron take fc = 550 N/mm^2 and α = 1/1600, E = 8x10^4 N/mm^2.	**07**
Q.2	**(a)**	Analyze the beam shown in figure- 1 by Moment distribution method and draw the bending moment diagram.	**07**
	(b)	(i)Define: Influence line. Give importance of ILD.	**03**
		(ii) State and explain Muller-Breslau Principle. Give application of the principle.	**04**
		OR	
	(b)	(i) Write assumptions made in Euler's formula	**03**
		(ii) Define: Effective length. Describe the various end conditions of the column and their effective lengths.	**04**
Q.3	**(a)**	Draw ILD for VA , VB and MA for a propped cantilever beam of span 8 m subjected to a unit load. Take 2 m intervals.	**07**
	(b)	A three hinged parabolic arch has span 20 m and central rise 3.0 m. It carries a point load of 10 kN at 7.5 m from the left hinge. Calculate the normal thrust, shear and B.M at section 7.5 m from right end hinge.	**07**
		OR	
Q.3	**(a)**	Draw qualitative ILD of reactions for three equal span continuous beam.	**07**
	(b)	A light cable, 16 m long, is supported at two ends at the same level. The supports are 16 m apart. The cable supports three loads of 8, 10 and 12 N dividing the 16 m distance in four equal parts. Fine the shape of the string.	**07**
Q.4	**(a)**	Analyze the plane frame as shown in figure-2 below using flexibility method.	**14**
		OR	
Q.4	**(a)**	(i) Give characteristics of stiffness and flexibility matrix.	**04**
		(ii) Explain : {AD}, {ADL}, {D}	**03**
	(b)	A hollow circular pipe having internal dia. 400 mm and 50 mm thickness is used as a column. Find critical load it can carry if Slenderness ratio = 90. Take Rankine's constant α = 1/4800 and allowable stress 320N/mm^2, what will be the length of the column if it is fixed at one end and free at the other end.	**07**
Q.5	**(a)**	A two hinged parabolic arch of span 18 m and rise 3.6 m carries two point loads each 25 kN, acting at the crown and at the left quarter span section. Find the horizontal thrust at each support and the bending moment at the loaded sections.	**07**
	(b)	Analyze the frame as shown in figure-2 by Slope Deflection Method.	**07**
		OR	
Q.5	**(a)**	Analyze the continuous beam shown in figure-3 by appropriate method. Support B sinks by 5 mm and support C sinks by 2mm. Draw BMD. E= 2 x 10^5 N/mm^2 and I= 16 x 10 ^{6} mm^4	**14**

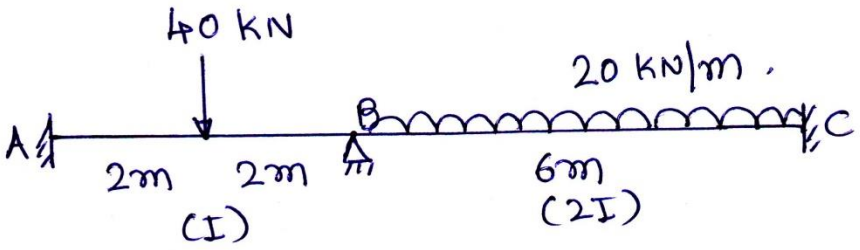

Figure : 1

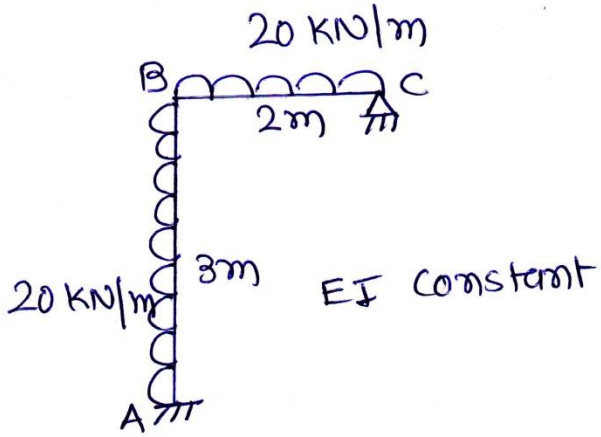

Figure : 2

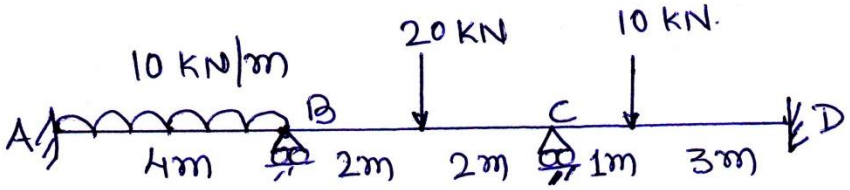

Figure : 3

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