Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

P.D.D.C. Sem- III Examination December 2010

Subject code: X30603

Subject Name: Structural Analysis-II

Date: 15 /12 /2010 **Time: 10.30 am – 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)** Analyze the frame shown in **figure-1** by using slope deflection method. **07**

(b) State "Muller Breslau's Principle" and explain it with suitable example. **07**

Q.2 **(a)** Analyze the beam shown in figure-2 by using "Moment distribution method". **07**

(b) Draw influence line diagram for Shear Force at point D for the beam shown in **figure-2.** **07**

OR

(b) Draw influence line diagram for Bending Moment at point D for the beam shown in **figure-3.** **07**

Q.3 **(a)** Derive the stiffness matrix for the frame shown in **figure-4.** **07**

(b) Find reactions of the beam shown in **figure-5** by "flexibility matrix method". **07**

OR

Q.3 **(a)** Derive the flexibility matrix for the frame shown in **figure-4.** **07**

(b) Find bending moments of the beam shown in **figure-5** by using "stiffness matrix method". **07**

Q.4 **(a)** Derive the expressions of horizontal reaction and tension at the ends for the uniformly loaded cable. **07**

(b) Write down short note on the followings, **07**

(1)Assumptions made in "Euler's column theory".

(2)Effective length of column.

OR

Q.4 **(a)** Define the following terms, **07**

(1) Settlement of support

(2) Statically indeterminate structure

(3) Truss

(4) Buckling of column

(5) Longitudinal stress

(6) Hoop stress

(7) Radius of gyration

(b) Determine the minimum diameter of a hollow cylindrical cast iron column is 5 m long with both ends fixed and internal diameter = 0.6 times the external diameter. Column has to carry a safe load of 200 kN with factor of safety is 5. Take ultimate crushing stress =550MPa, rankine's constant = 1/1600. **07**

Q.5 **(a)** Differentiate the followings. **07**

(1)Slope deflection method and Moment distribution method,

(2)Stiffness matrix method and Flexibility matrix Method.

(b) A symmetrical three hinged circular arch has a span of 20 m and central rise of 5 m. A 20 kN load acting at 4m from the central hinge. Find the reactions and maximum positive and negative bending moment. **07**

OR

Q.5 **(a)** Derive the equation of crippling load for the column which is having one end fixed and another end hinged. **07**

(b) Derive the expression of stresses and hoop stresses for dome loaded with uniformly distributed load over its plane length L. **07**

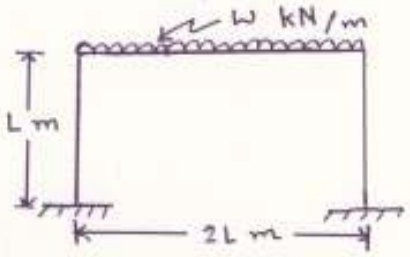

FIGURE-1

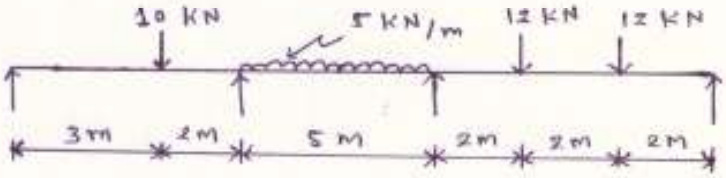

FIGURE-2

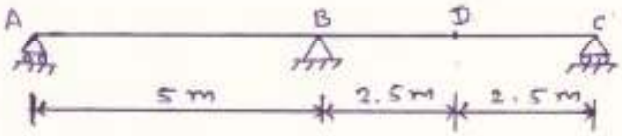

FIGURE-3

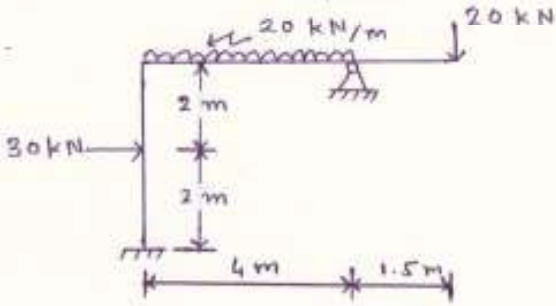

FIGURE-4

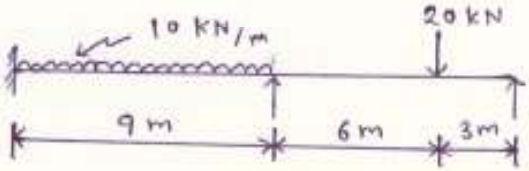

FIGURE-5

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