Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC – SEMESTER-III EXAMINATION – WINTER 2015

Subject Code:X30603 Date:23/12/2015

Subject Name: Structural Analysis-II

Time: 10:30pm to 01:00pm Total Marks: 70

Instructions:

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

Q.1 State and Explain Muller Breslau's Principle. Draw ILD for V_A, V_B, and M_A, V_X, M_X for a propped cantilever beam of span 10 m subjected to moving unit load. Take 1 m intervals. Consider section X at 4 m from left support. **14**

Q.2 (a) Formulate Displacement Matrix for a propped cantilever beam of span 4 m subjected to a central point load of 40 kN. **07**

Q.2 (b) A three hinged parabolic arch of span 16 m and central rise of 4 m is subjected to udl of 10 kN/m over left 8 m span. Calculate Support reactions and find out maximum positive & negative bending moment. **07**

OR

Q.2 (b) Compare load carrying capacity using Euler's and Rankine's formula for a compression member made up of Tee- section with following data. **07**

Flange size: 200 mm x 12 mm

Web size: 388mm x 10 mm

Modulus of Elasticity (E) = 2.1 x 10^5 N/mm^2 ,

Rankine's Constant = 1/1600, fc = 250 N/mm^2

Length of Column = 4 m (One End Fixed and one end Pinned)

Q.3 (a) Give characteristics of Stiffness and flexibility matrix. **07**

(b) Define: Distribution Factor, Carry over Factor, Carry over moment, Stiffness, Flexibility, Effective Length, Radius of Gyration **07**

OR

Q.3 Analyse the beam shown in **Figure-1** and draw BMD. Use Slope Deflection Method. **14**

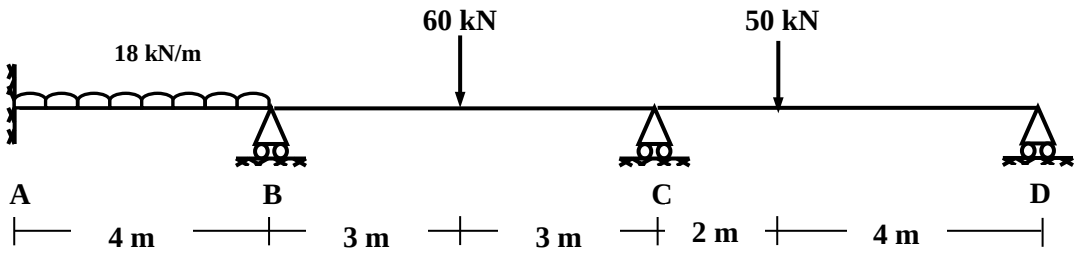

Fig. -1

Q.4 (a) For beam shown in **Figure-1** formulate stiffness matrix and load vector. **07**

(b) Using stiffness method formulate displacement matrix, reactions and draw Shear force and bending moment diagram for the beam shown in **Figure-1**. **07**

OR

Q.4 Analyse the beam shown in **Figure-2** using Moment Distribution Method. **14**

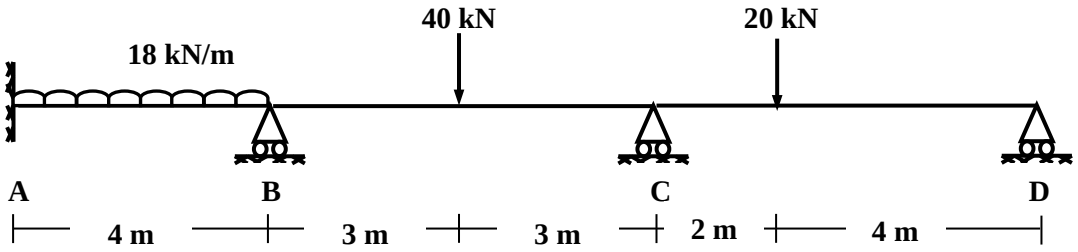

Fig. -2

Q.5 Analyse the plane frame shown in **Figure-3** using flexibility method. **14**

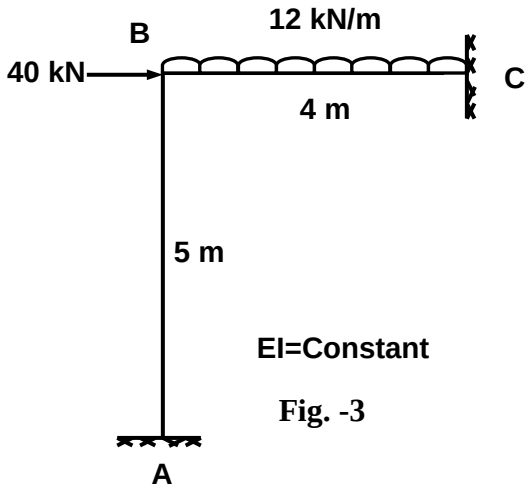

Fig. -3

OR

Q.5 Analyse the beam shown in **Figure-4** using appropriate method and draw bending moment diagram. Support B is sinking by 20 mm downwards and support C is sinking by 10 mm downwards. **14**

Consider EI = 2000 kN m^2

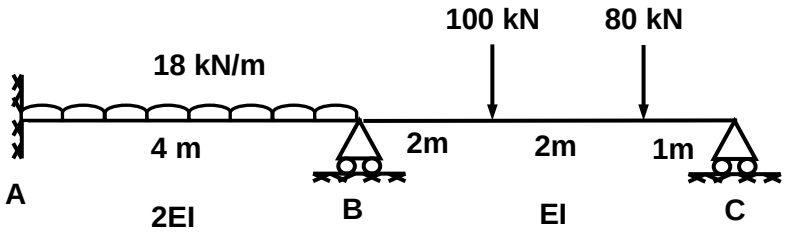

Figure-4

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