

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**PDDC - SEMESTER-III • EXAMINATION – SUMMER.2015**

Subject code: X-30603

Date: 03/06/2015

Subject Name: Structural Analysis-II

Time: 02.30pm-05.00pm

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 8 m subjected to moving unit load. Take 1 m intervals. Consider section X at 5 m from left support. **14**

**Q.2 (a)** Formulate Displacement Matrix for a propped cantilever beam of span 4 m subjected to udl of 24 kN/m over entire span. **07**

**Q.2 (b)** Calculate support reactions and draw shear force and bending moment diagrams for the beam in Q2(a). Use same displacement matrix. **07**

**OR**

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

Flange size: 200 mm x 20 mm

Web size: 488mm x 12 mm

Modulus of Elasticity (E) =  $2 \times 10^5$  N/mm<sup>2</sup>,Rankine's Constant = 1/1600,  $f_c = 250$  N/mm<sup>2</sup>

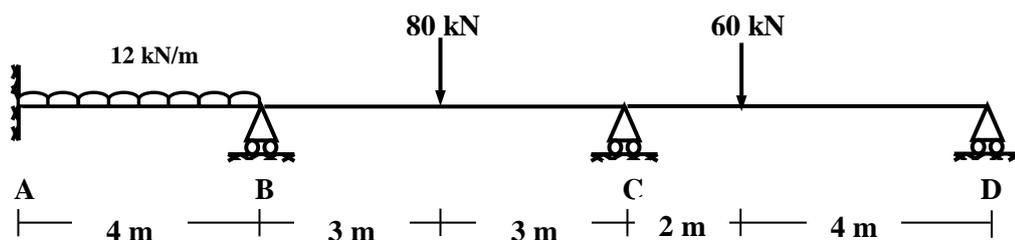
Length of Column = 4 m (Both ends are hinged)

**Q.3 (a)** Give difference between stiffness and flexibility method. **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

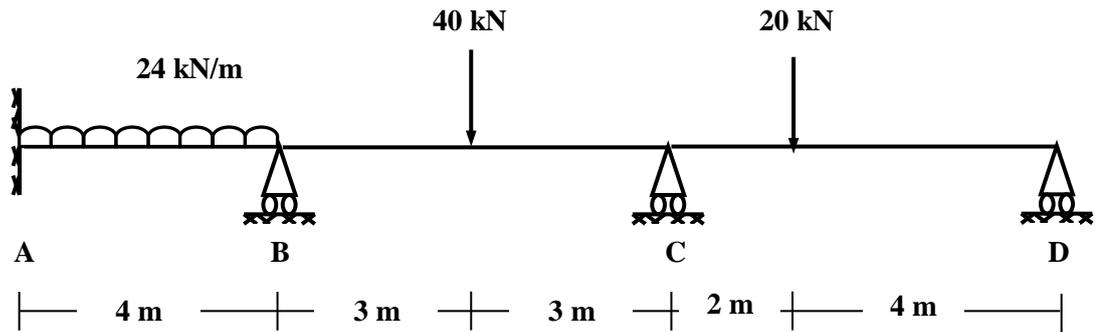


Fig. -2

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

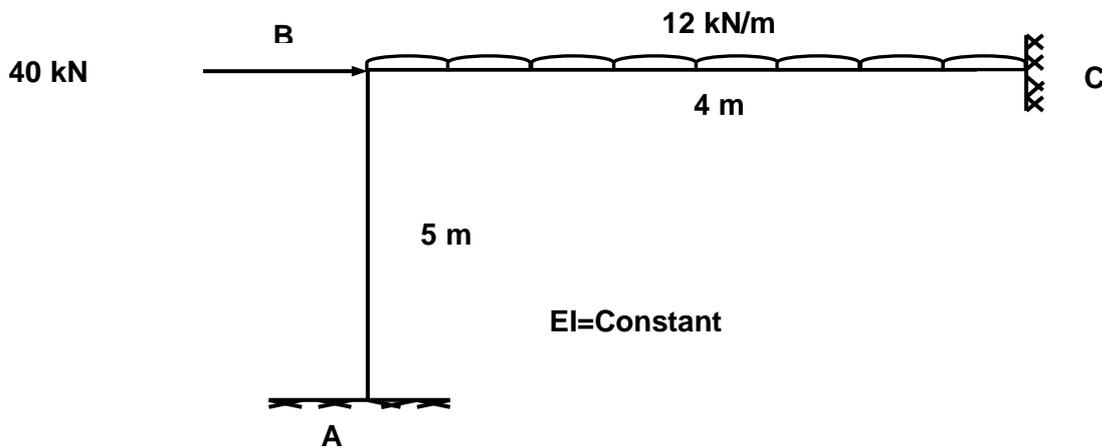


Fig. -3

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. Consider  $EI = 2000 \text{ kN m}^2$  14

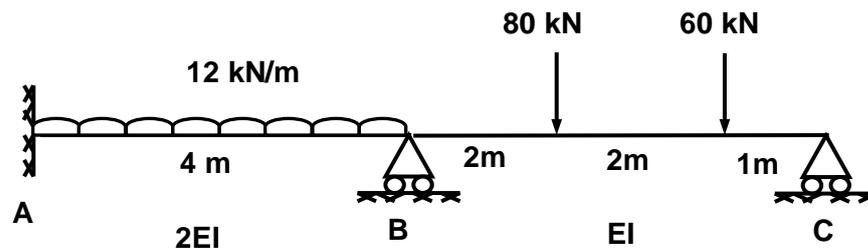


Figure-4