

GUJARAT TECHNOLOGICAL UNIVERSITY
PDDC - SEMESTER – III • EXAMINATION – WINTER 2012

Subject code: X 30603**Date: 31/12/2012****Subject Name: Structural Analysis - II****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 Analyze the portal frame as shown in fig. 1 using slope deflection method, where joint A is fixed and D is hinged. Draw only bending moment diagram only. **14**

Q.2 (a) Analyze the beam shown in fig. 2 by moment distribution method and draw only bending moment diagram. **07**

(b) Explain Muller – Breslau Principle. Also explain how influence line diagram for any quantity is different than that of normal quantity? **07**

OR

(b) Draw ILD for moment at B in the continuous beam shown in fig. 3. Calculate ordinates at 2 m intervals. Assume EI is constant throughout. **07**

Q.3 (a) Analyze the frame shown in fig. 4 by using flexibility matrix method by relieving joint D. Find out unknowns at joint D only. **10**

(b) Find load vector and stiffness matrix the continuous beam shown in fig. 5. **04**

OR

Q.3 (a) Analyze the frame shown in fig. 4 by using stiffness matrix method. Find only end moments. **10**

(b) Find only flexibility matrix for continuous beam shown in fig. 5. M_a and M_b are to be taken as redundant. **04**

Q.4 (a) A two hinged parabolic arch of span L and rise h carries a concentrated load W at the crown. Prove horizontal thrust developed at spring is as $(25/128) WL/h$. **06**

(b) Determine the centroidal principal moment of inertia of the equal angle section 30 x 30 x 10mm. **08**

OR

Q.4 (a) A two hinged parabolic arch of span 30m and rise 6 m carries two point loads each 60 kN, acting at 7.5m and 15 m from the left end, respectively. The moment of inertia varies as the secant of slope. Determine the horizontal thrust. **04**

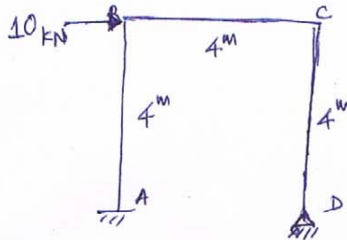
Q.4 (b) Determine the principal moment of inertia of the unequal angle section 90 x 60 x 10 mm. **10**

Q.5 (a) Derive the Euler's buckling formula, when the ends of column are hinged. **07**

(b) Analyze the beam shown in fig. 6 by stiffness matrix method. Find only end moments. **07**

OR

- Q.5 (a) Define slenderness ratio. Explain the assumptions made in the Euler's formula. Also elaborate the limitation of Euler's formula. 07
- (b) Analyze the continuous beam shown in fig. 7 by moment distribution method. Find only end moments. 07



EI const.

(Q.1) Fig-1

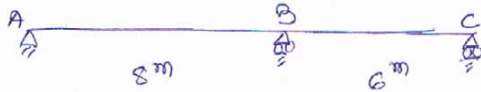


Fig-3 (Q.2 (b) OR)

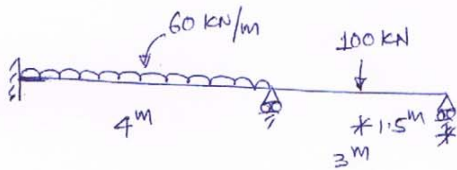


Fig-5 (Q.3 (b) and
OR Q.3 (b))

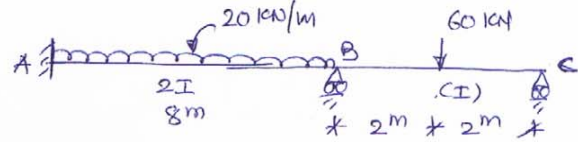


Fig. 2 (Q.2 (a))

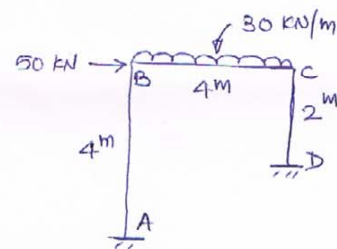


Fig. 4 (Q.3 (a))
and OR Q.3 (a))

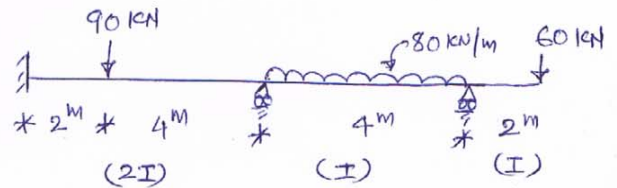
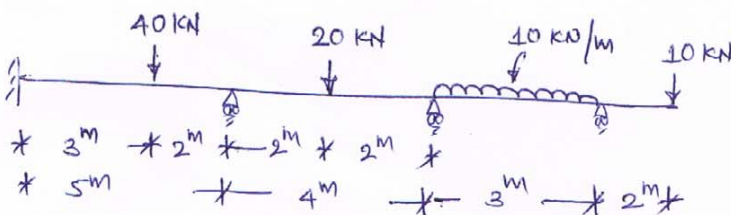


Fig-6 (Q.5 (b))



EI. constant

Fig. 7 (Q.5 (b) - OR)