

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-IV • EXAMINATION – WINTER 2013****Subject Code: 140603****Date: 26-12-2013****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.
4. Draw neat and clean figures wherever required.

Q.1 (a) Analyze the portal frame shown in Fig. 1 by moment distribution method and find only final moments. **10**

(b) Explain the terms “Rotational Contribution” and “Distribution Factor”. **04**

Q.2 (a) Analyze the beam shown in Fig. 2 by slope deflection method and find unknown slopes at Joint B and C. Joint B sinks by 10 mm. $E = 2 \times 10^5$ MPa and $I = 16 \times 10^7$ mm⁴. **07**

(b) Find the final moments at supports for the beam shown in Fig. 2 and plot SF and BM diagram both. **07**

OR

(b) Find the unknown slope at B for the frame shown in Fig. 3 by slope deflection method. **07**

Q.3 (a) Determine the final rotational contribution for each support of the beam shown in Fig. 4 by Kani’s method. **07**

(b) Find the support moments and plot BM diagram for the beam shown in Fig. 4 by the Kani’s Method. **07**

OR

Q.3 (a) Determine the final rotational contribution for each support of the beam shown in Fig. 5 by Kani’s method. **07**

(b) Find the support moments and plot BM diagram for the beam shown in Fig. 5 by the Kani’s Method. **07**

Q.4 (a) Find the support moments for the fixed beam shown in Fig. 6 by using the basic concepts of moment area theorem. **07**

(b) Determine the deflection under the point load for the beam shown in Fig. 7 by unit load method. $E = 2 \times 10^5$ MPa and $I = 3 \times 10^9$ mm⁴. **07**

OR

Q.4 (a) Derive the expression for the fixed end moment for a fixed beam of which one of the supports is sinking by amount “ δ ”. **07**

(b) Determine the rotation at the free end of the beam shown in Fig. 8 by Castiglione’s theorem. $EI = 2 \times 10^{13}$ N.mm². **07**

Q.5 (a) What are the losses in the prestressed Concrete? Explain any one of them which will occur in both post tensioned and pre tensioned concrete. **06**

(b) Determine the influence line ordinates for the reaction at C for the beam shown in Fig. 9 at 2 m interval and plot it. EI is constant. **08**

OR

Q.5 (a) Determine the influence line ordinates for the shear force at mid span BC for the Fig. 10 at 1 m interval and plot it. EI is constant. **08**

(b) Find the support reactions for the propped cantilever beam shown in Fig. 11. **06**

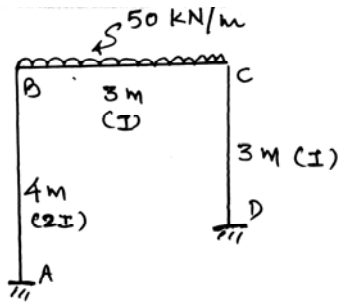


Fig. 1

(Q.1 (a))

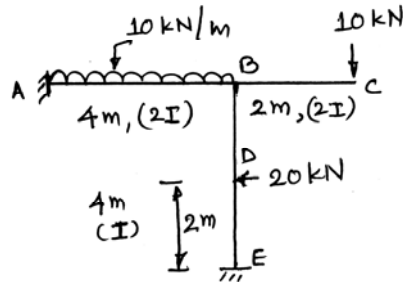


Fig. 3

(OR (Q. 2 (b)))

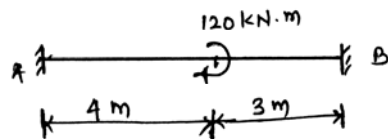


Fig. 6

(Q. 4 (a))

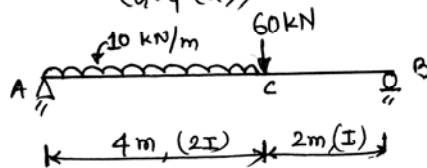


Fig. 7

(Q. 4 (b))

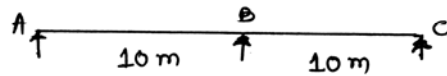


Fig. 9

(Q. 5 (b))

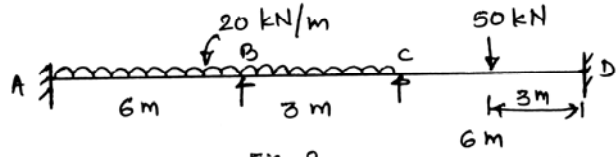


Fig. 2

(Q. 2 (a) and (b))

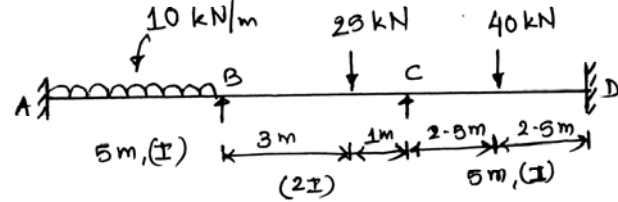


Fig. 4

(Q. 3 (a) and (b))

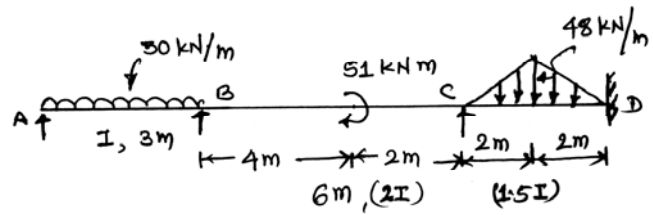


Fig. 5

(OR Q. 3 (a) and (b))

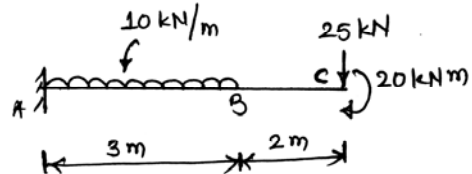


Fig. 8

(OR Q. 4 (b))

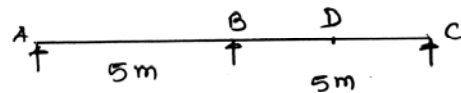


Fig. 10

(OR (Q. 5 (a)))

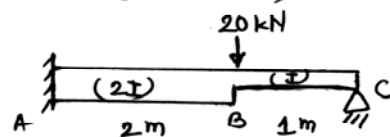


Fig. 11

(OR. Q. 5 (b))