

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**

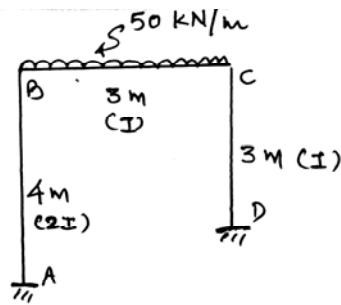


Fig. 1

(Q.1 (a))

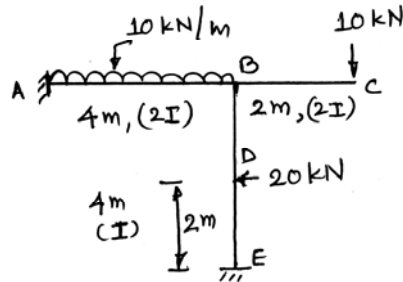


Fig. 3

(OR (Q. 2 (b)))

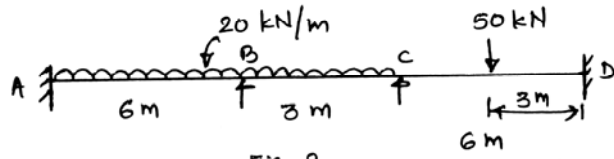


Fig. 2
(Q. 2 (a) and (b))

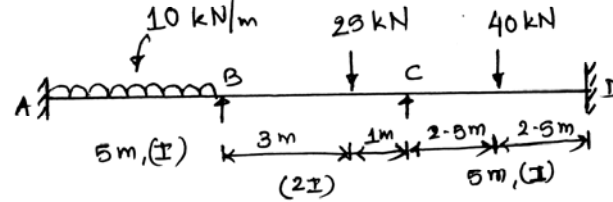


Fig. 4

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

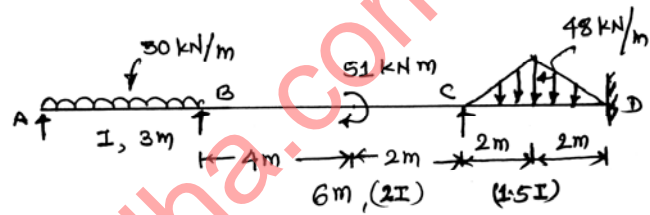


Fig. 5

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

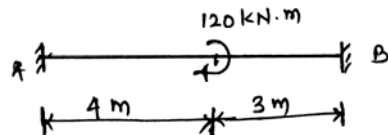


Fig. 6

(Q. 4 (a))

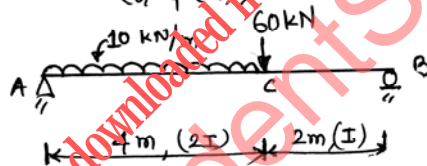


Fig. 7

(Q. 4 (b))

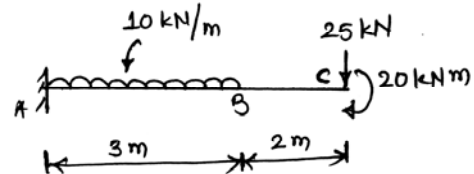


Fig. 8

(OR Q. 4 (b))

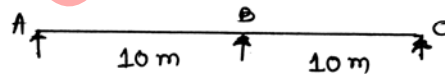


Fig. 9

(Q. 5 (b))

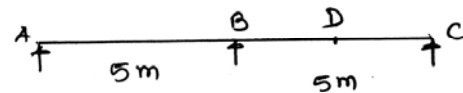


Fig. 10

(OR (Q. 5 (a)))

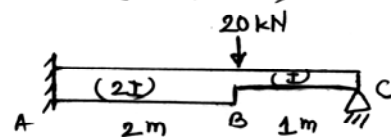


Fig. 11

(OR. Q. 5 (b))