

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-IV (OLD) EXAMINATION – WINTER 2018****Subject Code:140603****Date: 10/12/2018****Subject Name: Structural Analysis-II****Time: 02:30 PM TO 05:00 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** (a) Distinguish between : Pre-tensioning and Post tensioning **07**
(b) Define strain energy. State and Prove Castigliano's first theorem. **07**
- Q.2** (a) Calculate fixed end moments and draw B.M. and S.F. diagrams for a fixed beam AB of span 4m and subjected to udl of 25 kN/m over the entire span. **07**
(b) Calculate vertical displacement of point C for a rigid cantilever frame shown in **Fig. 1**. $E = 2 \times 10^5 \text{ N/mm}^2$ and $I = 3 \times 10^8 \text{ mm}^4$. **07**
- OR**
- (b) Calculate horizontal displacement of point C for a rigid cantilever frame shown in **Fig. 1**. $E = 2 \times 10^5 \text{ N/mm}^2$ and $I = 3 \times 10^8 \text{ mm}^4$. **07**
- Q.3** (a) List causes of side sway for portal frame. **04**
(b) Using Moment Distribution method find support moments and draw B.M. and S.F. diagrams for the continuous beam shown in **Fig. 2** **10**
- OR**
- Q.3** (a) Explain (i) Carry over factor (ii) Distribution Factor **04**
(b) Analyse the beam shown in **Fig. 3** by consistent deformation method. Draw shear force and bending moment diagram. $EI = \text{constant}$. **10**
- Q.4** (a) Advantages and disadvantages of fixed beam. **04**
(b) A continuous beam ABC is having spans AB and BC of length 4m and 3m, respectively. Span AB is subjected to udl of 60 kN/m while span BC is subjected to udl of 80 kN/m respectively. Consider support system at A, B and C is roller (simply) support. Find the support moments and draw B.M. and S.F. diagrams. **10**
- OR**
- Q.4** (a) Explain Muller-Breslau principle. **04**
(b) Using Slope Deflection method, determine the support moments and reactions for the continuous beam shown in **Fig. 4**. Draw B.M. and S.F. diagrams. **10**
- Q.5** (a) State and explain Clapeyron's theorem of three moments. **04**
(b) Using Kani's Method, determine the moments at A, B, C, D for the portal frame as shown in **Fig. 5** **10**
- OR**
- Q.5** (a) List losses in prestressing. **04**
(b) Draw influence line diagram for propped cantilever beam AB of length 12 m for (i) Reaction at fixed end (V_a) (ii) Reaction at propped end (V_b) **10**

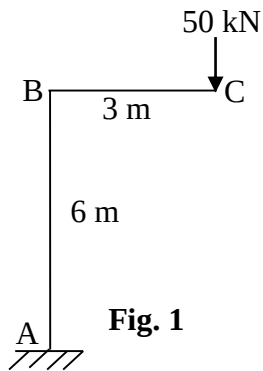


Fig. 1

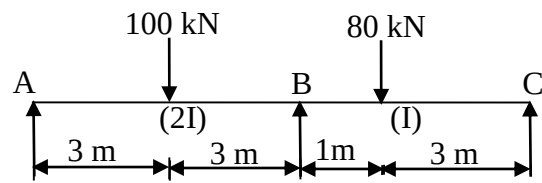


Fig. 2

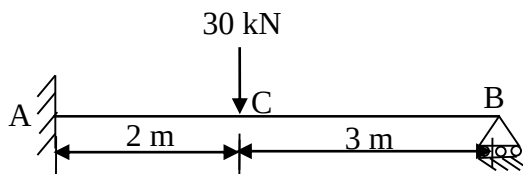


Fig. 3

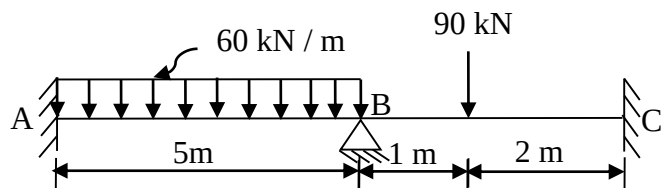


Fig. 4

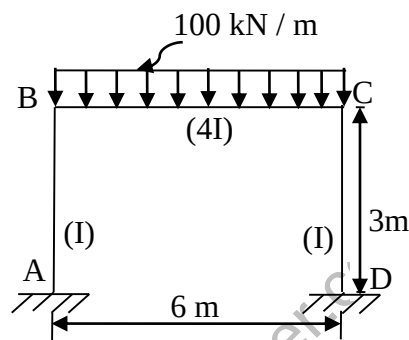


Fig. 5
