

Total No. of Questions—8]

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[4857]-1009**S.E. (Civil) (II Sem.) EXAMINATION, 2015****STRUCTURAL ANALYSIS-I****(2012 PATTERN)****Time : Two Hours****Maximum Marks : 50**

- N.B. :-** (i) Answer Q. No. 1 or Q. No. 2, Q. No. 3 or Q. No. 4;
Q. No. 5 or Q. No. 6 and Q. No. 7 or Q. No. 8
- (ii) Neat sketches must be drawn wherever necessary.
- (iii) Figures to the right indicate full marks.
- (iv) Assume suitable data, if necessary.
- (v) Use of electronic pocket calculator is allowed.
- (vi) Use of cell phone is prohibited in the examination hall.

1. (a) A cantilever beam subjected to uniformly distributed load 10 kN/m on entire span of 2 m, determine maximum slope and deflection in term of EI. [6]
- (b) Determine moment at B for the continuous beam loaded and supported as shown in the Fig. 1 by Clapeyron's theorem. [6]

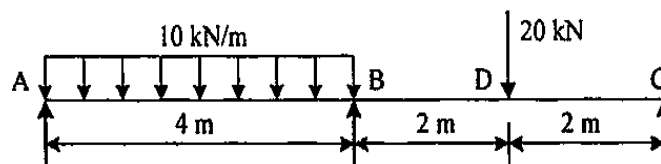


Fig. 1

P.T.O.

Or

2. (a) Determine the static and kinematic indeterminacy of a propped cantilever and fixed beams. [6]
- (b) Determine the fixed end moments for the fixed beam loaded and supported as shown in Fig. 2. [6]

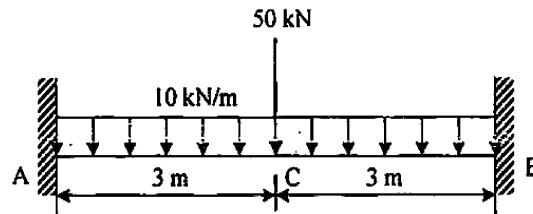


Fig. 2

3. (a) Find the vertical deflection of joint C of the truss shown in Fig. 3. The area of inclined member is 2000 mm^2 while the area of horizontal member is 1600 mm^2 . Take $E = 200 \text{ kN/mm}^2$. [6]

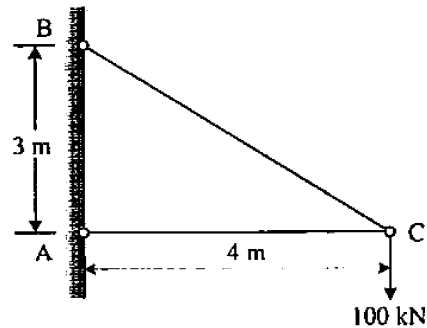


Fig. 3

- (b) A simply supported beam is loaded and supported as shown in Fig. 4. Determine support reaction at A, shear and moment at C by drawing influence line diagram. [6]

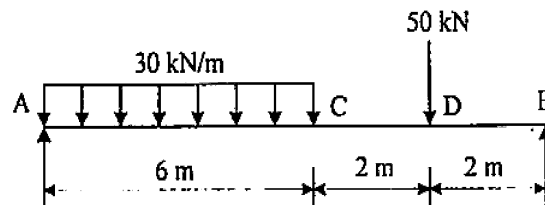


Fig. 4

Or

4. (a) Find forces in members of the truss as shown in Fig. 5. Cross-sectional area and material of all members are same. [6]

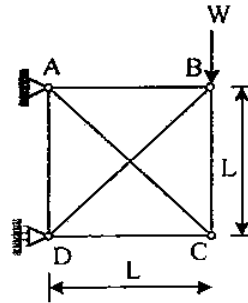


Fig. 5

- (b) Draw the influence line diagram for the members U_1 U_2 , L_1 L_2 and U_1 L_1 of a truss as shown in Fig. 6. [6]

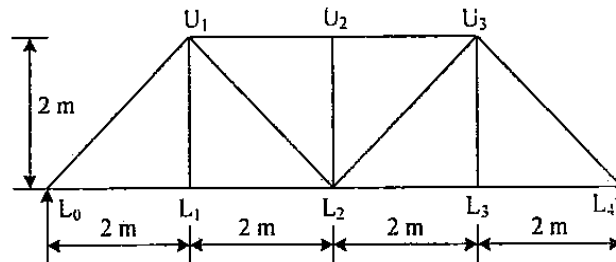


Fig. 6

5. (a) A three hinged parabolic arch has a span of 25 m and a rise of 8 m. The arch carries uniformly distributed load 10 kN/m on the left half of the span. Find normal thrust and radial shear at 5 m from left hand support. [7]
- (b) Derive the expression for horizontal thrust when point load of W acts at crown of two hinged semicircular arch. [6]

Or

6. (a) A three hinged segmental arch has a span of 30 m and rise of 6 m. A 80 kN load is acting at point 7 m from the right support. Find horizontal thrust at the supports. Normal thrust and radial shear at a section 10 m from the left support. [7]
- (b) Derive the expression for horizontal thrust when entire span of two hinged parabolic arch is loaded with uniformly distributed load of intensity w per unit length. [6]
7. (a) State the assumptions in plastic theory. [5]
- (b) A beam fixed at both ends is subjected to uniformly distributed load w per unit length on right half portion. The beam is of uniform plastic moment M_p . Determine the magnitude of collapse load. [8]
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- Or*
8. (a) Find the shape factor for rectangular cross-section of width b and depth d . [5]
- (b) Find out the collapse load for a propped cantilever subjected to uniformly distributed load w per unit length. [8]