

Total No. of Questions—8]

[Total No. of Printed Pages—4+2

Seat No.	
-------------	--

[4757]-1009

S.E. (Civil) (Second Semester) 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 4 m simply supported beam subjected to clockwise moment 20 kNm at mid span, determine maximum slope and deflection in term of EI. [6]

P.T.O.

- (b) Determine moment at B for the continuous beam loaded and supported as shown in the Fig. 1(b) by Clapeyron's theorem. [6]

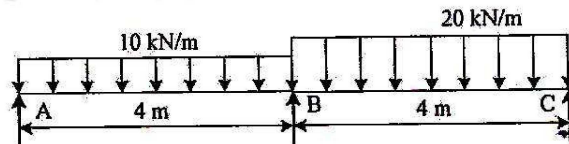


Fig. 1(b)

Or

2. (a) A propped cantilever of span 3 m loaded with uniformly distributed load 10 kN/m on entire span, determine the prop reaction. [6]
- (b) Determine the fixed end moments for the fixed beam loaded and supported as shown in Fig. 2(b). [6]

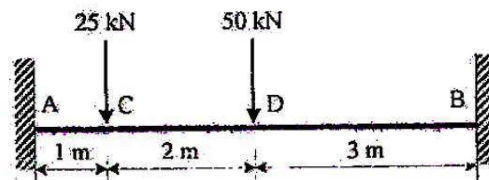


Fig. 2(b)

3. (a) Find the horizontal deflections of joint C of the truss shown in Fig. 3(a). 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]

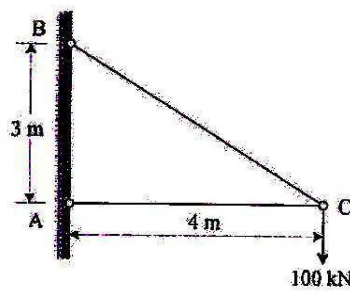


Fig. 3(a)

- (b) A simply supported beam is loaded and supported as shown in Fig. 3(b). Determine support reaction at A, Shear and moment at C by drawing Influence line diagram. [6]

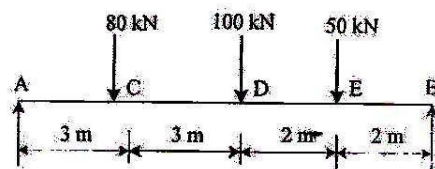


Fig. 3(b)

Or

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

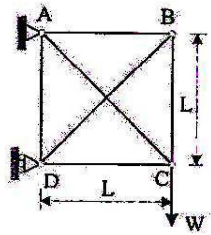


Fig. 4(a)

- (b) Draw the influence line diagram for the members U_2U_3 , L_2L_3 and U_2L_2 of a truss as shown in Fig. 4(b). [6]

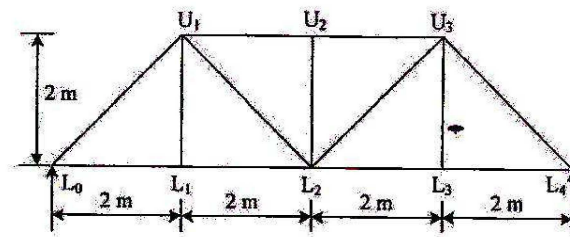


Fig. 4(b)

5. (a) A three hinge parabolic arch has a span of 24 m and a central rise of 4 m. It carries a concentrated load of 50 kN at 18 m from left support. Determine thrust and radial shear at a section 6 m from left support. [7]
- (b) Derive the expression for horizontal thrust when a uniformly distributed load w is acting on entire span of two hinged semicircular arch. [6]

Or

6. (a) A three hinged circular arch has a span of 40 m and a central rise of 8 m. It carries a uniformly distributed load 20 kN/m over the left-half of span. Find the reaction at the supports and shear at a section 10 m from left support. [7]
- (b) A two hinged parabolic arch of span 30 m and central rise 4 m is subjected to a point load of 30 kN at the center of the arch. Find the horizontal thrust and moment at 8 m from left hand support. [6]
7. (a) State and explain lower bound, upper bound and uniqueness theorem. [5]

- (b) A beam fixed at both ends is subjected to central point load W . The beam is of uniform plastic moment M_p . Determine the magnitude of collapse load. [8]

Or

8. (a) Find the shape factor for circular cross-section of diameter d . [5]
- (b) Determine collapse load in a propped cantilever of span L subjected to central concentrated load W . [8]