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]

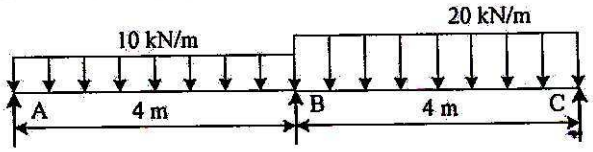

Fig. 1(*b*)

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]

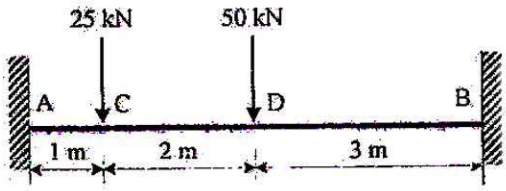

Fig. 2(*b*)

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 kN/mm^2. [6]

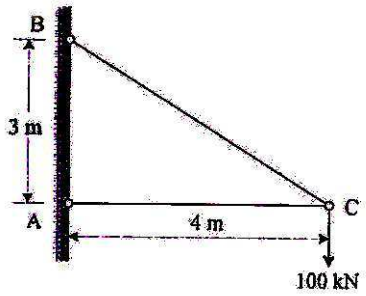

Fig. 3(*a*)

(*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]

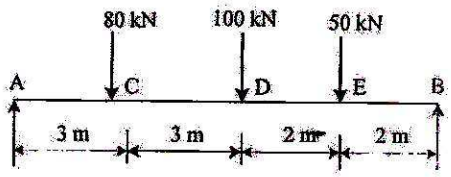

Fig. 3(*b*)

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]

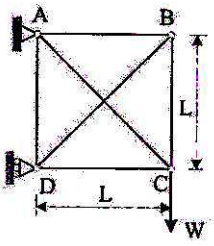

Fig. 4(*a*)

(*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]

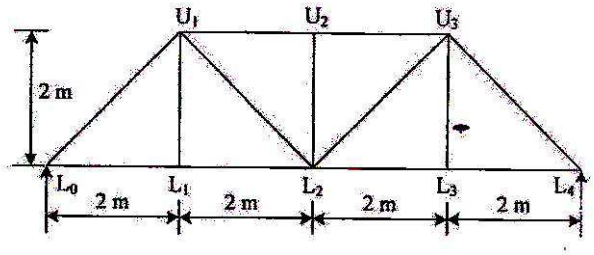

Fig. 4(*b*)

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]