Total No. of Questions—8]　　　　[Total No. of Printed Pages—4

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<tr><td>Seat No.</td><td></td></tr>
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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]
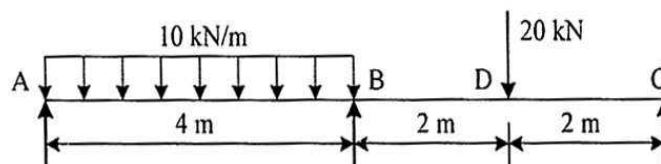

Fig. 1

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]
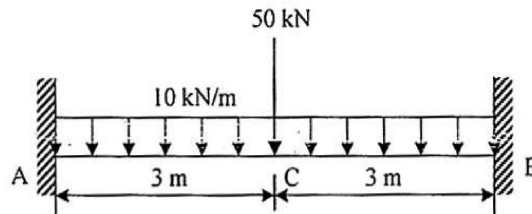

Fig. 2

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 kN/mm^2. [6]
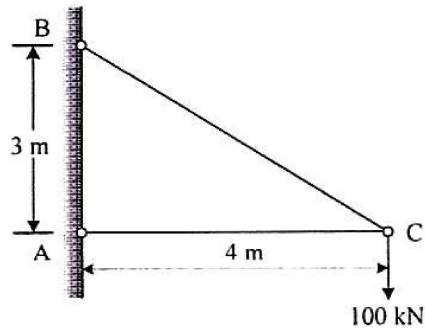

Fig. 3

(*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]
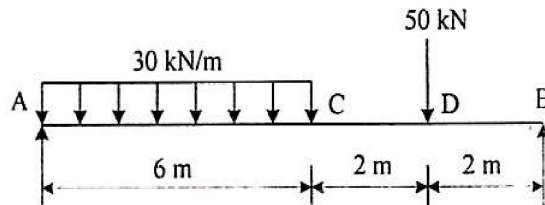

Fig. 4

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]
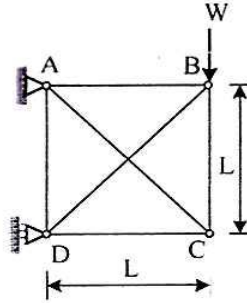

Fig. 5

(*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]
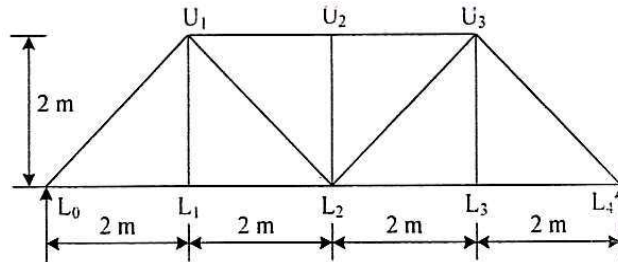

Fig. 6

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 Mp. Determine the magnitude of collapse load. [8]

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]