Total No. of Questions—**8**] [Total No. of Printed Pages—**5**

Seat No.	

[5252]-109

S.E. (Civil) (Second Semeter) EXAMINATION, 2017
STRUCTURAL ANALYSIS—I
(2012 PATTERN)

Time : Two Hours **Maximum Marks : 50**

N.B. **:—** (*i*) Answer Q. **1** *or* Q. **2**, Q. **3** *or* Q. **4**, Q. **5** *or* Q. **6**, and Q. **7** *or* Q. **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.

(*vi*) Use of cell phone is prohibited in the examination hall.

1. (*a*) Determine maximum slope and deflection for cantilever of span L loaded with uniformly distributed load *w* per unit length. [6]

(*b*) Determine moment at B for the continuous beam loaded and supported as shown in Fig. 1 (*b*) by three moment theorem. Assume uniform flexural rigidity. [6]

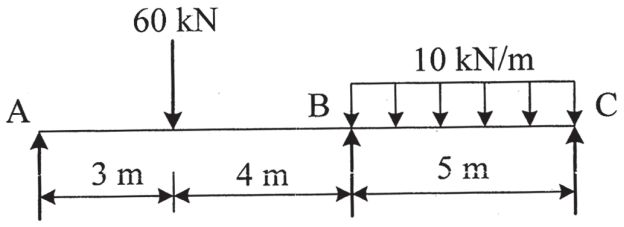

Fig. 1 (*b*)

P.T.O.

Or

2. (*a*) Determine the propped reaction for the propped cantilever loaded with uniformly distribute load w on entire span L by strain energy method. [6]

(*b*) Determine the fixed moment for the fixed beam loaded and supported as shown in Fig 2 (*b*). [6]

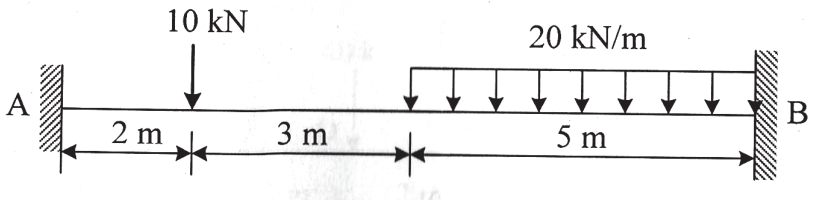

Fig. 2 (*b*)

3. (*a*) Find the vertical displacement of joint C for the pin jointed truss as shown in Fig. 3 (*a*). The cross-sectional area of the members AC and CB are 1500 mm^2 and the areas of the members AB is 1000 mm^2. Take E = 200 kN/mm^2. [6]

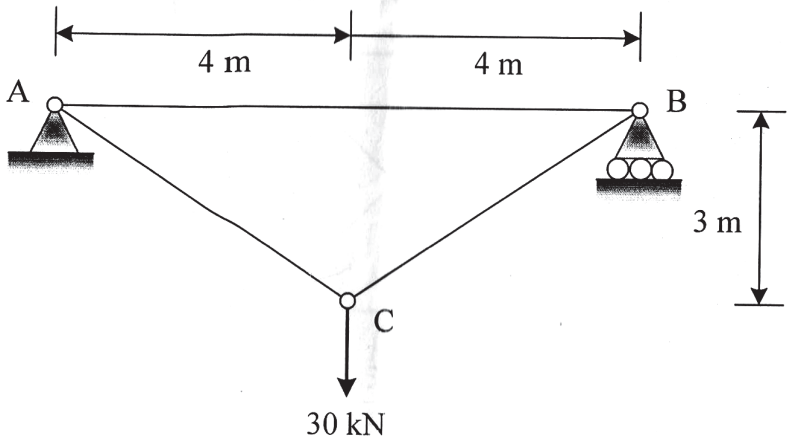

Fig. 3 (*a*)

(*b*) Draw influence line diagrams for axial forces in the members U_2U_3, L_2U_3 and L_2L_3 of the through type bridge truss of height 4 m as shown in Fig. 3 (*b*). [6]

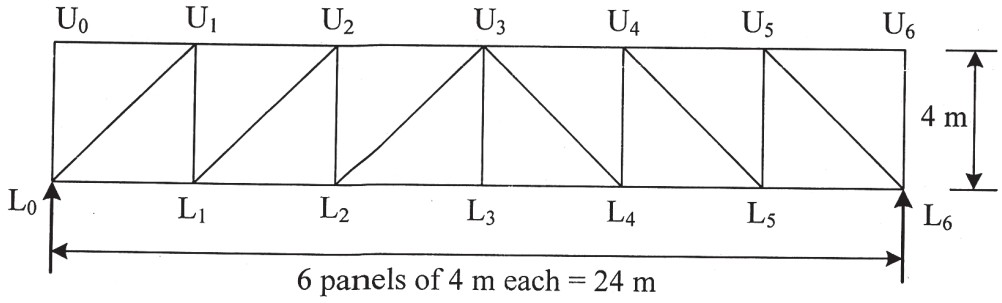

Fig. 3 (*b*)

Or

4. (*a*) A simply supported beam is loaded and supported as shown in Fig. 4 (*a*). Determine shear and moment at D by influence line diagram. [6]

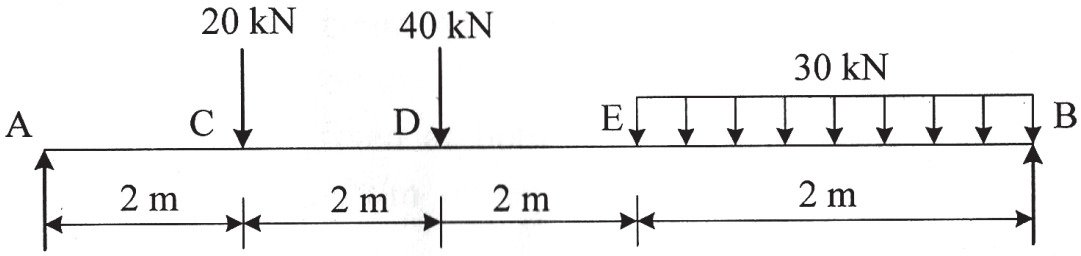

Fig. (*a*)

(*b*) Find forces in members of the indeterminate truss as shown in Fig. 4 (*b*) by strain energy method. Cross-sectional area and material of all members is same.

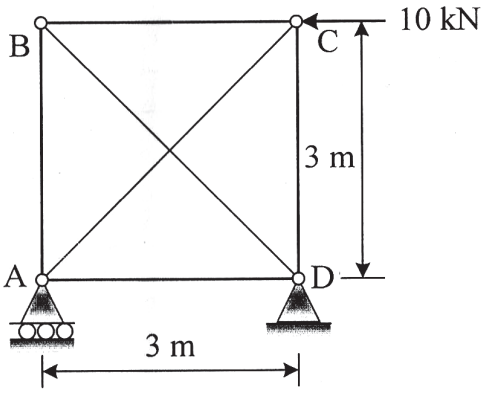

Fig. 4 (*b*)

5. (*a*) A three hinged parabolic arch of horizontal span 48 m has a central rise of 10 m. It carries a uniformly distributed load 20 kN per horizontal meter run over the middle 16 m length of the span. Calculate the radial shear force, Normal thrust at 20 m from the left support. [6]

(*b*) A two-hinged parabolic arch of span L and central rise *y* is loaded with a concentrated load W at the crown. Determine the horizontal thrust at the support. [7]

Or

6. (*a*) A circular arched rib of 20 m span with central rise of 4 m is hinged at crown and springing. It carries a point load 100 kN at 5 m from the left hand hinge. Determine horizontal thrust, reaction at supports and moment under point load. [6]

(*b*) A two-hinged semicircular arch of uniform section is hinged at the abutments which are at the same level. It carries a point load W at the crown. Show that the horizontal thrust at the abutment is W/π. [7]

7. (*a*) A simply supported beam AB of span L loaded with central point load W. Determine collapse load by static and kinematic method. [6]

(*b*) A 4 m span beam fixed at both ends is loaded with uniformly distributed load 10 kN/m on entire span. Determine the plastic moment. [7]

Or

8. (*a*) Explain idealized stress-strain curve for mild steel in tension. [5]

(*b*) Determine the collapse load for the frame shown in Fig. 8 (*b*) assuming uniform M_p for all members. [8]

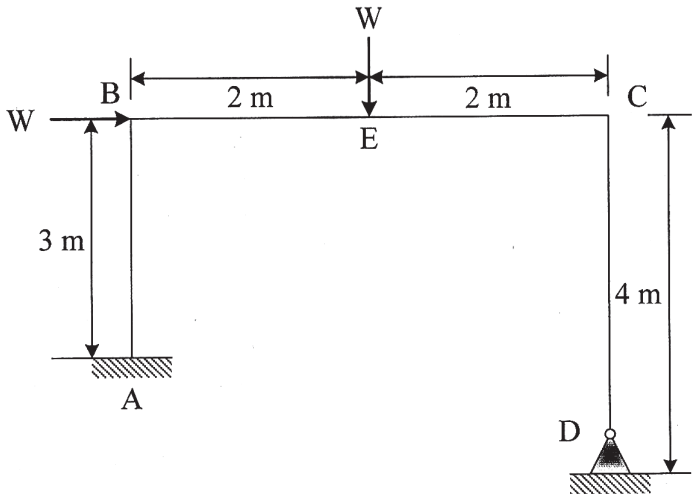

Fig. 8 (*b*)