[3863] – 301

T.E. (Civil) (Semester – I) Examination, 2010
STRUCTURAL ANALYSIS – II (2008 Course) (New)

Time : 3 Hours | Max. Marks : 100

Instructions : *1) Answers to the **two** Sections should be written in **separate** books.*
*2) **Neat** diagrams must be drawn **wherever** necessary.*
*3) Black figures to the **right** indicate **full** marks.*
4) Use of electronic pocket calculator is allowed.
*5) Assume suitable data, **if necessary**.*
*6) Attempt Q. **1** or Q. **2**, Q. **3** or Q. **4**, Q. **5** or Q. **6** from Section – **I** and Q. **7** or Q. **8**, Q. **9** or Q. **10**, Q. **11** or Q. **12** from Section – **II**.*

SECTION – I

1. a) Analyse the continuous beam loaded and supported as shown in figure 1(a) by slope-deflection method. The relative moment of Inertia values of all spans are indicated on the beam. Draw bending moment diagram. **8**

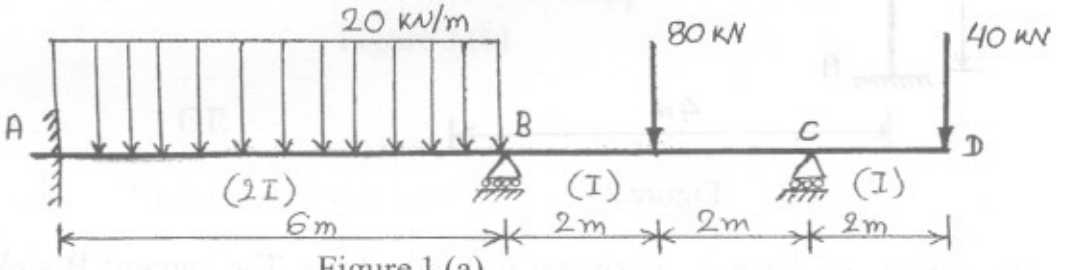

Figure 1 (a)

b) Analyse the frame as shown in figure 1(b). The relative values of I for each member are indicated in figure. E is constant use slope-deflection method. **8**

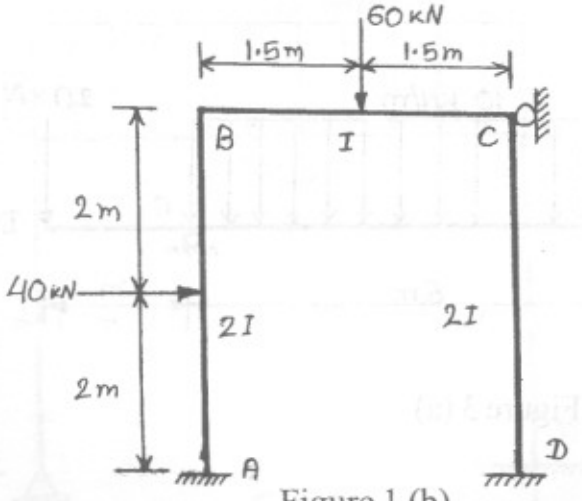

Figure 1 (b)

OR

2. Using slope-deflection method determine end moments of the members of a frame loaded and supported as shown in figure 2. EI is same throughout. Plot bending moment diagram. **16**

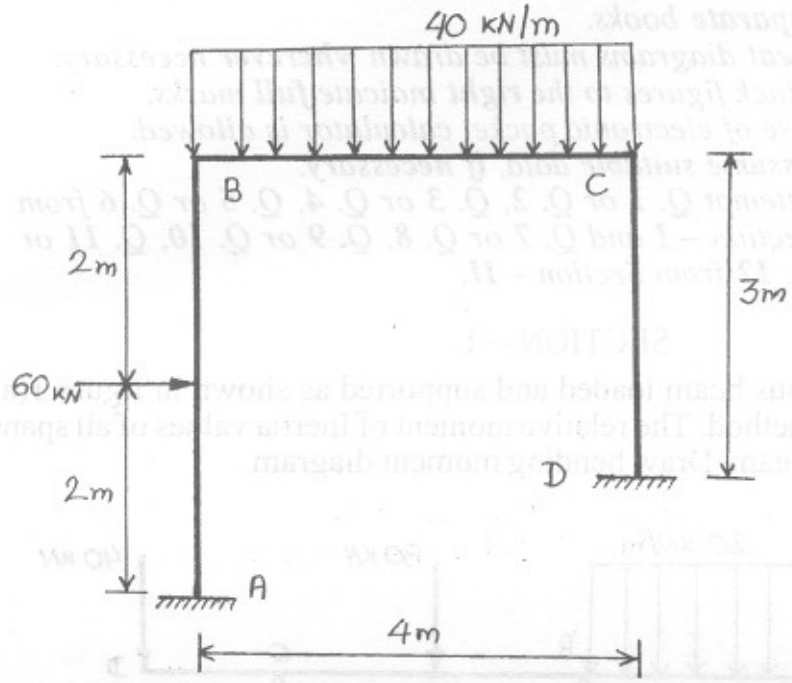

Figure 2

3. a) The continuous beam is as shown in figure 3 (a). The support B sink by 10 mm. Determine the support moment using moment distribution method. Also plot bending moment diagram. $E = 200\times10^6 KN/m^2$ and $I = 100\times10^{-6}\ m^4$ $(100\times10^6\ mm^4)$. **9**

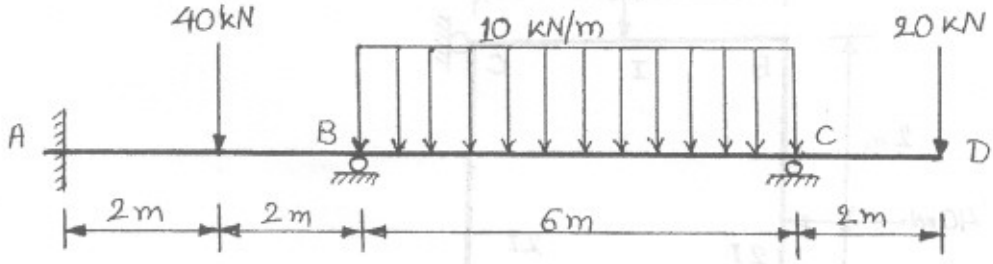

Figure 3 (a)

b) Analyse the rigid frame as shown in figure 3 (b) by Moment Distribution Method. E is constant and I is as shown in figure. **9**

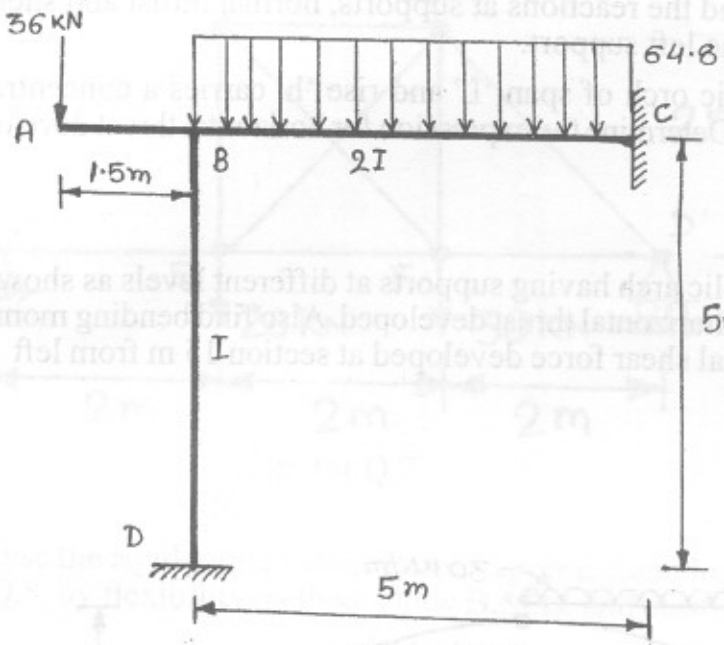

Figure 3 (b)

OR

4. Determine end moments of members of frame as shown in figure (4). E is constant and relative I values are indicated on frame. Plot deflected shape and bending moment diagram. **18**

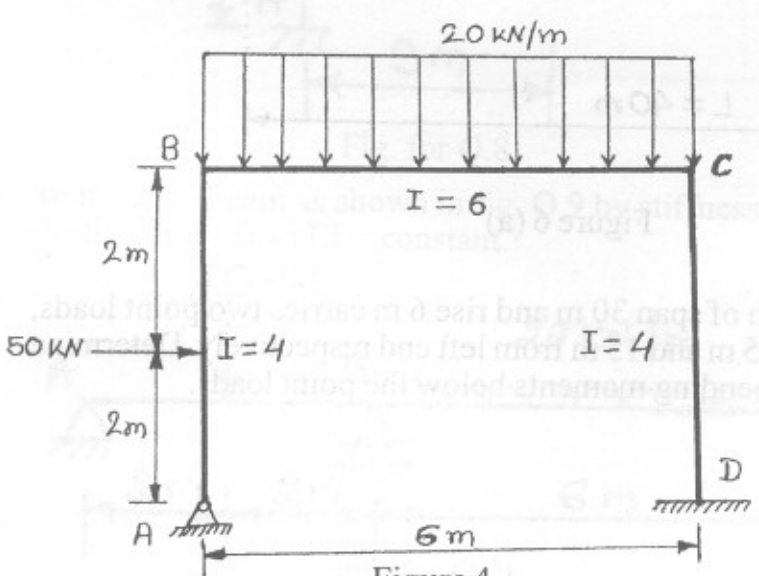

Figure 4

5. a) A three hinge circular arch hinged at springing and crown point has a span of 40 m and a central rise of 8 m . It carries uniformly distributed load of 20 KN/m over the left half of the span with a concentrated load of 100 KN at right quarter span point. Find the reactions at supports, normal thrust and shear at a section 10 m from the left support. **8**

b) A two hinged parabolic orch of span 'L' and rise 'h' carries a concentrated load 'W' at the crown. Determine the expression for horizontal thrust developed at springings. **8**

OR

6. a) A three hinged parabolic arch having supports at different levels as shown in figure 6(a). Determine horizontal thrust developed. Also find bending moment, normal thrust and radial shear force developed at section 15 m from left support. **8**

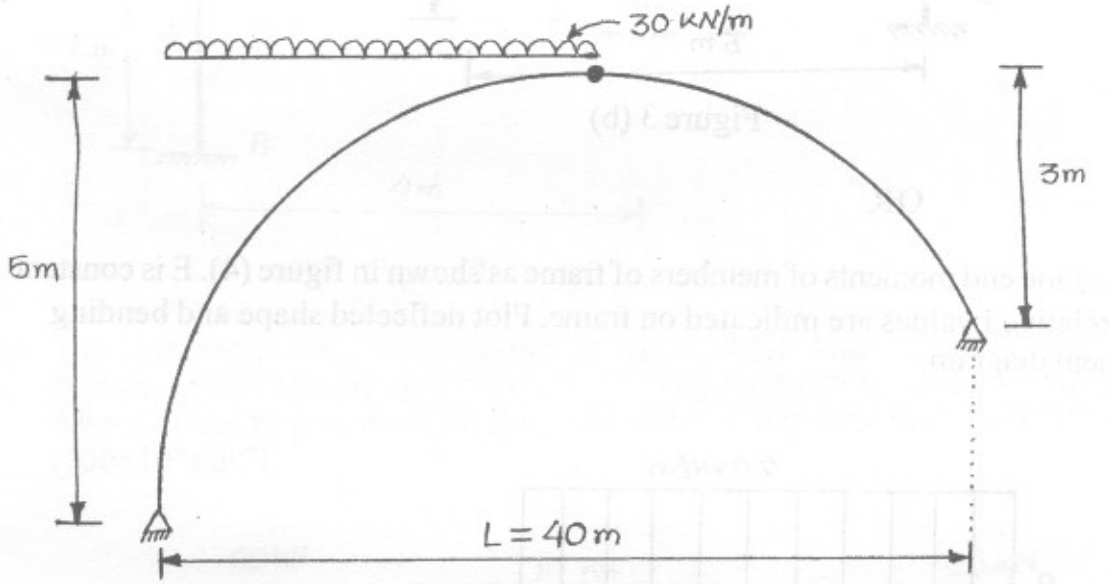

Figure 6 (a)

b) Two hinged parabolic arch of span 30 m and rise 6 m carries two point loads, each of 60 kN, acting at 7.5 m and 15 m from left end respectively. Determine the horizontal thrust and bending moments below the point loads. **8**

SECTION – II

7. Analyse the truss supported and loaded as shown in fig. Q.7. Assume that the Elastic modulus and area of cross-section for all members are the same. **16**

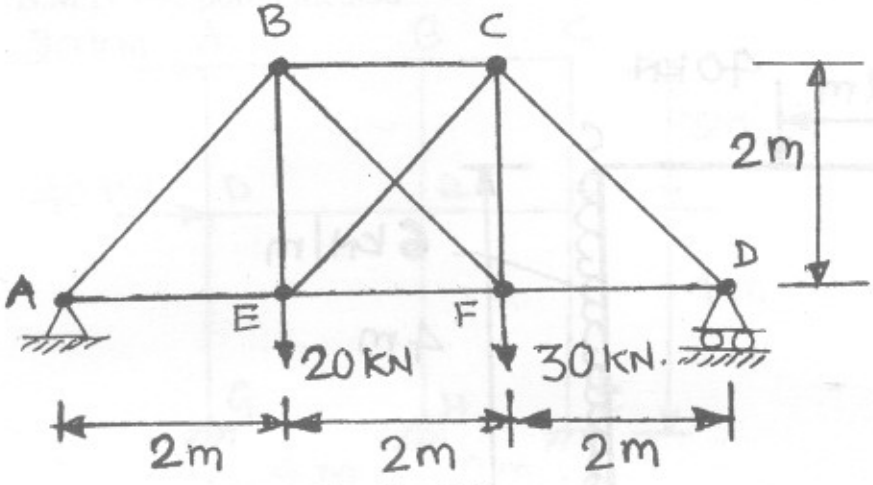

Fig. for Q.7

OR

8. Analyse the rigid jointed plane frame supported and loaded as shown in fig. Q.8, by flexibility method. Draw B.M.D. and elastic curve. **16**

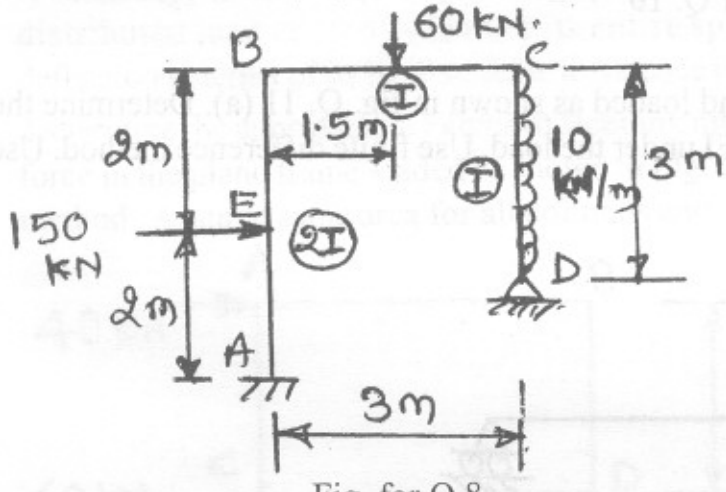

Fig. for Q.8

9. Analyse the beam as shown in fig. Q.9 by stiffness method. Draw B.M.D. and elastic curve. Take EI = constant. **16**

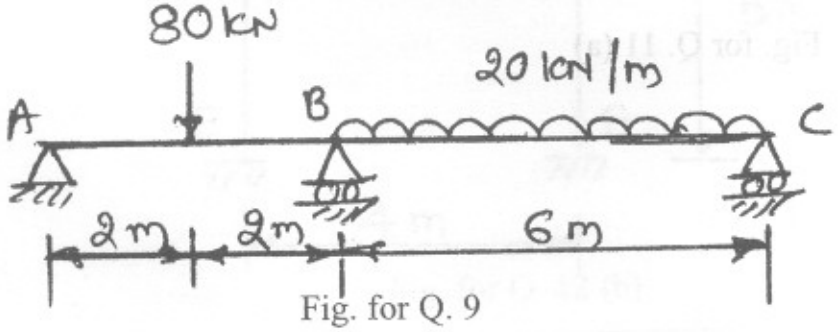

Fig. for Q. 9

OR

10. Analyse the rigid jointed plane frame supported and loaded as shown in fig. Q. 10 by stiffness method. Draw B.M.D. and elastic curve. Take EI = constant. **16**

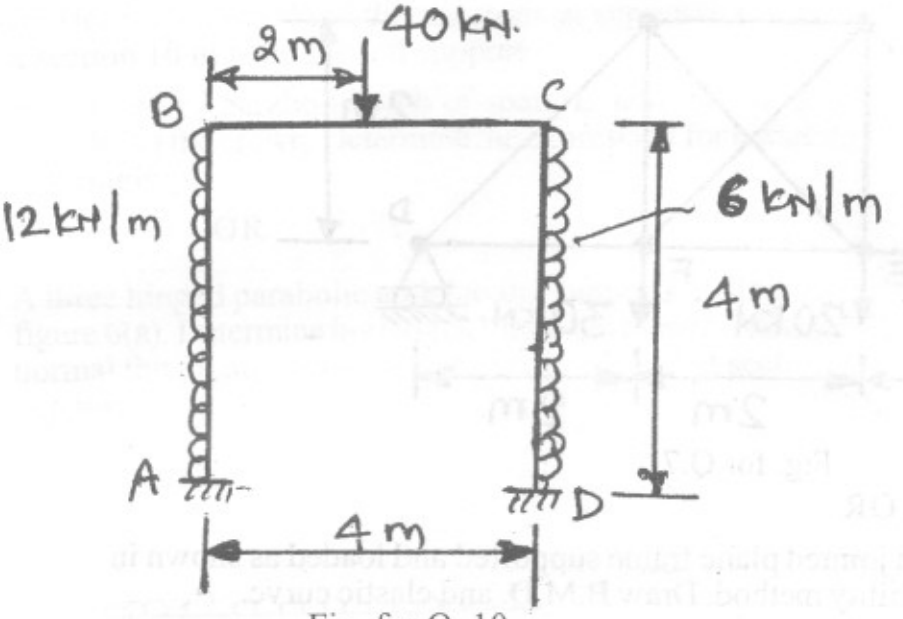

Fig. for Q. 10

11. a) The beam is supported and loaded as shown in fig. Q. 11 (a). Determine the deflection in terms of its EI under the load. Use finite difference method. Use five nodes. **6**

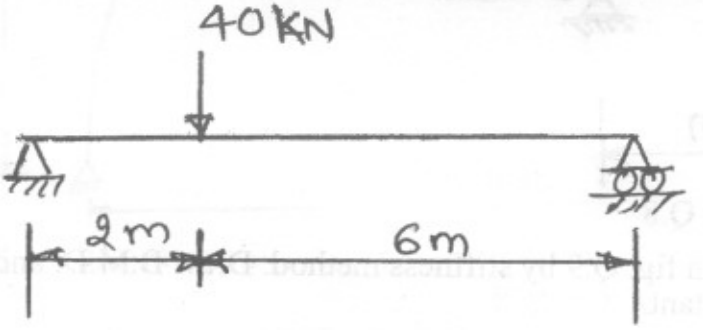

Fig. for Q. 11 (a)

b) Determine the approximate values of moment, shear, and axial force in each member of frame loaded and supported as shown in fig. Q. 11 (b). Draw B.M.D. Use portal method. **12**

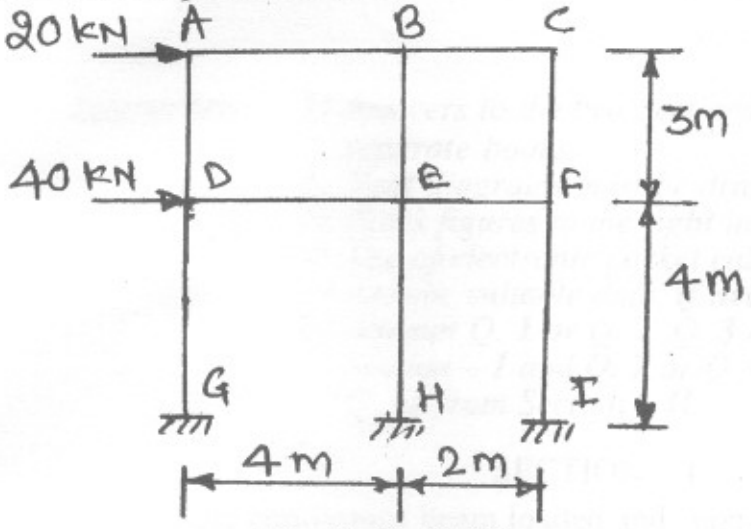

Fig. for Q. 11 (b)

OR

12. a) A beam supported at both ends having span 8 m. The beam carries uniformly distributed load of 10 KN/m over its entire span. Determine the central deflection in terms of its EI. Use finite difference method. Use five nodes. **6**

b) Determine the approximate values of Bending moment, shear force and axial force in the plane frame loaded as shown in Fig. Q. 12 (b) using cantilever method . Assume same area for all columns and draw B.M.D. **12**

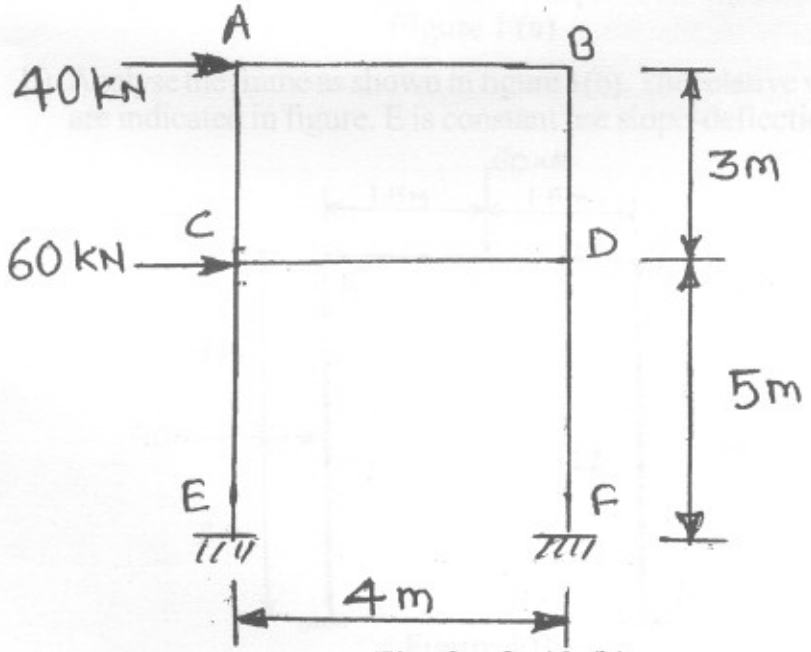

Fig. for Q. 12 (b)