Total No. of Questions : 12]

SEAT No. :

**P2246**

[Total No. of Pages :6

# [4758] - 1
## T.E. (Civil)
## STRUCTURAL ANALYSIS - II
## (2008 Course) (Semester - I)

*Time : 3 Hours]* *[Max. Marks : 100*

***Instructions to the candidates:***

1) ***Answer Q.1 or Q.2, Que. 3 or Que. 4, Q.5 or Q.6 from Section I.***
2) ***Answer Q.7 or Q.8, Q.9 or Q.10, Q.11 or Q. 12 from Section II***
3) ***Answers to the two sections should be written separately.***
4) ***Neat diagrams must be drawn wherever necessary.***
5) ***Figures to the right indicate full marks.***
6) ***Assume suitable data, wherever necessary.***
7) ***Use of Non-Programmable electronic Scientific calculator is allowed.***

## SECTION - I

***Q1)*** Determine the support moment for the continuous girder shown in fig (1), if the support B sink by 2.5mm, for the member I = $3.50 \times 10^7$ $mm^4$ and E = 200 $kN/mm^2$ using slope Deflection Method. **[16]**

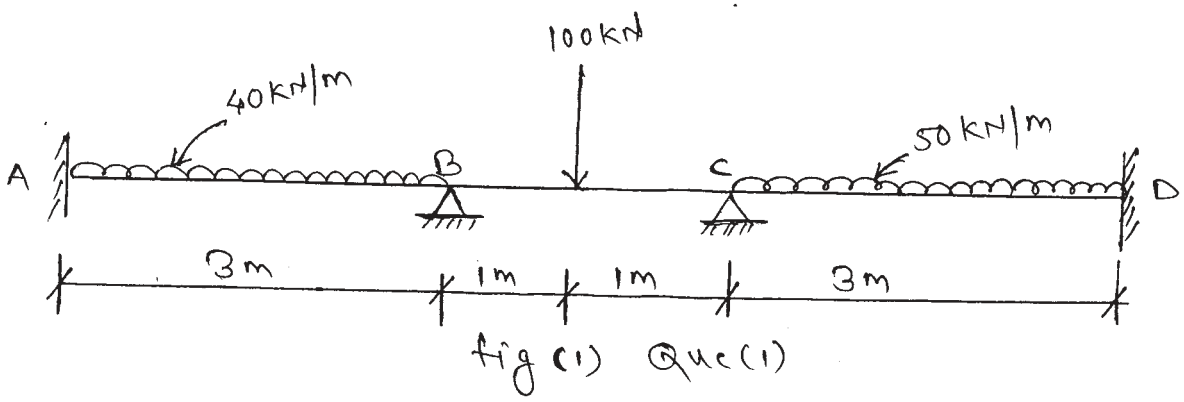


fig (1) Que (1)

OR

***Q2)*** Analyse the frame shown in fig (2) by using slope Deflection Method and Draw B.M.D. for the frame. **[16]**

***P.T.O.***

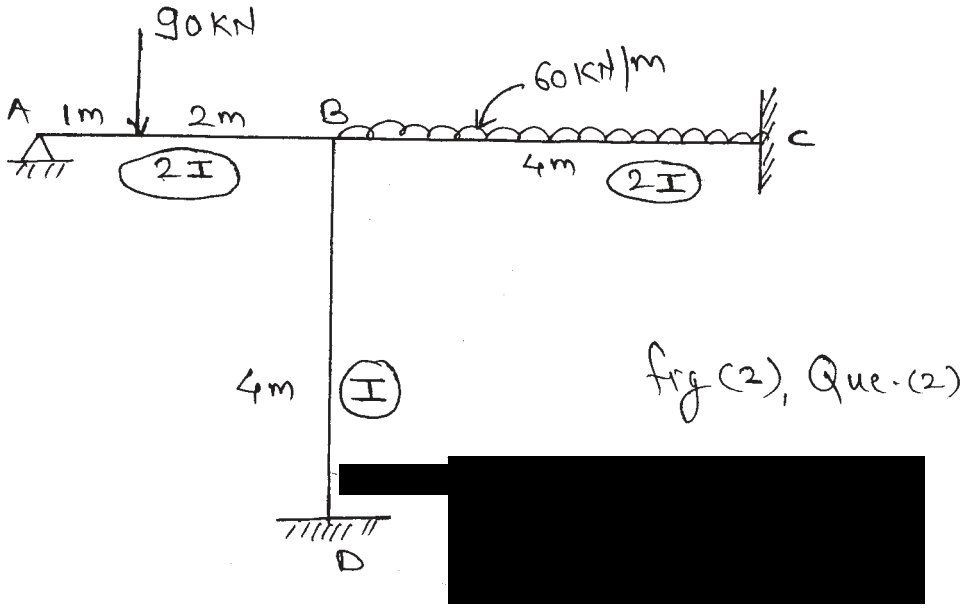


fig (2), Que. (2)

***Q3)*** Analyse the continuous beam shown in Fig (3) by

a) Using Moment Distribution Method and draw B.M.D. **[9]**

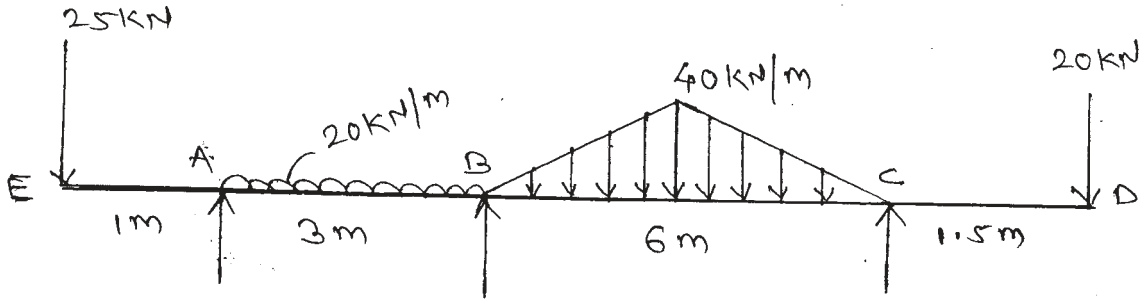


Fig (3) Que. 3(a)

b) Analyse the continuous beam shown in fig (4) by using Moment Distribution Method if support B and C sink by 3mm and 5mm respectively take E = 200 kN/mm$^2$ and I = 4 × 10$^7$ mm$^4$. Draw B.M.D. **[9]**

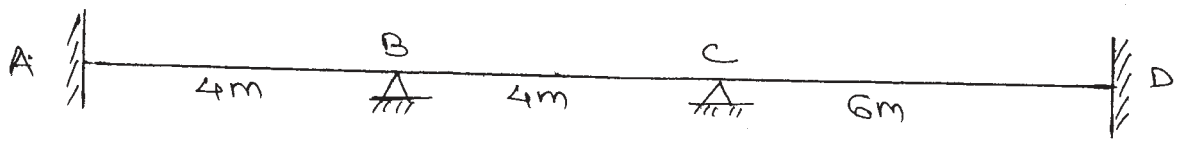


fig (4) Que. 3(b)

OR

***Q4)*** Analyse the Frame shown in fig (5) by using Moment Distribution Method and Draw B.M.D. **[18]**

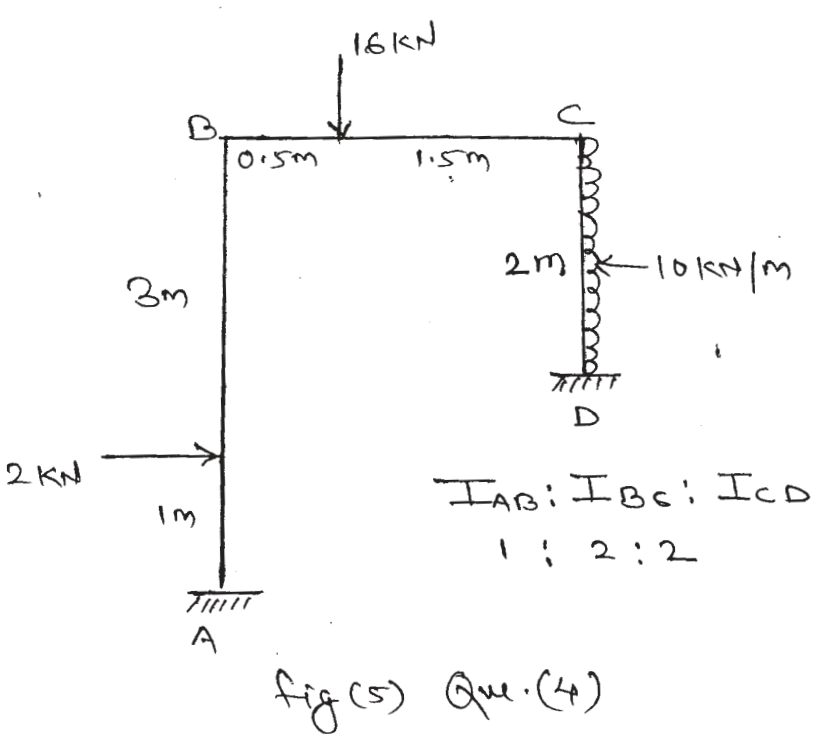


fig (5) Que. (4)

***Q5)*** a) A two - hinged Semi-Circular Arch of radius R carries a concentrated load W at the crown show that the horizontal thrust at each support is $W/\Pi$ assume uniform flexural rigidity. **[8]**

b) A two hinged parabolic Arch of span 18m and rise 3.60m carries two concentrated loads of 25 kN each at the crown and at the left quarter span section find horizontal thrust at each support and the Bending Moment at the loaded section. **[8]**

OR

***Q6)*** a) A three hinged parabolic arch of Span L has its abutments A and B at depth $h_1$ and $h_2$ below the crown C, the arch carries a concentrated load W at the crown, find the horizontal thrust at each support. **[8]**

b) A three hinge parabolic Arch ACB of span 30 met. has its supports at depth 4m and 16m below the crown hinge C, the Arch carries a point load of 60 kN at distance 5m from C, on left side and point load of 120 kN at a distance 10m from C on right side find the reactions at support and B.M under the loads. **[8]**

## SECTION - II

***Q7)*** Analyse the truss supported and loaded as shown in fig. 7. Assume that the Elastic modulus and area of cross-section for all members are the same. **[16]**

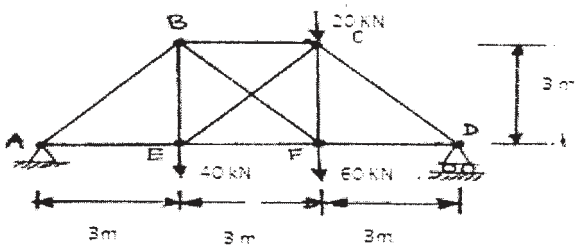


Fig. 7

OR

***Q8)*** Analyse the rigid jointed plane frame supported and loaded as shown in fig. 8, by flexibility method. Draw B.M.D. and elastic curve. **[16]**

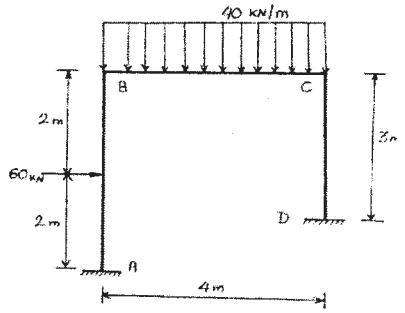


Fig. 8

***Q9)*** Analyse the beam as shown in fig. 9 by stiffness method. Draw B.M.D. and elastic curve. Take EI = constant. **[16]**

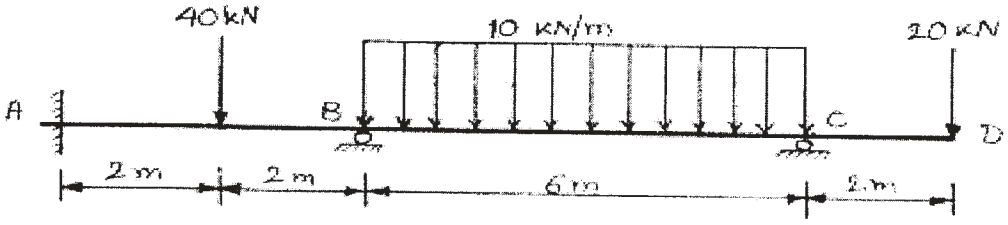


Fig. 9

OR

***Q10)*** Analyse the rigid jointed plane frame supported and loaded as shown in fig. 10 by stiffness method. Draw B.M.D. and elastic curve. Take EI = constant. **[16]**

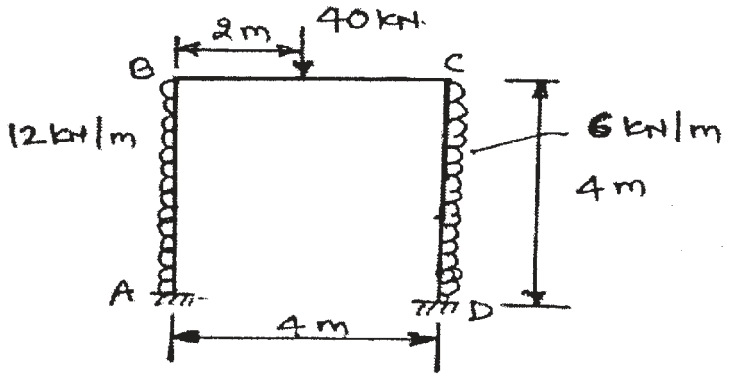


Fig. 10

***Q11)*** a) Using finite difference method, determine the displacement at centre of simple Supported beam, AB of span 6m subjected to udl of 10 kN/m over the half span. Assume the interval as 1m and constant EI for beam AB. **[8]**

b) Determine the approximate values of moment, shear, and axial force in each member of frame loaded and supported as shown in fig. 11. Draw B.M.D. Use portal method. **[10]**

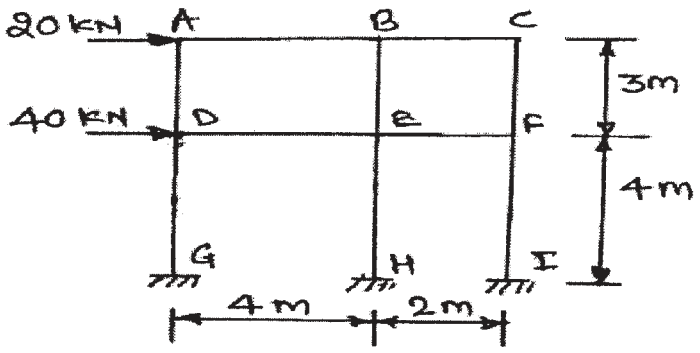


Fig. 11

OR

***Q12)***a) Using finite difference method, determine the displacement at the centre of simple supported beam AB of span 4m subjected to concentric point load of 50 kN at 1m from support A. Assume 1m interval and EI for AO and OB is EI:2EI. Point 'O' is the midpoint of span AB. **[8]**

b) Determine the approximate values of Bending moment, shear force and axial force in the plane frame loaded as shown in Fig. 12 using cantilever method. Assume same area for all columns and draw B.M.D. **[10]**

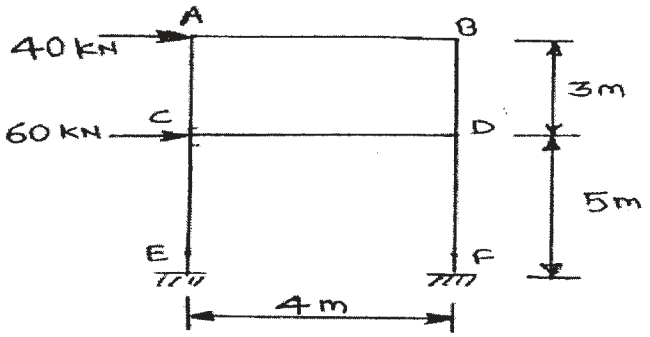


Fig. 12