



Allowed Tables and Charts: (None or e.g. Steam Tables)

Answer all the following Questions [120 Marks]

**Q(1)[20]**

For the structure shown in Fig. 1, draw shear stresses distribution and calculate the straining actions at section 1-1 (distance in m and  $\gamma=2.5 \text{ t/m}^3$ ).

**Q(2) [15]**

For the cross section presented in Fig. 2, draw the shear flow distribution ( $t=1\text{cm}$ ).

**Q (3) [15]**

For the cross section shown in Fig. 3, draw the normal stresses distribution if  $N=50\text{t}$ ,  $M_x=20\text{mt}$  and  $M_y=15\text{mt}$ .

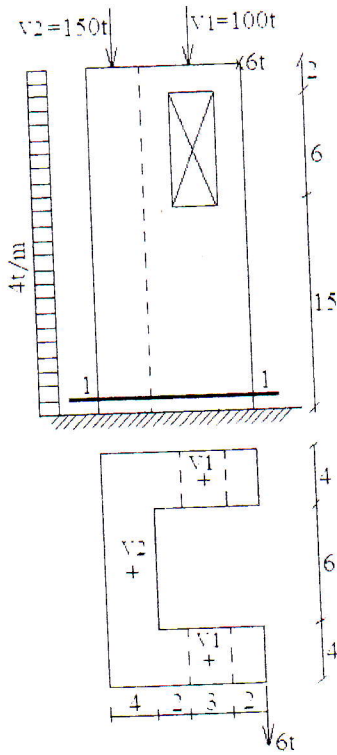


Fig. 1

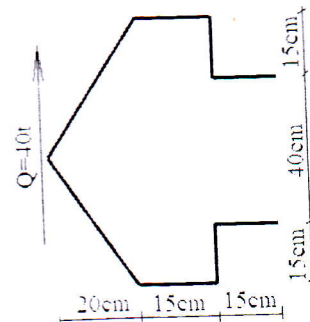


Fig. 2

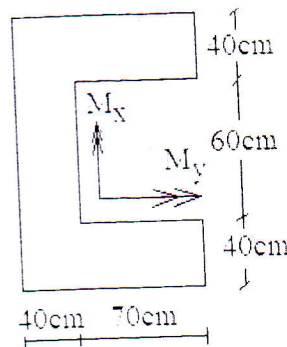


Fig. 3

This exam measures the following ILOs												
No. Q	Q1	Q2	Q3	Q4	Q6	Q1	Q4	Q5	Q3	Q4	Q5	Q6
	a-10-2	a-10-2	a-10-2	a-5-2	a-11-1	b-2-1, b-1-1	b-2-2, b-2	b-11-2	c-6-2	c-2-1, c-2-3	c-6-1	c-6-3
Skills	Knowledge & Understanding Skills					Intellectual Skills			Professional Skills			

**Q (4)/15]**

For the beam shown in Fig. 4, calculate the value of the deflection and the angle of slope (rotation) at the selected joints then draw the elastic line.

**Q (6)/15]**

For the shown structure in Fig. 5, check the stresses acting on section 1-1 taking the buckling into consideration.

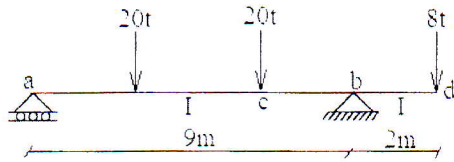


Fig. 4

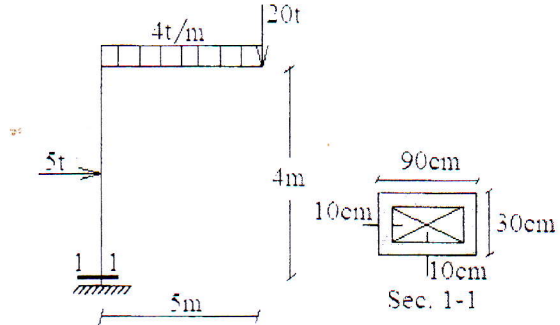


Fig. 5

**Q (6)/25]**

For the frame presented in Fig. 6, draw the final bending moment and shear force diagrams due to the applied load and draw only the bending moment diagram due the movement support (a) as shown in Fig. 6 ( $EI$  is  $35000 \text{ t.m}^2$ ).

**Q (7)/15]**

For the frame presented in Fig. 7, draw the influence line for the reactions at the supports, for the bending moment and shear force at sections s-s, m-m, n-n and for normal force at sec. t-t.

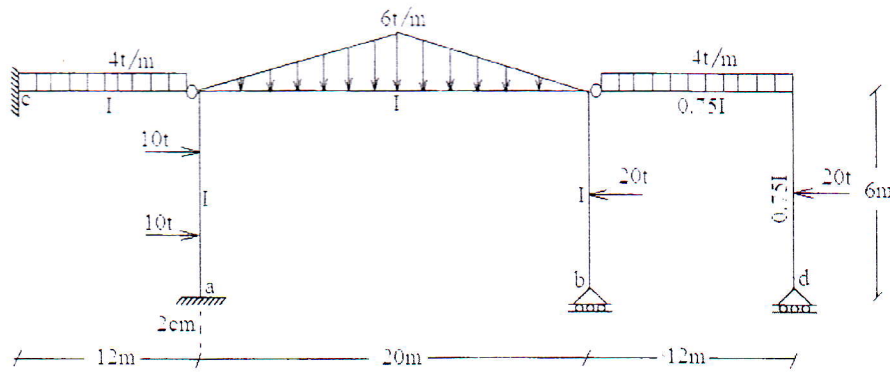


Fig. 6

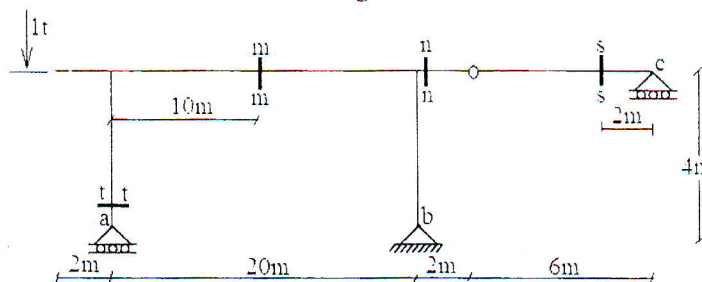


Fig. 7