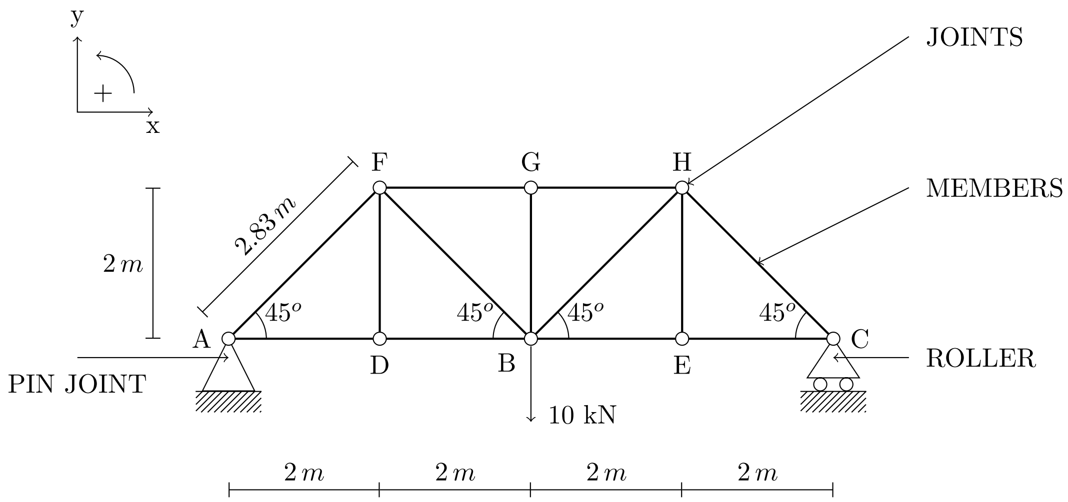
a)



b)

NO of JOINTS (only joints, no pin joint and roller)	COST/UNIT $/u	COST $(USD)
8	50	400
NO of MEMBERS -	COST/$(75+L^4)$ $\$/L^4$	COST $(USD)
9 (L=2 m) 4 (L=2.82 m)	$(75+2^4)$ $(75+2.82^4)$	819 553
	TOTAL COST	**1 772 $ (USD)**

c) The truss is *internally stable*, because contains 13 members (m) and 8 joints (j), so the equation $m \geq 2 \cdot j - 3$ is satisfied and it has sufficient members to form a rigid body. Thus it is possible to find the reaction forces:

$$\sum F_x = 0 \qquad F_{A_x} = 0 \qquad F_{A_x} = 0$$
$$\sum F_y = 0 \qquad F_{A_y} - 10 + F_{C_y} = 0 \qquad F_{A_y} = 5\,kN$$
$$\sum M_A = 0 \qquad -10 \cdot 4 + 8 \cdot F_{C_y} = 0 \qquad F_{C_y} = 5\,kN$$

Also the truss is *statically determinate* because the equation $m + r = 2 \cdot j$ (r is equal to the 3 reactions) is satisfied. The truss has 3 zero force members: FD, GB and HE.

Particicle equilibrium: since the geometry of the truss and the applied loading are symmetrical about the center line of the truss (GB member), its member forces will also be symmetrical with respect to the line of symmetry. It is, therefore, sufficient to determine member forces in only one-half of the truss.

(joint A) In order to satisfy $\sum F_y = 0$ the $F_{AF_y} = 5\,kN$ (must push downward into the joint with a magnitude of $5\,kN$ to balance the upward reaction of $5\,kN$). $F_{AF_y} = F_{AF} \cdot sin(45^o)$ so $F_{AF} = 7.07\,kN$ and the force in member AF is compressive (C). $F_{AF_x} = F_{AF} \cdot cos(45^o) = 5\,kN$.
In order to satisfy $\sum F_x = 0$, the $F_{AD_x} = 5\,kN$ (must pull to the right with a magnitude of $5\,kN$ to balance the horizontal component of F_{AF} acting to the left). Therefore, member AD is in tension with a force of $5\,kN$ (T).

(joints D, F, B) after similar considerations due to the particicle equilibrium, the members that will be the first to fail by tensile yielding are FB and BH and by compressive buckling are FG and GH as shown in the figure: