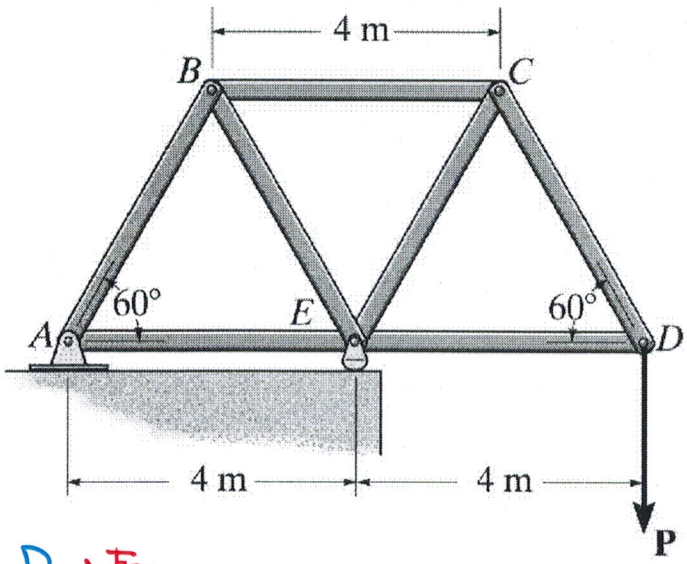
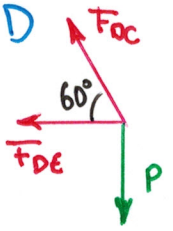
If the maximum force that any member can support is 8 kN in tension and 6 kN in compression, determine the maximum force **P** that can be supported at joint *D*.



We will apply the method of joints, starting from joint D, and going through all the members.

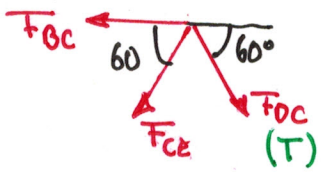
Joint D



$\Sigma F_y = 0$ $\quad F_{DC}\sin 60 - P = 0$ $\quad F_{DC} = 1.1547P$ (T)

$\Sigma F_x = 0$ $\quad -F_{DE} - 1.1547P\cos 60 = 0$ $\quad F_{DE} = 0.5773P$ (C)

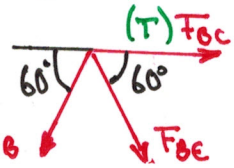
Joint C



$\Sigma F_y = 0$ $\quad -1.1547P\sin 60 - F_{CE}\sin 60 = 0$ $\quad F_{CE} = 1.1547P$ (C)

$\Sigma F_x = 0$ $\quad 2(1.1547P)\cos 60 - F_{BC} = 0$ $\quad F_{BC} = 1.1547P$ (T)

Joint B

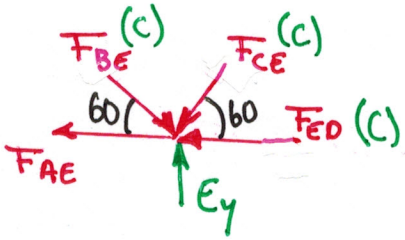


$\Sigma F_y = 0$ $\quad -F_{AB}\sin 60 - F_{BE}\sin 60 = 0$ $\quad F_{AB} = -F_{BE}$

$\Sigma F_x = 0$ $\quad F_{BC} - F_{AB}\cos 60 + F_{BC}\cos 60 = 0$ $\quad F_{AB} = 1.1547P$ (T)

$1.1547P - 2F_{AB}\cos 60 = 0$ $\quad F_{BE} = 1.1547P$ (C)

Joint E



$\Sigma F_x = 0$ $\quad (1.1547P - 1.1547P)\cos 60 - 0.5773P - F_{AE} = 0$

$F_{AE} = 0.5773P$ (C)

Maximum Force at $1.1547P$ (C)

$6 = 1.1547P$

$P = 5.20$ kN