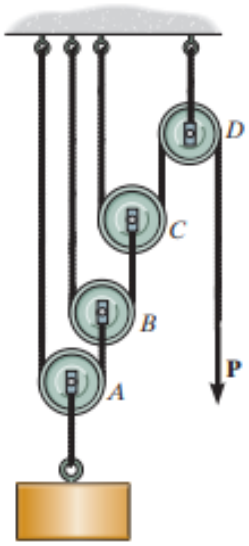
**Problem 3 – Pulleys**

**Determine the force P required to hold the 100-lb weight in equilibrium.**




## SOLUTION

**Equations of Equilibrium:** Applying the force equation of equilibrium along the $y$ axis of pulley $A$ on the free - body diagram, Fig. $a$,

$+\uparrow \Sigma F_y = 0; \qquad 2T_A - 100 = 0 \qquad T_A = 50 \text{ lb}$

Applying $\Sigma F_y = 0$ to the free - body diagram of pulley $B$, Fig. $b$,

$+\uparrow \Sigma F_y = 0; \qquad 2T_B - 50 = 0 \qquad T_B = 25 \text{ lb}$

From the free - body diagram of pulley $C$, Fig. $c$,

$+\uparrow \Sigma F_y = 0; \qquad 2P - 25 = 0 \qquad P = 12.5 \text{ lb}$ **Ans.**


(a)


(b)


(c)

**Ans:**
$P = 12.5$ lb