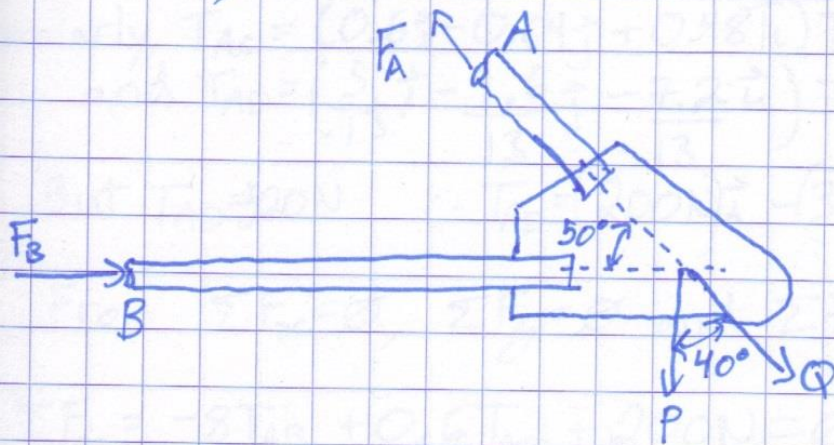
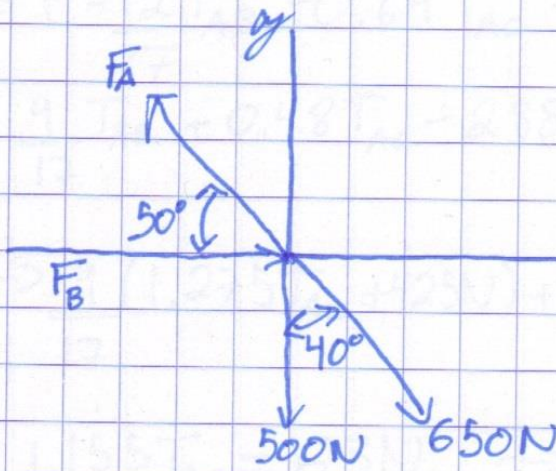


2.55) Use N instead of lb. (pg. 59)  
 $P=500\text{N}$ ;  $Q=650\text{N}$



FBD



$$\sum F_x = F_B - F_A \cos 50^\circ + 650\text{N} \sin 40^\circ = 0$$

$$\sum F_y = F_A \sin 50^\circ - 500\text{N} - 650\text{N} \cos 40^\circ = 0$$

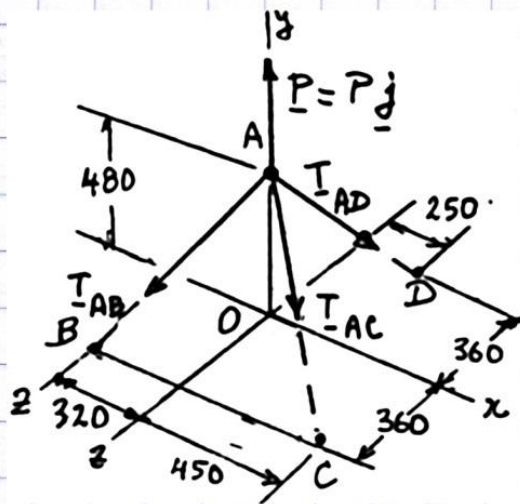
$$\therefore F_A = \frac{500\text{N} + 650\text{N} \cos 40^\circ}{\sin 50^\circ}$$

$$F_A = 1302.70\text{N}$$

$$\therefore F_B = 1302.70\text{N} \cos 50^\circ - 650\text{N} \sin 40^\circ$$

$$F_B = 419.55\text{N}$$

2.110) pg. 79



$$T_{AD} = 520\text{N}$$

$$\vec{AB} = -(320\text{mm})\hat{i} - (480\text{mm})\hat{j} + (360\text{mm})\hat{k}$$

$$\vec{AC} = (450\text{mm})\hat{i} - (480\text{mm})\hat{j} + (360\text{mm})\hat{k}$$

$$\vec{AD} = (250\text{mm})\hat{i} - (480\text{mm})\hat{j} - (360\text{mm})\hat{k}$$

$$\therefore AB = 680\text{mm}$$

$$\therefore AC = 750\text{mm}$$

$$\therefore AD = 650\text{mm}$$

$$\therefore \vec{T}_{AB} = T_{AB} \lambda_{AB} = T_{AB} \frac{\vec{AB}}{AB} = \left( \frac{-8}{17} \vec{i} - \frac{12}{17} \vec{j} + \frac{9}{17} \vec{k} \right) T_{AB}$$

similarly,  $\vec{T}_{AC} = (0.6\vec{i} - 0.64\vec{j} + 0.48\vec{k}) T_{AC}$

and  $\vec{T}_{AD} = \left( \frac{5}{13} \vec{i} - \frac{9.6}{13} \vec{j} - \frac{7.2}{13} \vec{k} \right) T_{AD}$

But  $T_{AD} = 200\text{N}$   $\therefore \vec{T}_{AD} = (200\text{N})\vec{i} - (384\text{N})\vec{j} - (288\text{N})\vec{k}$

From  $\Sigma F_x = 0$ ,  $\Sigma F_y = 0$  and  $\Sigma F_z = 0$

$$\Sigma F_x = \frac{-8T_{AB}}{17} + 0.6T_{AC} + 200\text{N} = 0 \leadsto T_{AB} = 1.275T_{AC} + 425\text{N}$$

$$\Sigma F_y = P - \frac{12T_{AB}}{17} - 0.64T_{AC} - 384\text{N} = 0$$

$$\Sigma F_z = \frac{9}{17}T_{AB} + 0.48T_{AC} - 288\text{N} = 0$$

$$\therefore \hookrightarrow \frac{9}{17}(1.275T_{AC} + 425\text{N}) + 0.48T_{AC} = 288\text{N}$$

$$\therefore 1.155T_{AC} = 63\text{N} \leadsto T_{AC} = 54.545\text{N}$$

$$\therefore T_{AB} = 1.275(54.545\text{N}) + 425\text{N} \leadsto T_{AB} = 494.545\text{N}$$

$$\therefore P = \frac{12}{17}(494.545\text{N}) + 0.64(54.545\text{N}) + 384\text{N}$$

$$P = 768\text{N}$$