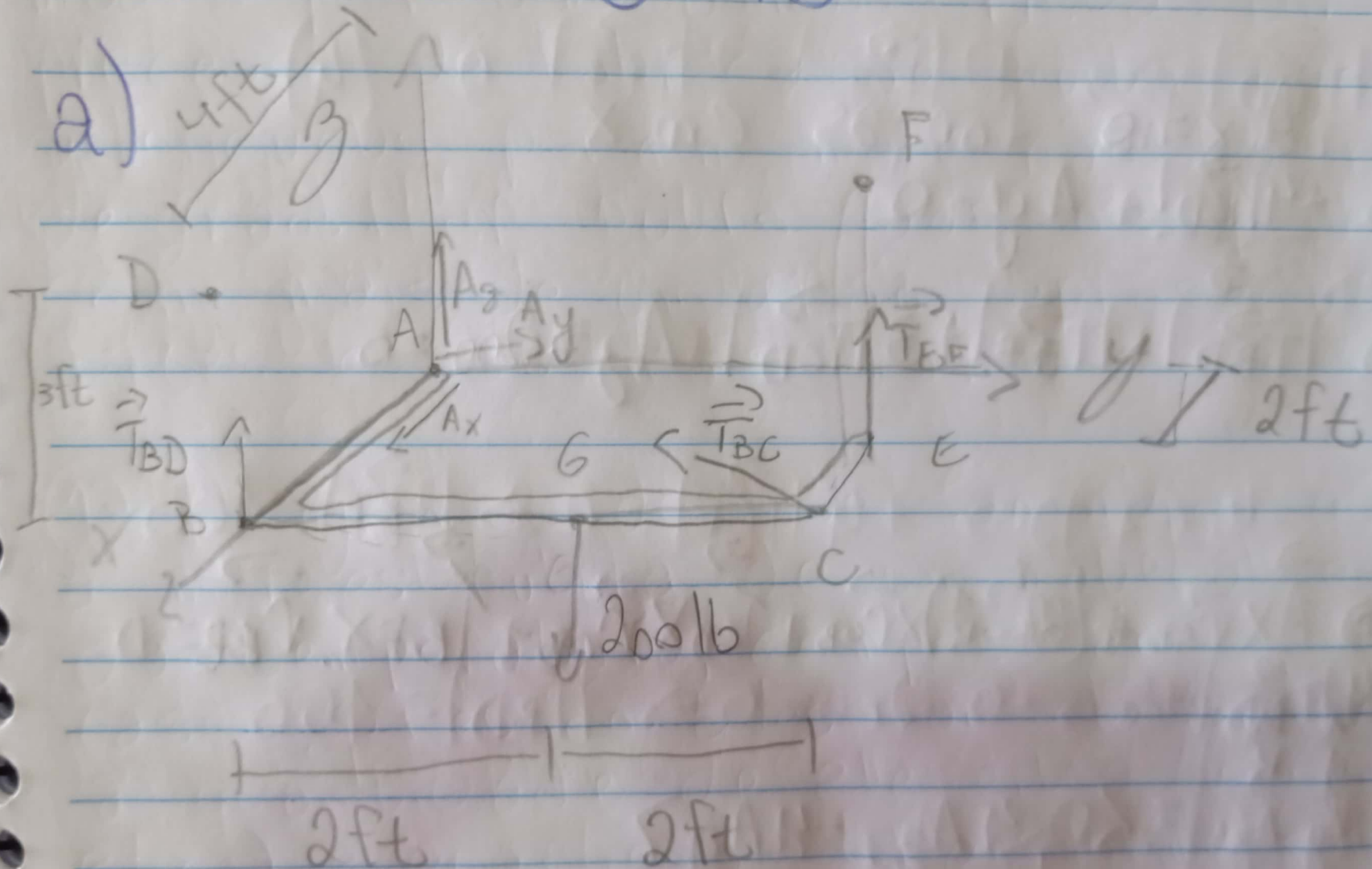


M E C A B



$$A = (0, 0, 0) \quad B = (4, 0, 0) \quad C = (4, 4, 0) \quad D = (4, 0, 3) \quad E = (2, 4, 0) \\ F = (2, 4, 3) \quad G = (4, 2, 0)$$

$$\vec{r}_{BD} = \frac{\vec{r}_{BD} \cdot \vec{BD}}{|\vec{BD}|} = \frac{\vec{r}_{BD} \cdot \vec{BD}}{|\vec{BD}|} \hat{k}$$

$$\vec{r}_{CD} = \frac{\vec{r}_{CD} \cdot \vec{CD}}{|\vec{CD}|} = \frac{\vec{r}_{CD} \cdot \langle 0, -4, 3 \rangle}{5}$$

$$\vec{r}_{EF} = \frac{\vec{r}_{EF} \cdot \vec{EF}}{|\vec{EF}|} = \frac{\vec{r}_{EF} \cdot \vec{EF}}{|\vec{EF}|} \hat{k}$$

$$\sum \vec{F} = 0$$

$$F_x: A_x = 0$$

$$F_y: A_y - 4 \frac{|\vec{T}_{CD}|}{5} = 0 \quad (1)$$

$$F_z: A_z + |\vec{T}_{BD}| + |\vec{T}_{EF}| - 200 = 0 \quad (2)$$

$$\sum \vec{M}_A = 0$$

$$|\vec{T}_{BD}| \times \vec{r}_{BA} + (-200 \hat{k}) \times \vec{r}_{GA} + |\vec{T}_{CD}| \times \vec{r}_{CA} + |\vec{T}_{EF}| \times \vec{r}_{FA} = 0$$

$$\Rightarrow \vec{r}_{BD} \times \vec{r}_{BA} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 0 & 0 & 4 \\ 4 & 0 & 0 \end{vmatrix} \Rightarrow -4 |\vec{r}_{BD}| \hat{j}$$

$$(-200\hat{k}) \times \vec{r}_{CA} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 0 & 0 & -200 \\ -4 & -2 & 10 \end{vmatrix} \Rightarrow \langle -400, 800, 0 \rangle$$

$$\vec{T}_{CD} \times \vec{r}_{CA} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 1 & 1 & 4 \\ 0 & -4/5 & 3/5 \\ -4 & -4 & 0 \end{vmatrix} = \left\langle \frac{12}{5} |\vec{T}_{CD}|, -\frac{12}{5} |\vec{T}_{CD}|, \frac{16}{5} |\vec{T}_{CD}| \right\rangle$$

$$\vec{T}_{EF} \times \vec{r}_{EA} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 1 & 1 & 1 \\ 0 & 0 & 1/5 \\ -2 & -4 & 0 \end{vmatrix} = \langle 4 |\vec{T}_{EF}|, -2 |\vec{T}_{EF}|, 0 \rangle$$

$$\sum \vec{M}_A: -400 + \frac{12}{5} |\vec{T}_{CD}| + 4 |\vec{T}_{EF}| = 0 \quad (3)$$

$$\sum \vec{M}_y: -4 |\vec{T}_{BD}| + 800 - \frac{12}{5} |\vec{T}_{CD}| - 2 |\vec{T}_{EF}| = 0 \quad (4)$$

$$\sum \vec{M}_z: |\vec{T}_{CD}| = 0$$

Da eq. 3: $-400 + \frac{12 \cdot 0}{5} + 4 |\vec{T}_{EF}| = 0 \Rightarrow |\vec{T}_{EF}| = 100$

Da eq. 4: $-4 |\vec{T}_{BD}| + 800 - 0 - 200 = 0 \Rightarrow |\vec{T}_{BD}| = 150$

Da eq. 1: $A_y - 0 = 0 \Rightarrow A_y = 0$

Da eq. 2: $A_z + 150 + 100 - 200 = 0 \Rightarrow A_z = 50$

$$\vec{T}_{BD} = 150 \hat{k} \text{ lb}$$

$$\vec{T}_{CD} = 0 \text{ lb}$$

$$\vec{T}_{EF} = 100 \hat{k} \text{ lb}$$

$$A = 50 \hat{k} \text{ lb}$$