

b) $\vec{W} = -W\vec{j}$

$AB = \sqrt{(-0.3-0)^2 + (2-1.2)^2 + (1-0)^2} = 1.315$

$\vec{T}_{AB} = \frac{T_{AB}}{AB} (-0.3\vec{i} + 0.8\vec{j} + 1\vec{k}) = T_{AB} (-0.228\vec{i} + 0.608\vec{j} + 0.760\vec{k})$

$AC = \sqrt{0 + (2-1.2)^2 + (-1)^2} = 1.281$

$\vec{T}_{AC} = \frac{T_{AC}}{AC} (0.8\vec{j} - 1\vec{k}) = T_{AC} (0.624\vec{j} - 0.781\vec{k})$

$AD = \sqrt{2^2 + (2-1.2)^2 + 0} = 2.154$

$\vec{T}_{AD} = \frac{T_{AD}}{AD} (2\vec{i} + 0.8\vec{j}) = T_{AD} (0.928\vec{i} + 0.371\vec{j})$

c) $\sum F_x = 0 \Rightarrow -\frac{0.3}{AB} T_{AB} + \frac{2}{AD} T_{AD} = 0 \Rightarrow T_{AD} = 0.15 \frac{AD}{AB} T_{AB}$

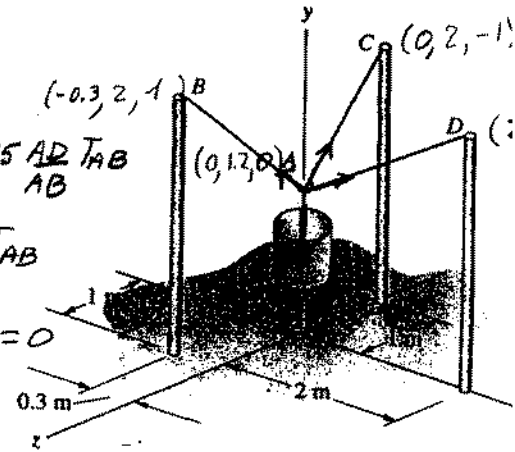
$\sum F_z = 0 \Rightarrow \frac{T_{AB}}{AB} - \frac{T_{AC}}{AC} = 0 \Rightarrow T_{AC} = \frac{AC}{AB} T_{AB}$

$\sum F_y = 0 \Rightarrow \frac{0.8}{AB} T_{AB} + \frac{0.8}{AC} T_{AC} + \frac{0.8}{AD} T_{AD} - W = 0$

$T_{AB} = 152.91$

$T_{AD} = 37.57$

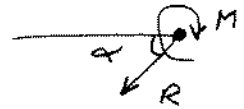
$T_{AC} = 148.95$



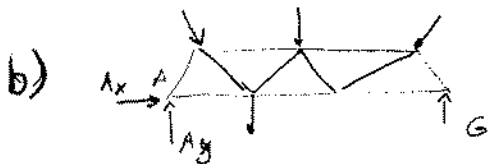
a) $R = (2.4 \cos 70 - 3 \cos 40)\vec{i} + (-2.4 \sin 70 - 1.8 - 1.6 - 3 \sin 40)\vec{j}$

$R = -1.477\vec{i} - 7.584\vec{j}$

$\alpha = \tan^{-1} \left(\frac{7.584}{1.477} \right) = 79^\circ$; $R = 7.726 \text{ kN}$



$M = -2.4 \cos 70 \cdot 6 - 2.4 \sin 70 \cdot 4 - 8 \cdot 1.8 - 12 \cdot 1.6 + 3 \cos 40 \cdot 6 - 3 \sin 40 \cdot 20 = -72.325$



c) $\sum M_A = 0 \Rightarrow -72.325 + G \cdot 24 = 0$
 $G = 3.01 \text{ kN}$

$\sum F_x = 0 \Rightarrow A_x = 3 \cos 40 - 2.4 \cos 70$
 $A_x = 1.48 \text{ kN}$

$\sum F_y = 0 \Rightarrow A_y = 24 \sin 70 + 1.8 + 1.6 + 3 \sin 40 - G$
 $A_y = 4.57 \text{ kN}$

$A = 4.80 \text{ kN}$; $\theta = \tan^{-1} \left(\frac{4.57}{1.48} \right) = 72.05^\circ$