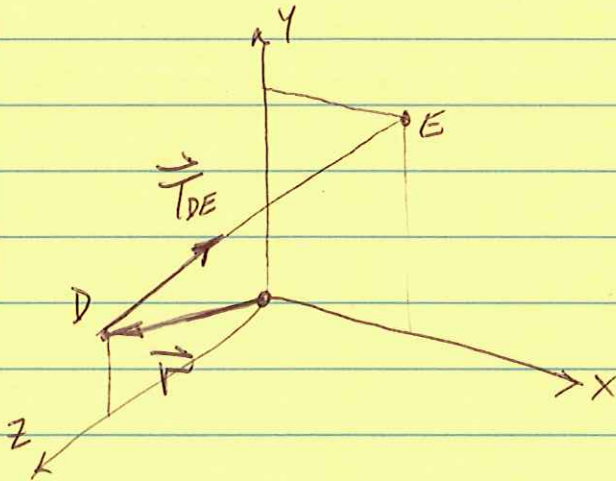


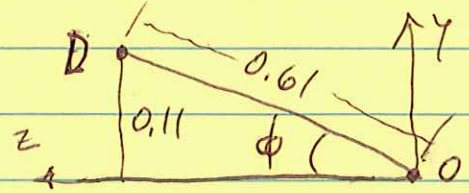
(1)

PROB. 3.47

$$\vec{T}_{DE} = 66^N, \text{ FIND } \vec{M}_O$$



LOCATE POINTS:



$$\phi = \tan^{-1}\left(\frac{0.11}{0.61}\right) = 10.2^\circ$$

~~THE~~
$$y_D = 0.11^m, \quad z_D = 0.61 \cos 10.2^\circ = 0.600^m$$

$$D(0, 0.11, 0.600)^m, \quad E(0.3, 0.71, 0)^m$$

$$\vec{T}_{DE}: \quad dx = x_E - x_D = 0.3 - 0 = 0.3^m$$

$$dy = y_E - y_D = 0.71 - 0.11 = 0.6^m$$

$$dz = z_E - z_D = 0 - 0.6 = -0.6^m$$

$$d = \sqrt{0.3^2 + 0.6^2 + 0.6^2} = 0.9^m$$

$$F_x = F \frac{dx}{d} = (66^N) \left(\frac{0.3}{0.9} \right) = 22^N$$

~~W~~ ~~W~~ ~~W~~
$$F_y = F \frac{dy}{d} = (66) \left(\frac{0.6}{0.9} \right) = 44^N$$

$$F_z = F \frac{dz}{d} = (66) \left(\frac{-0.6}{0.9} \right) = -44^N$$

$$\vec{T}_{DE} = (22)\hat{i} + (44)\hat{j} + (-44)\hat{k} \text{ N}$$

$$\vec{r} = (0.11)\hat{j} + (0.6)\hat{k} \text{ m}$$

$$\vec{M}_O = \vec{r} \times \vec{T}_{DE} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 0 & 0.11 & 0.6 \\ 22 & 44 & -44 \end{vmatrix}$$

$$\vec{M}_O = [(0.11)(-44) - (0.6)(44)]\hat{i}$$

$$- [0 - (0.6)(22)]\hat{j} + [0 - (0.11)(22)]\hat{k} \text{ N}\cdot\text{m}$$

$$\vec{M}_O = (-31.2)\hat{i} + (13.2)\hat{j} + (-2.42)\hat{k} \text{ N}\cdot\text{m}$$