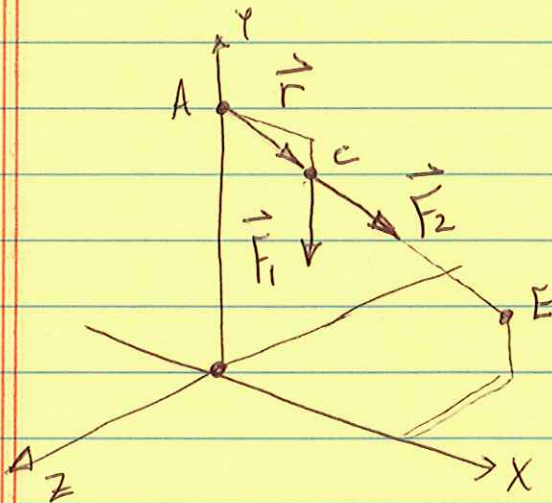


①

PROB. 3.22

$$m = 26 \text{ kg}, \quad W = mg = (26 \text{ kg}) \left(9.81 \frac{\text{m}}{\text{s}^2} \right) = 255 \text{ N}$$

FIND \vec{M}_A 

$$\vec{F}_1 = (-255) \hat{j} \text{ N}$$

LOCATE POINTS:

$$A(0, 7.4, 0) \text{ m}$$

$$C(1, 7.1, 0) \text{ m}$$

$$E(2.5, 1.1, -2) \text{ m}$$

$$\vec{F}_2: dx = x_E - x_C = 2.5 - 1 = 1.5 \text{ m}$$

$$dy = y_E - y_C = 1.1 - 7.1 = -6 \text{ m}$$

$$dz = z_E - z_C = -2 - 0 = -2 \text{ m}$$

$$d = \sqrt{1.5^2 + 6^2 + 2^2} = 6.5 \text{ m}$$

$$F_x = F \frac{dx}{d} = (255) \left(\frac{1.5}{6.5} \right) = 59.8 \text{ N}$$

$$F_y = F \frac{dy}{d} = (255) \left(\frac{-6}{6.5} \right) = -235 \text{ N}$$

$$F_z = F \frac{dz}{d} = (255) \left(\frac{-2}{6.5} \right) = -78.5 \text{ N}$$

PROB. 3.22

(2)

$$\vec{F}_2 = (58.8)\hat{i} + (-235)\hat{j} + (-78.5)\hat{k} \text{ N}$$

$$\vec{R} = \vec{F}_1 + \vec{F}_2 = (58.8)\hat{i} + (-490)\hat{j} + (-78.5)\hat{k} \text{ N}$$

$$\vec{r} : dx = x_c - x_A = 1 - 0 = 1 \text{ m}$$

$$dy = y_c - y_A = 7.1 - 7.4 = -0.3 \text{ m}$$

$$dz = z_c - z_A = 0 - 0 = 0 \text{ m}$$

$$d = \sqrt{1^2 + 0.3^2} = 1.04 \text{ m}$$

$$\vec{r} = (1)\hat{i} + (-0.3)\hat{j} \text{ m}$$

$$\vec{M}_A = \vec{r} \times \vec{R} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 1 & -0.3 & 0 \\ 58.8 & -490 & -78.5 \end{vmatrix}$$

$$\vec{M}_A = [(-0.3)(-78.5)]\hat{i} - [(1)(-78.5)]\hat{j}$$

$$+ [(1)(-490) - (-0.3)(58.8)]\hat{k}$$

$$\vec{M}_A = (23.6)\hat{i} + (78.5)\hat{j} + (-472)\hat{k} \text{ N}\cdot\text{m}$$