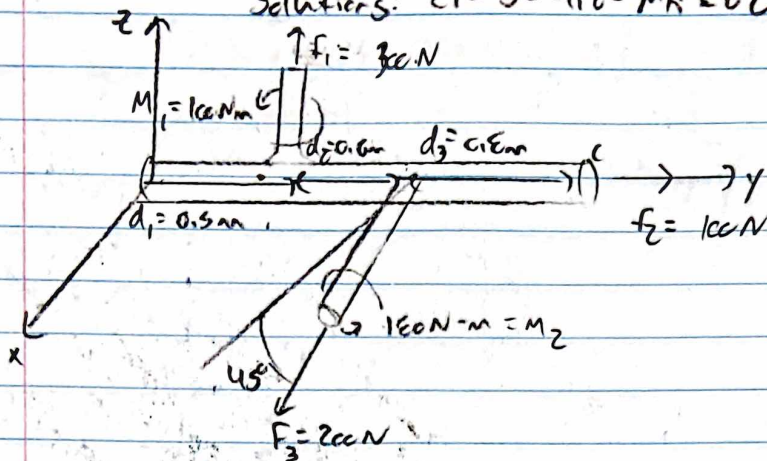


Solutions: 21-5-11.8-MK-02



$$F_1 = 300 \hat{k}$$

$$F_2 = 100 \hat{j}$$

$$F_3 = 200 \text{ N} \cos 45^\circ \hat{i} + 200 \text{ N} \sin 45^\circ \hat{k} \Rightarrow F_3 = 141.4 \hat{i} - 141.4 \hat{k}$$

$$F_R = 141.4 \hat{i} + 100 \hat{j} + (300 - 141.4) \hat{k}$$

$$F_R = 141.4 \hat{i} + 100 \hat{j} + 158.6 \hat{k}$$

$$M_1 = 100 \hat{k}$$

$$M_2 = 180 \cos 45^\circ \hat{i} - 180 \sin 45^\circ \hat{k} \Rightarrow 127.3 \hat{i} - 127.3 \hat{k}$$

$$r_1 = 0.5 \hat{j}$$

$$r_2 = 1.1 \hat{j}$$

$$M_R = r_1 \times F_1 + r_2 \times F_2 + M_1 + M_2$$

$$r_1 \times F_1 = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 0 & 0.5 & 0 \\ 0 & 0 & 300 \end{vmatrix} = 150 \hat{i} + 0 \hat{j} + 0 \hat{k}$$

$$r_2 \times F_2 = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 0 & 1.1 & 0 \\ 141.4 & 0 & -141.4 \end{vmatrix} = -155.6 \hat{i} + 0 \hat{j} - 155.6 \hat{k}$$

$$M_{R0} = (127.3 + 130 - 135.6) \hat{i} + (0) + (-127.3 - 135.5 + 100) \hat{k}$$

$$M_{R0} = 121.7 \hat{i} + 0 \hat{j} - 162.8 \hat{k}$$