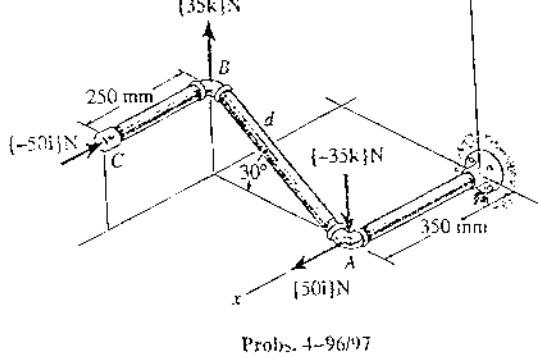
-97



Probs. 4–96/97

(0·35, 0, 0)

(0·35, -d cos30, d sin30)

$r_{AB} = \{-d\cos30\,j + d\sin30\,k\}$

$\vec{M}_1 = \vec{r}_{AB} \times \vec{F}_1$

$= (-d\cos30\,j + d\sin30\,k) \times 35k$

$= -d\,30{\cdot}3\; j \times k = -d\,30{\cdot}3\; i$

$= -30{\cdot}31\,d\,i$

Again

A(0·35, 0, 0)

C(0·6, -d cos30, d sin30)

$\vec{r}_{AC} = (0{\cdot}25i - d\cos30\,j + d\sin30\,k)$

$\vec{M}_2 = \vec{r}_{AC} \times \vec{F}_2$

$= \{0{\cdot}25i - d\cos30\,j + d\sin30\,k\} 50i$

$= 43{\cdot}3\,d\,k + 25d\,j$

$\vec{M}_R = \vec{M}_1 + \vec{M}_2$

$\Rightarrow 20 = \sqrt{(30{\cdot}31d)^2 + (25d)^2 + (43{\cdot}3)^2}$

$\Rightarrow 400 = 3418{\cdot}6\,d^2$

$\Rightarrow d = \sqrt{\frac{400}{3418{\cdot}6}} = 0{\cdot}342\ m$

$\therefore d = \underline{342\ mm}$