DATE

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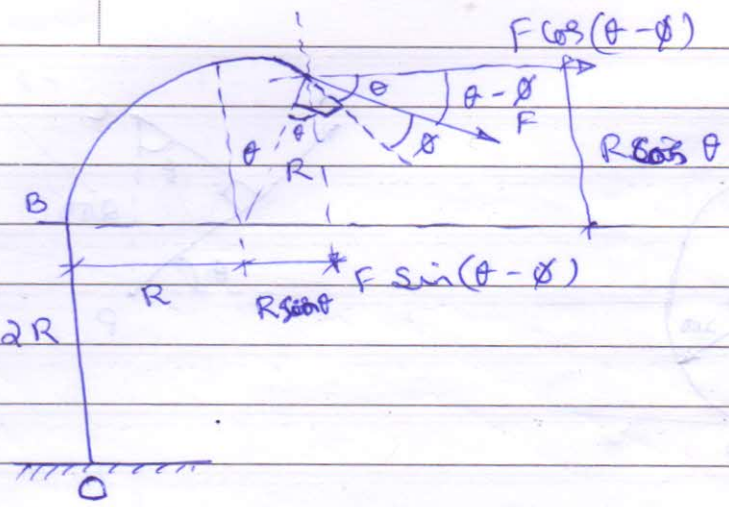

Given

$F = 750\ N$, $R = 2.4\ m$, $\theta = 30^\circ$ & $\phi = 15^\circ$

To find

General expression for moment at B & at O

Solution

$$M_B = -F \sin(\theta-\phi) \times (R + R \sin\theta) - F\cos(\theta-\phi) \times R\cos\theta$$

$$= -FR\left[\sin(\theta-\phi)(1+\sin\theta) + \cos(\theta-\phi)\cos\theta\right]$$

$$= -750 \times 2.4 \times \left[\sin(30^\circ - 15)(1+\sin 30^\circ) + \cos(30^\circ - 15)\cos 30^\circ\right]$$

$$= -869.333 - 869.333$$

$$= 2204.54\ N\text{-}m$$

$$M_O = -F\sin(\theta-\phi) \times (R + R\sin\theta) - F\cos(\theta-\phi) \times (2R + R\cos\theta)$$

$$= -FR\left[\sin(\theta-\phi)(1+\sin\theta) + \cos(\theta-\phi)(2+\cos\theta)\right]$$

$$= -750 \times 2.4 \left[\sin(30-15)(1+\sin 30^\circ) + \cos(30-15)(2+\cos 30)\right]$$

$$= -5681.87\ N\text{-}m$$

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