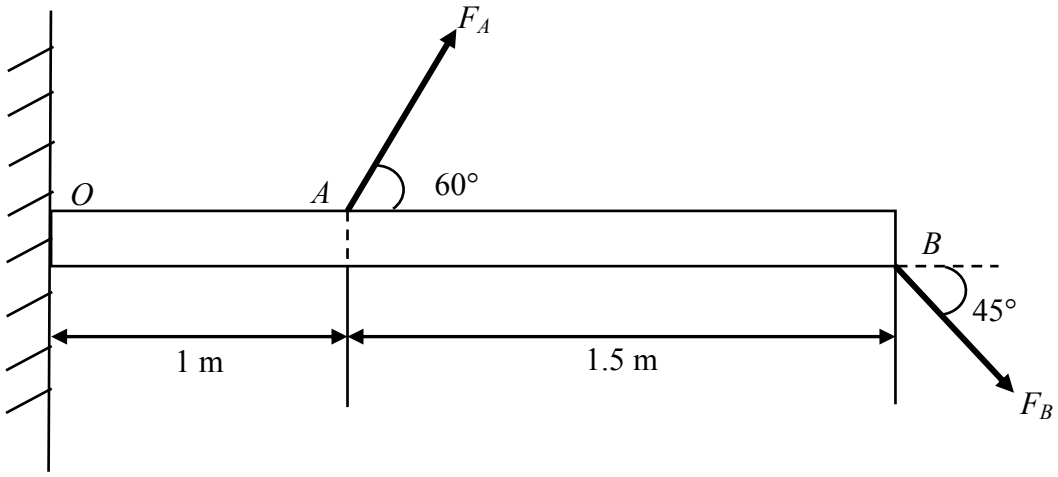
21. Determine the distribution of the resultant moment acting on the beam at *O*. The two forces are normally and independently distributed with $F_A \sim N(100, 5^2)$ N and $F_B \sim N(120, 6^2)$ N.



Solution

$$M_O = F_A \sin 60°(1) - F_B \sin 45°(2.5)$$

Therefore,

$$\mu_{M_O} = \mu_{F_A} \sin 60°(1) - \mu_{F_B} \sin 45°(2.5) = -125.53 \text{ N} \cdot \text{m}$$

$$\sigma_{M_O} = \sqrt{(\sigma_{F_A} \sin 60°(1))^2 + (\sigma_{F_B} \sin 45°(2.5))^2} = 11.46 \text{ N} \cdot \text{m}$$

Finally, we have $M_O \sim N(-125.53, 11.46^2)$ N · m, anticlockwise **Ans**.