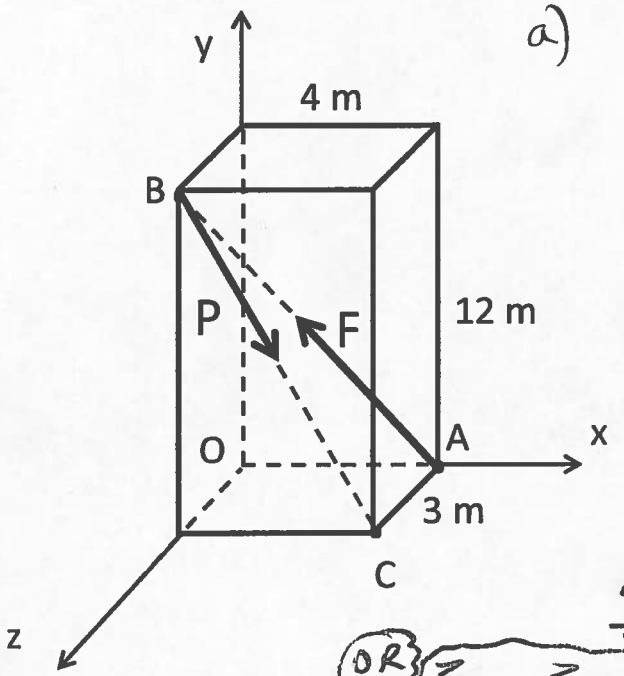
SOLUTION

Given the magnitude of the forces, F=260 N and P=100 N

a) Determine the moment of force $\overline{F}$ about point O

b) Determine the moment of the force $\overline{P}$ about point O



a) FORCE $\vec{F}$

FROM MODULE 4

$\vec{F} = -80\hat{i} + 240\hat{j} + 60\hat{k}$ N

$\vec{M}_O = \vec{r}_{OA} \times \vec{F}$

$\vec{M}_O = 4\hat{i} \times (-80\hat{i} + 240\hat{j} + 60\hat{k})$

$\vec{M}_O = -240\hat{j} + 960\hat{k}$ N-m ANS

OR $\vec{M}_O = \vec{r}_{OB} \times \vec{F}$

WHY? BOTH POINTS A AND B LIE ON LOA FOR FORCE $\vec{F}$

$\vec{M}_O = (12\hat{j} + 3\hat{k}) \times (-80\hat{i} + 240\hat{j} + 60\hat{k}) = -240\hat{j} + 960\hat{k}$ N-m ANS

b) FORCE P

FROM MODULE 4 $\vec{P} = 31.6\hat{i} - 94.9\hat{j}$ N

$\vec{M}_O = \vec{r}_{OB} \times \vec{P}$

$\vec{M}_O = (12\hat{j} + 3\hat{k}) \times (31.6\hat{i} - 94.9\hat{j}) = 285\hat{i} + 94.8\hat{j} - 379\hat{k}$ N-m ANS

OR $\vec{M}_O = \vec{r}_{OC} \times \vec{P}$

$\vec{M}_O = (4\hat{i} + 3\hat{k}) \times (31.6\hat{i} - 94.9\hat{j}) = 285\hat{i} + 94.8\hat{j} - 379\hat{k}$ N-m ANS.