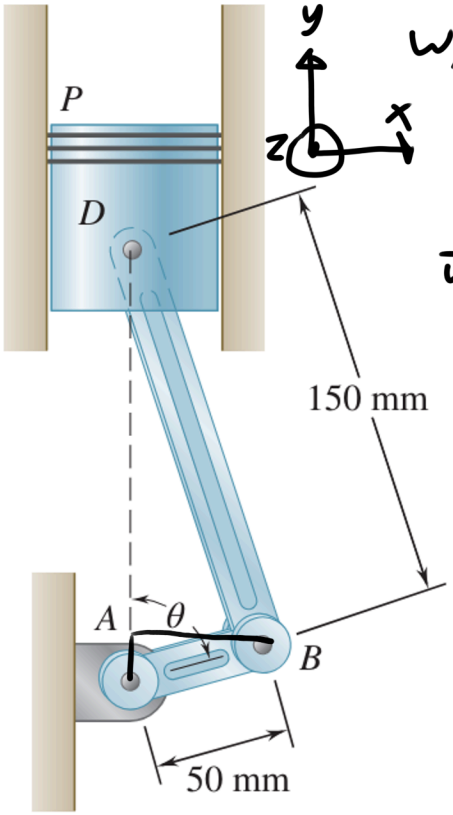
Knowing that crank AB rotates about point A with a constant angular velocity of 900 rpm clockwise, determine the acceleration of the piston P when $\theta = 60°$.



$$\omega_{AB} = 900 \frac{\text{rev}}{\text{min}} \left(\frac{2\pi \text{ rad}}{1 \text{ rev}}\right)\left(\frac{1 \text{ min}}{60 \text{ s}}\right)$$

$$= 94.2 \text{ rad/s}$$

$$\vec{\omega}_{AB} = -94.2\,\vec{k} \text{ rad/s}$$

$$\vec{a}_B = \vec{a}_A + \vec{\alpha} \times \vec{r}_{B/A} - \omega^2 \vec{r}_{B/A}$$

($\vec{a}_A = 0$, $\vec{\alpha} = 0$)

$$\vec{r}_{B/A} = 50\sin\theta\,\vec{i} + 50\cos\theta\,\vec{j}\ \text{mm}$$

$$= 43.3\,\vec{i} + 25\,\vec{j}\ \text{mm}$$

$$\vec{a}_B = -94.2^2(43.3\,\vec{i} + 25\,\vec{j})$$

$$= -4081\,\vec{i} - 2355\,\vec{j}\ \text{mm/s}^2$$

$$\vec{a}_D = \vec{a}_B + \vec{\alpha} \times \vec{r}_{D/B} - \omega_{BD}^2 \vec{r}_{D/B}$$