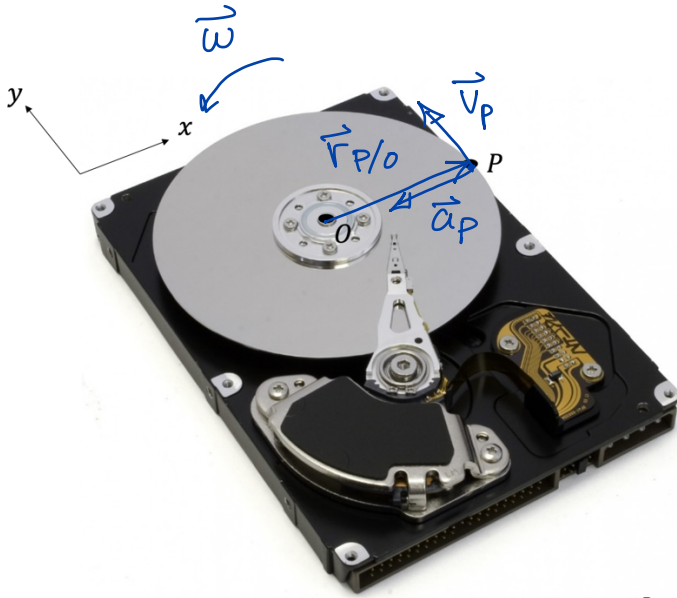


An 8 cm diameter hard drive platter is rotating at a constant rate of 3600 rpm counterclockwise. What is the velocity of a point, P , on the outer edge of the platter? What is the acceleration experienced by a point, P , on the edge of the platter?



\vec{v}_P, \vec{a}_P

$$\omega = 3600 \frac{\text{rot}}{\text{min}} \cdot \frac{1 \text{ min}}{60 \text{ s}} \cdot \frac{2\pi \text{ rad}}{\text{rot}}$$

$$= 376.8 \text{ rad/s}$$

$$\vec{\omega} = 376.8 \text{ rad/s } \hat{k}$$

$$\vec{r}_{P/O} = 0.04 \text{ m } \hat{i}$$

$$\vec{v}_P = \vec{\omega} \times \vec{r}_{P/O} = 376.8 \text{ rad/s } \hat{k} \times 0.04 \text{ m } \hat{i}$$

$$\boxed{\vec{v}_P = 15.1 \text{ m/s } \hat{j}}$$

$$\vec{a}_P = \cancel{\vec{\alpha}} \times \vec{r}_{P/O} - \omega^2 \vec{r}_{P/O}$$

$$= -\omega^2 \vec{r}_{P/O}$$

$$= -(376.8)^2 (0.04 \hat{i})$$

$$\boxed{\vec{a}_P = -5679.1 \text{ m/s}^2 \hat{i}}$$

because ω is constant,
 $\alpha = 0$