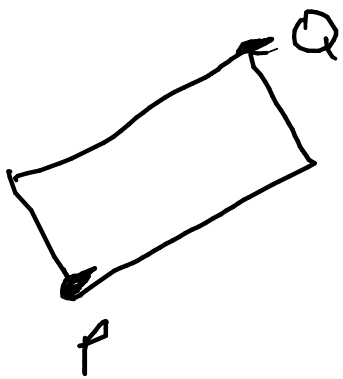
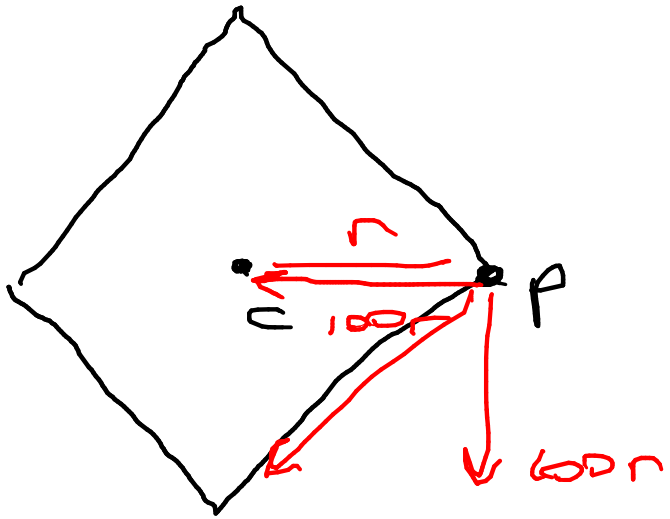
Recap



$$\vec{a}_Q = \vec{a}_P + \vec{\alpha} \times \vec{r}_{PQ} + \vec{\omega} \times (\vec{\omega} \times \vec{r}_{PQ})$$

$$= \vec{a}_P + \alpha_z \vec{r}_{PQ}^{\perp} - \omega_z^2 \vec{r}_{PQ}$$

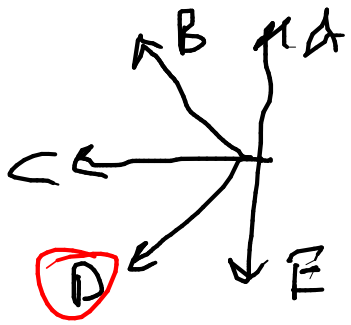


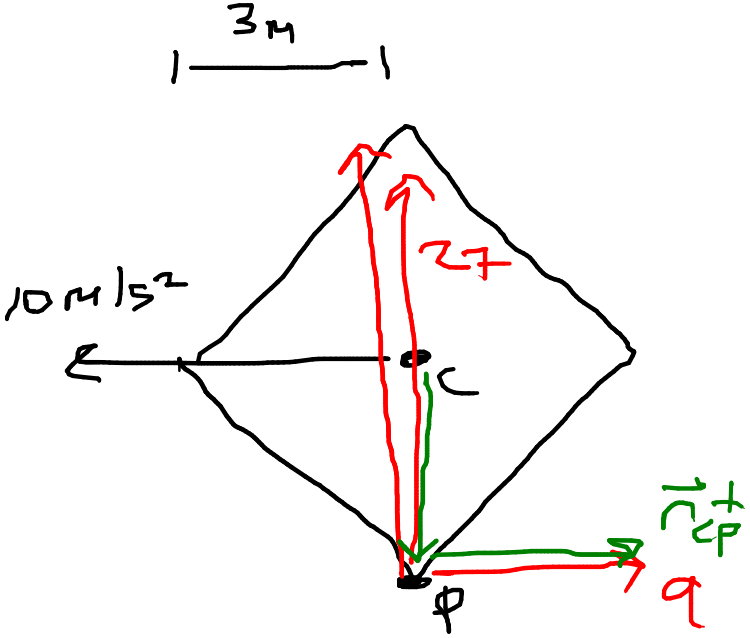
$\vec{a}_C = 0$

$\vec{\alpha} = -100\hat{k}$ rad/s^2

$\vec{\omega} = -10\hat{k}$ rad/s^2

$\hat{a}_P$ closest to:

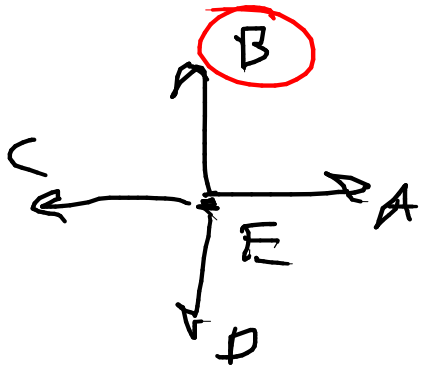




$\omega = 3$ rad/s CW $\quad \omega_z = -3$

$\alpha = 3$ rad/s² CCW $\quad \alpha_z = +3$

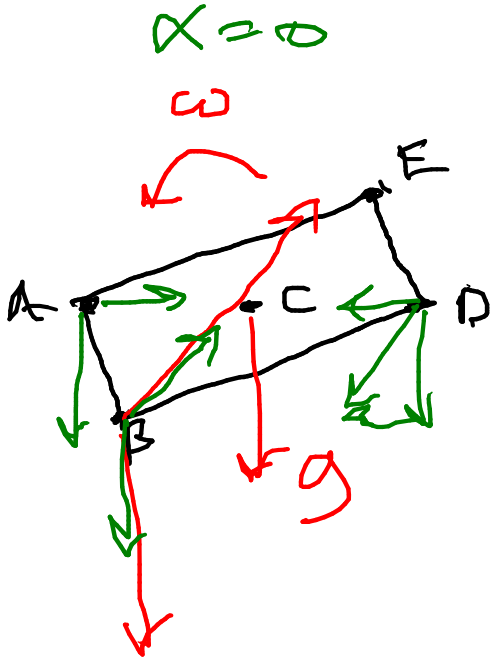
$\hat{a}_P$?



$r_{CP} = 3$

$\omega^2 r = 27$

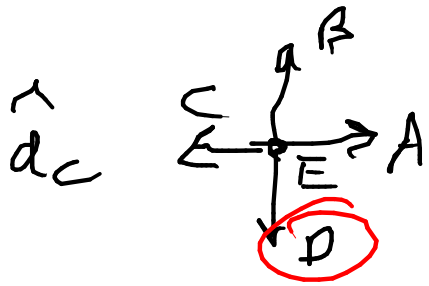
$$\vec{a}_P = \vec{a}_C + \alpha_z \vec{r}_{CP} - \omega_z^2 \vec{r}_{CP}$$

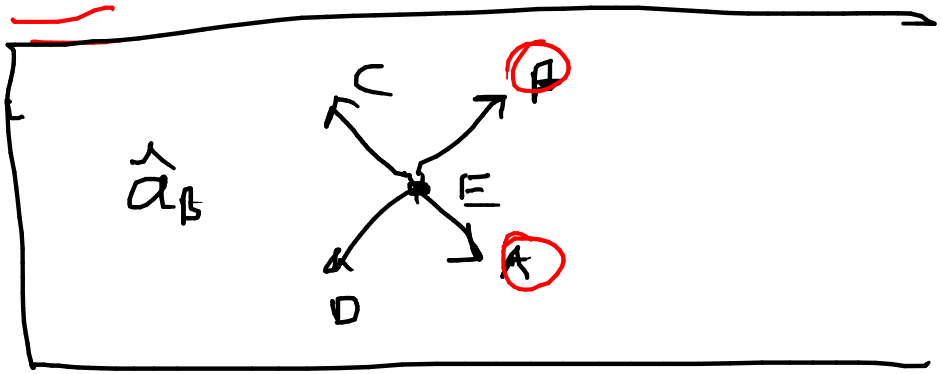


which A–E has largest a (acc. mag.)?

B 40%

E 30%





$\vec{\omega}$

A. CW

B. 0

C. CCW

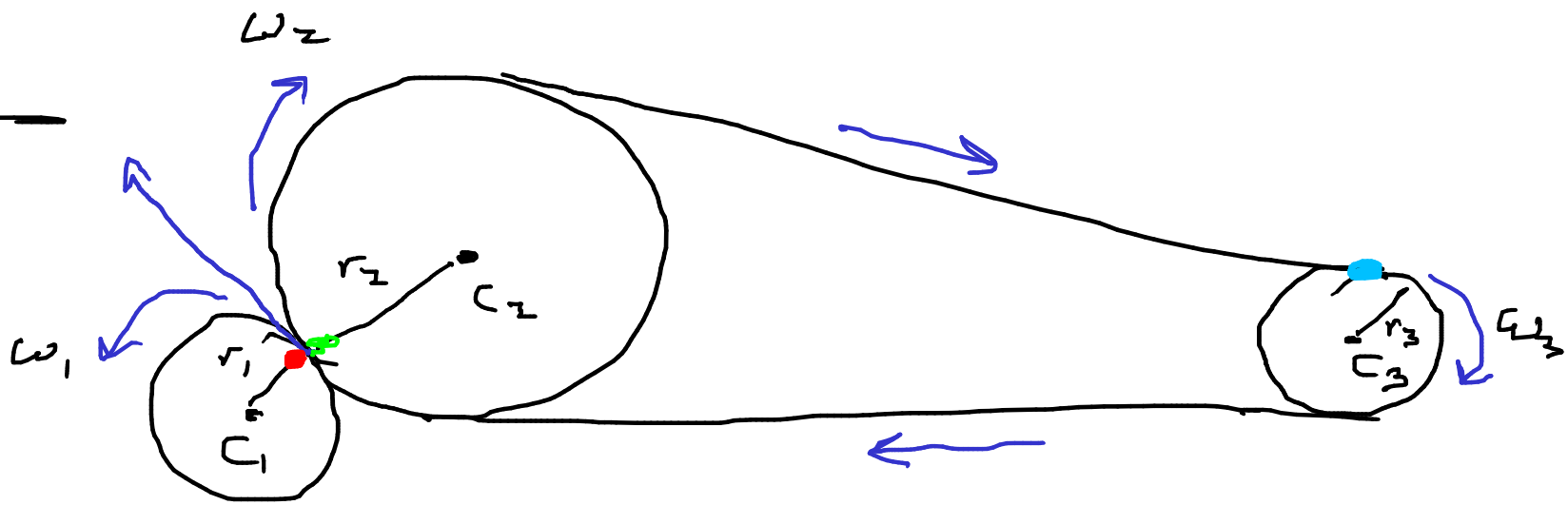
$\vec{\alpha}$

A. CW — slowing rot

B. 0

C. CCW — speeding up rot.

Gears



$$v = v = v$$

$$\text{magnitudes} = r_1\omega_1 = r_2\omega_2 = r_3\omega_3$$

$$\frac{\omega_1}{\omega_2} = \frac{r_2}{r_1}$$

– velocities of contact points match (are equal).