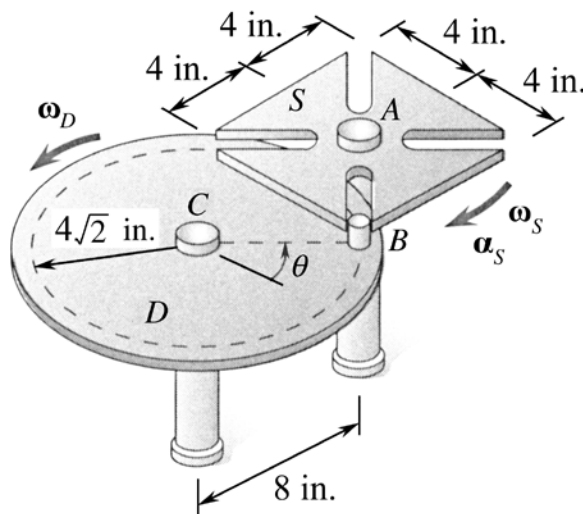


MEEG 4003 Quiz #15.m22.093

1. ⑤ Define the symbols in the acceleration formula:

$$\mathbf{a}_B = \mathbf{a}_{B/Axyz} + \mathbf{a}_{B'} + 2\boldsymbol{\Omega} \times \mathbf{v}_{B/Axyz}$$

2. ⑩ The Geneva mechanism shown consists of a star wheel S and a driving wheel D , as shown. It is known that the driving wheel D rotates with a constant angular velocity $\boldsymbol{\omega}_D = 3 \text{ rad/s} \curvearrowright$. For the instant when $\theta = 60^\circ$, determine the angular velocity $\boldsymbol{\omega}_S$ and the velocity $\mathbf{v}_{B/S}$ of the engaging pin B relative to the wheel S .



1. ⑤ $OXYZ$: fixed reference frame. $Axyz$: rotating reference frame.

\mathbf{a}_B = acceleration of B measured in $OXYZ$

$\mathbf{a}_{B/Axyz}$ = acceleration of B measured in $Axyz$

$\mathbf{a}_{B'}$ = acceleration of B' measured in $OXYZ$, where B' is a point embedded in $Axyz$ but coincides with point B at the instant under consideration

$\boldsymbol{\Omega}$ = angular velocity of $Axyz$ measured in $OXYZ$

$\mathbf{v}_{B/Axyz}$ = velocity of B measured in $Axyz$

2. ⑩ Let $AXYZ$ be the fixed reference frame and $Axyz$ be embedded in the star wheel with the x axis directed along the line AB .

$$\boldsymbol{\omega}_S = 1.225 \text{ rad/s} \curvearrowright$$

$$\mathbf{v}_{B/S} = 16.17 \text{ in./s} \curvearrowleft 132.4^\circ$$