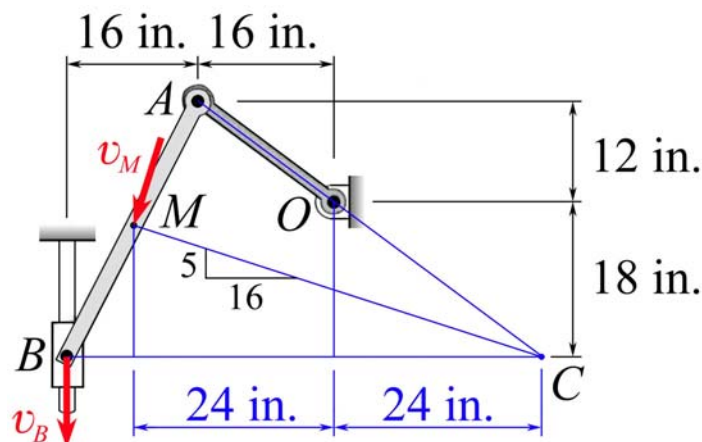
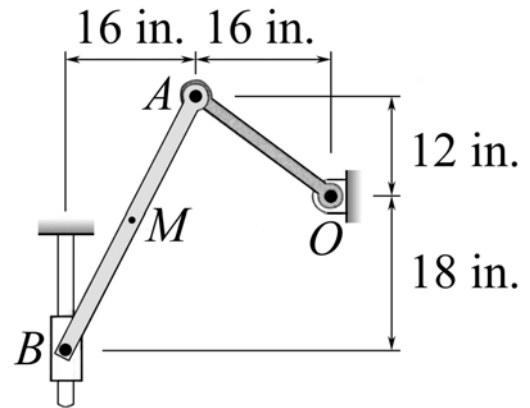


MEEG 2013 Quiz #5.m25

The crank OA rotates with a constant angular velocity $\omega_{OA} = 4 \text{ rad/s } \curvearrowright$. For the instant shown, determine (a) \mathbf{v}_B of collar B , (b) \mathbf{v}_M of the midpoint M of link AB .



$$v_A = \overline{OA} \omega_{OA} = 20(4) = \overline{CA} \omega_{AB} = 50 \omega_{AB} \quad \omega_{AB} = 1.6 \text{ rad/s} \quad \textcircled{2}$$

$$v_B = \overline{CB} \omega_{AB} = 56(1.6) = 89.6 \quad \therefore \mathbf{v}_B = 89.6 \text{ in./s } \downarrow \quad \textcircled{2}$$

$$v_M = \overline{CM} \omega_{AB} = \sqrt{(48)^2 + (15)^2} \cdot (1.6) = 4.8\sqrt{281} \quad \textcircled{2}$$

$$\mathbf{v}_M = v_M \cdot \frac{-5\mathbf{i} - 16\mathbf{j}}{\sqrt{281}} = 4.8\sqrt{281} \cdot \frac{-5\mathbf{i} - 16\mathbf{j}}{\sqrt{281}} = -24\mathbf{i} - 76.8\mathbf{j}$$

$$\mathbf{v}_M = -24\mathbf{i} - 76.8\mathbf{j} \text{ in./s} \quad \textcircled{2}$$