

# DYNAMICS ASSIGNMENT

## Planar Kinematics of a Rigid Body (Relative Motion Analysis)

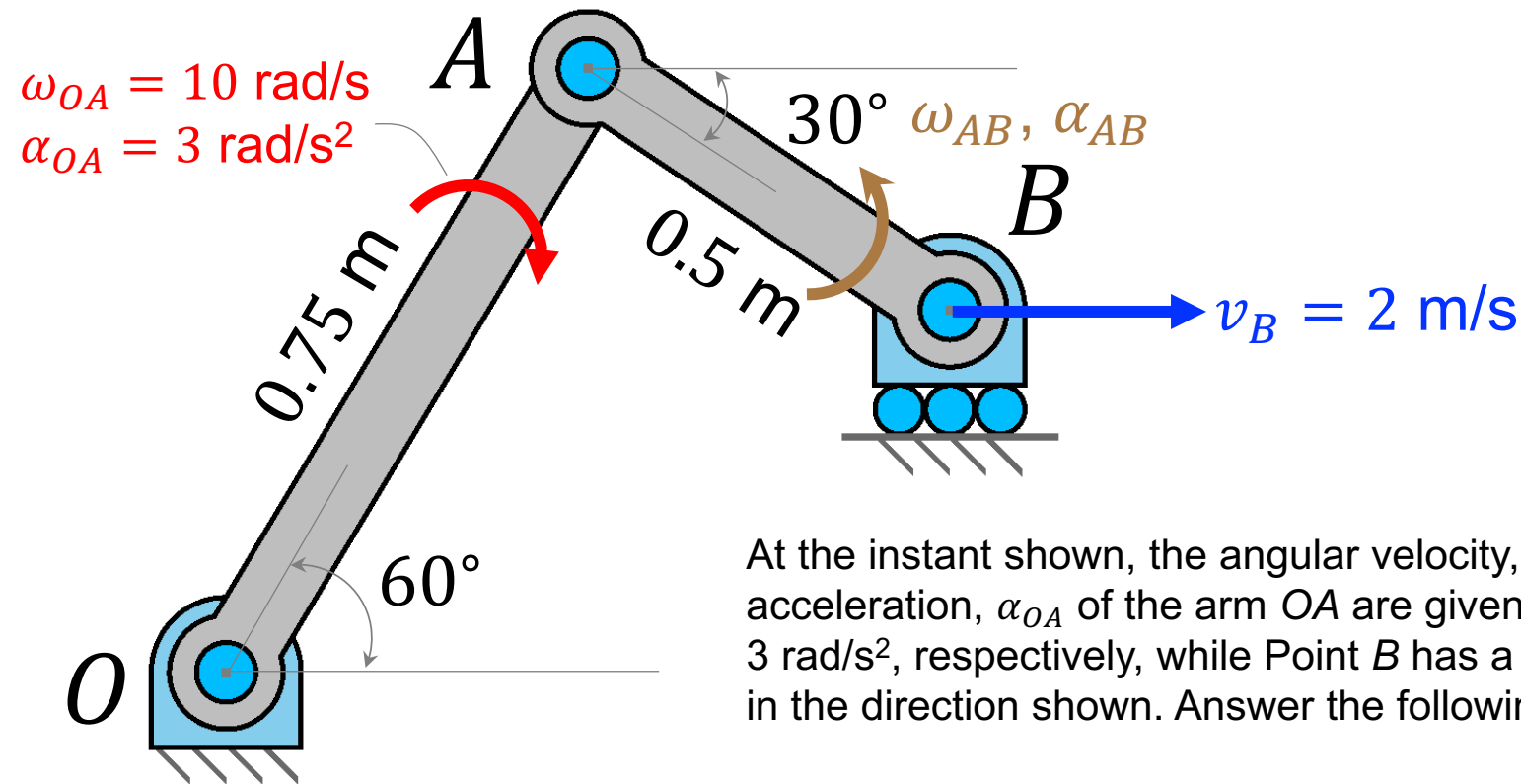
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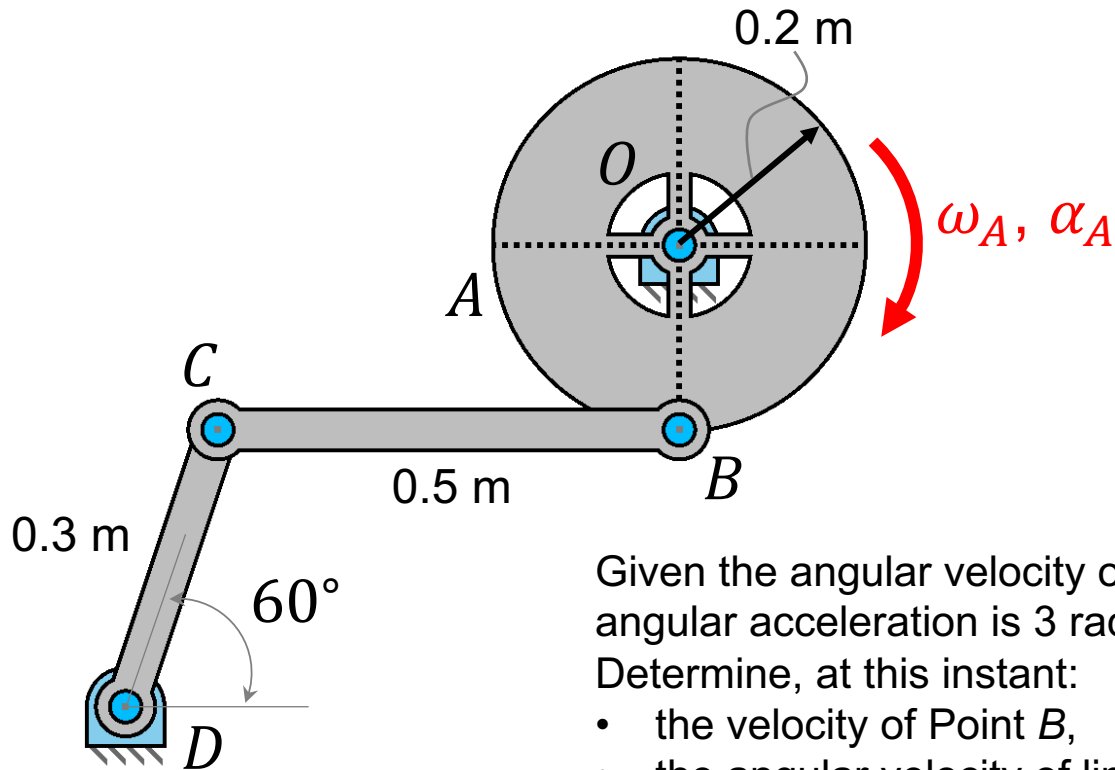
# Question 1 – Velocity and Acceleration



At the instant shown, the angular velocity,  $\omega_{OA}$  and angular acceleration,  $\alpha_{OA}$  of the arm OA are given as 10 rad/s and 3 rad/s<sup>2</sup>, respectively, while Point B has a velocity of 2 m/s in the direction shown. Answer the following questions:

- Calculate the velocity of Point A at this instant.
- Calculate the acceleration of Point A at this instant.
- Determine the angular velocity and angular acceleration of link AB at this instant.

# Question 2 – Velocity and Acceleration



Given the angular velocity of the wheel A is 6 rad/s and its angular acceleration is 3 rad/s<sup>2</sup>, both in clockwise direction.

Determine, at this instant:

- the velocity of Point B,
- the angular velocity of link BC,
- the velocity of Point C,
- the acceleration of Point B,
- the angular acceleration of link BC, and
- the acceleration of Point C.