Question 1:

The angular accelerations of the two bars are zero and sleeve C slides at a constant velocity of 1 m/s relative to bar BD. Find the acceleration (magnitude) of sleeve C if $\omega_{AB} = 2$ rad/s CCW and $\omega_{BD} = 4$ rad/s CCW.
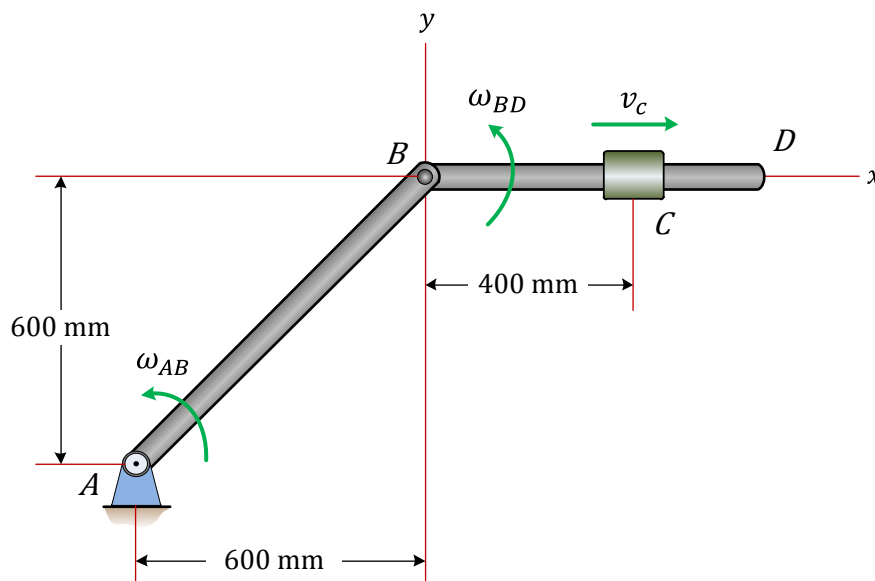
$$[a_c = 10.431 \ \text{m/s}^2]$$

Question 2:

Pin A in the bell crank AOD is guided by the flanges of the collar B, which slides with a constant velocity v_B of 0.9 m/s along the fixed shaft for an interval of motion. For the position $\theta = 30^\circ$, determine the acceleration of the plunger CE whose upper end is positioned by the radial slot in the bell crank.
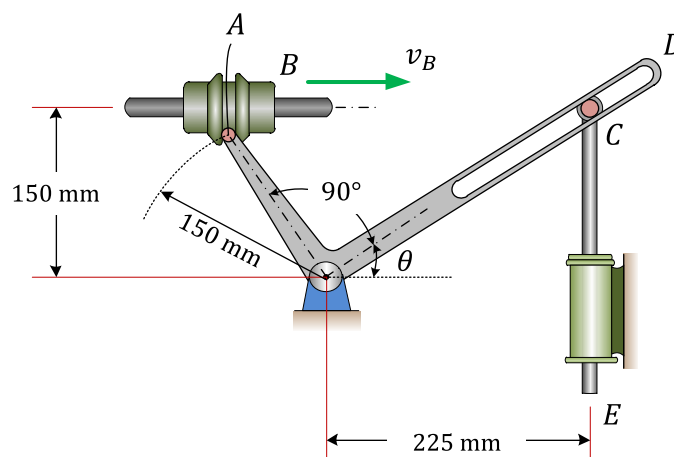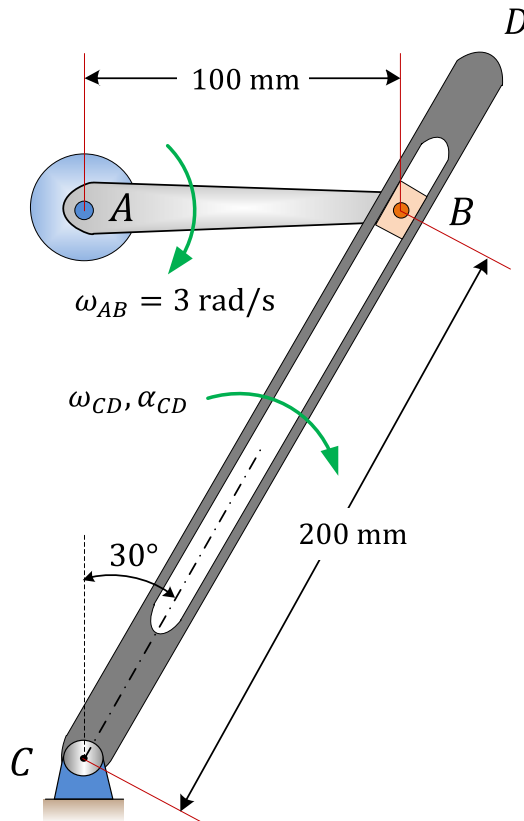

$$[\ a_{CE} = 24.96 \ \text{m/s}^2]$$

Questions 3-4:

Block *B* of the mechanism is confined to move within the slot member *CD*. If *AB* is rotating at a constant rate of $\omega_{AB} = 3$ rad/s and the centre of rotation *A* is fixed, determine:

(a) The angular velocity (magnitude and direction) of member *CD* at the instant shown.
(b) The angular acceleration (magnitude and direction) of link *CD* at the instant shown.

$[\omega_{CD} = 0.75 \text{ rad/s CW}; \; \alpha_{CD} = 1.947 \text{ rad/s}^2 \text{ CCW}]$