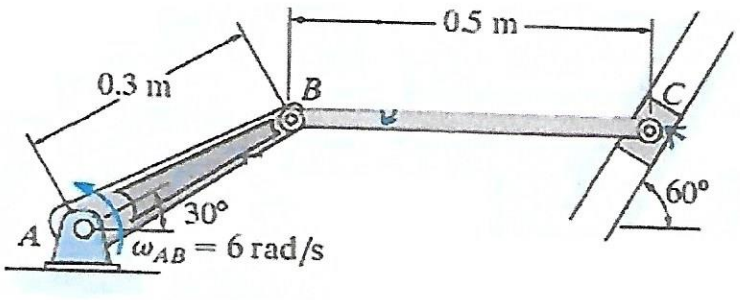
Rigid Body Kinematics II – Problem #1

If crank *AB* rotates with a constant angular velocity of $\omega_{AB} = 6$ rad/sec, determine the angular velocity of rod BC and the velocity of the slider block at the instant shown. The rod is in a horizontal position.



① CLASSIFY MOTION

AB - RAFA
BC - GPM
C - TRANSLATION

② RELATIVE VELOCITY EQNS

$$V_B = V_A + V_{B/A} = V_C + V_{B/C}$$

③ KINEMATIC ~~EQNS~~ DIAGRAMS

V_A + $V_{B/A}$ ($V_{B/n} = \omega_{AB}(.3) = 1.8$ m/s) V_C + $V_{B/C}$

0 + (30°, 60°, $\omega_{AB} = 6$ rad/s, ω_{BC}, $V_{B/C} = \omega_{BC}(.5)$)

④ Scalar Eqns

$\Sigma V_x \rightarrow$ $\quad 0 - 1.8\sin 30 = V_C \cos 60 + 0$

$$V_C = -1.8 \text{ m/s} = 1.8 \text{ m/s} \swarrow 60°$$

$\Sigma V_y \uparrow$ $\quad 0 + 1.8\cos 30 = V_C \sin 60 + \omega_{BC}(.5)$

$$\omega_{BC} = 6.24 \text{ rad/s} \circlearrowright$$