HOMEWORK 6

Solve any 5 of the following problems.
Adapt the rules given in the previous homework.

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1 – Pinion gear $A$ rolls on the gear racks $B$ and $C$. If $B$ is moving to the right at 2.4 m/s and $C$ is moving to the left at 1.2 m/s, determine the angular velocity of the pinion gear and the velocity of its center $A$.

2 – The gear rests in a fixed horizontal rack. A cord is wrapped around the inner core of the gear so that it remains horizontally tangent to the inner core at $A$. If the cord is pulled to the right with a constant speed of 0.6 m/s, determine the velocity of the center of the gear, $C$.

3 – If bar $AB$ has an angular velocity $\omega_{AB} = 4$ rad/s, determine the velocity of the slider block $C$ at the instant shown.
4 – If the hydraulic cylinder shortens at a constant rate of $v_C = 0.6 \text{ m/s}$, determine the angular velocity of link $ACB$ and the velocity of block $B$ at the instant shown.

5 – At the instant shown, the truck travels to the right at $3 \text{ m/s}$, while the pipe rolls counterclockwise at $\omega = 8 \text{ rad/s}$ without slipping at $B$. Determine the velocity of the pipe’s center $G$.

6 – If the ring gear $D$ is held fixed and link $AB$ rotates with an angular velocity of $\omega_{AB} = 10 \text{ rad/s}$, determine the angular velocity of gear $C$.

7 – If rod $CD$ is rotating with an angular velocity $\omega_{DC} = 8 \frac{\text{rad}}{\text{s}}$ determine the angular velocities of rods $AB$ and $BC$ at the instant shown.