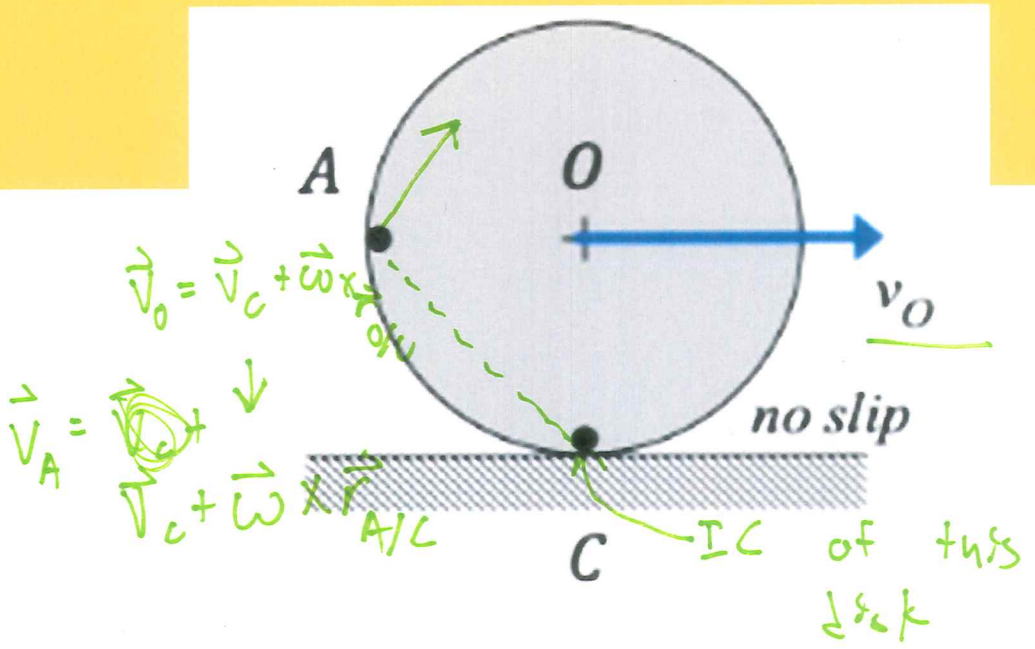
Question #1



- A circular disk rolls without slipping to the right on a stationary surface with its center O having a speed of v_O.
- Choose the figure that most accurately represents the velocity $\vec{v}_A$ of point A on the circumference of the disk.

Figure (a)

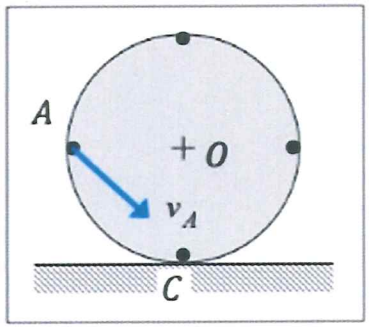


Figure (b)

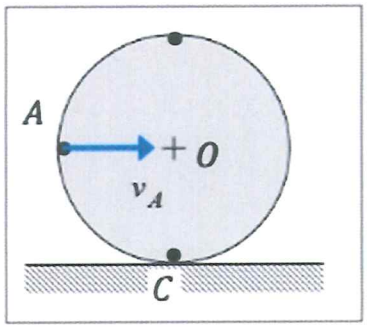


Figure (c)

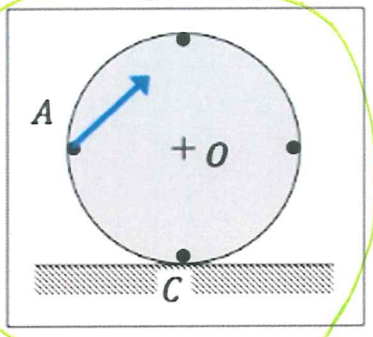
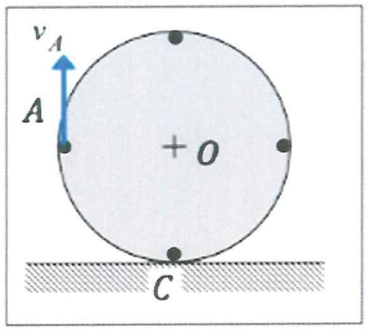


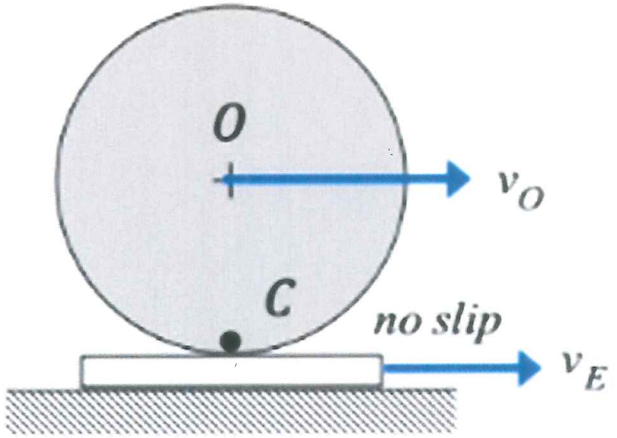
Figure (d)



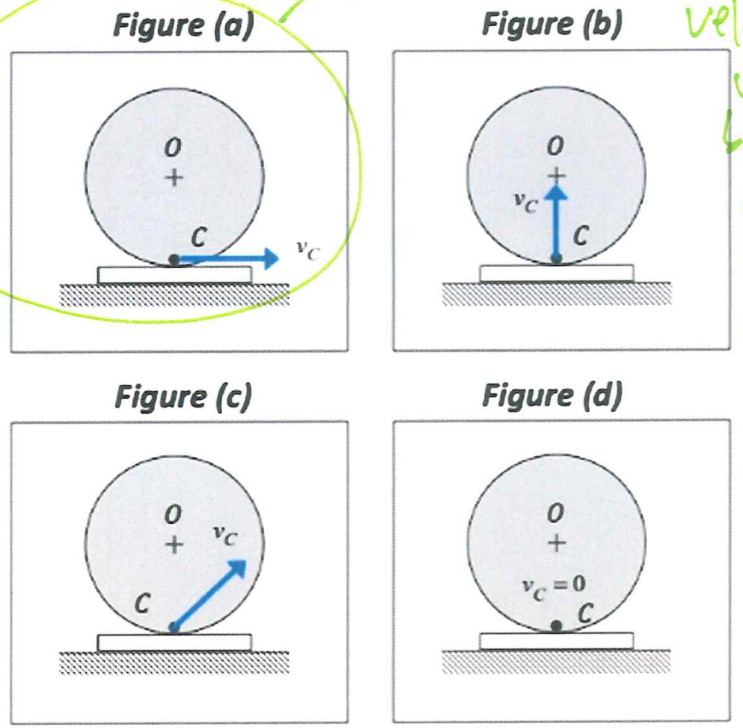
Question #2

- A circular disk rolls without slipping to the right on a moving block with its center O having a speed of v_O . The block moves to the right with a speed of v_E , where $v_E > v_O$.

- Choose the figure that most accurately represents the velocity $\vec{v}_C$ of the contact point C on the disk.

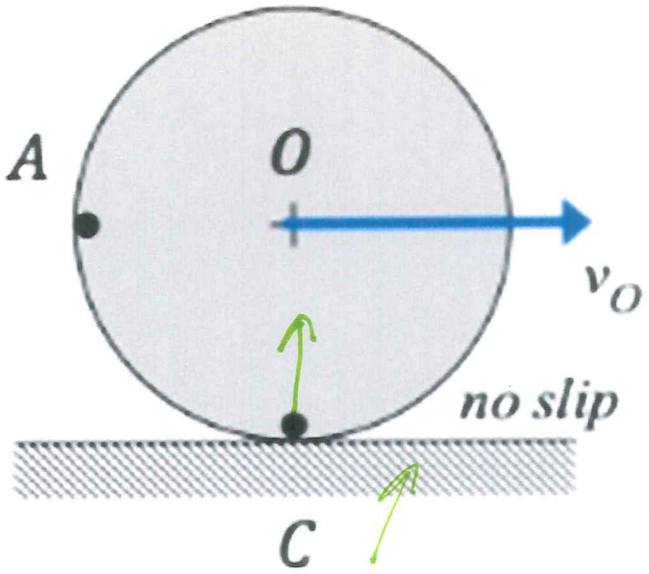


point C has to match velocity of the block otherwise it would slip

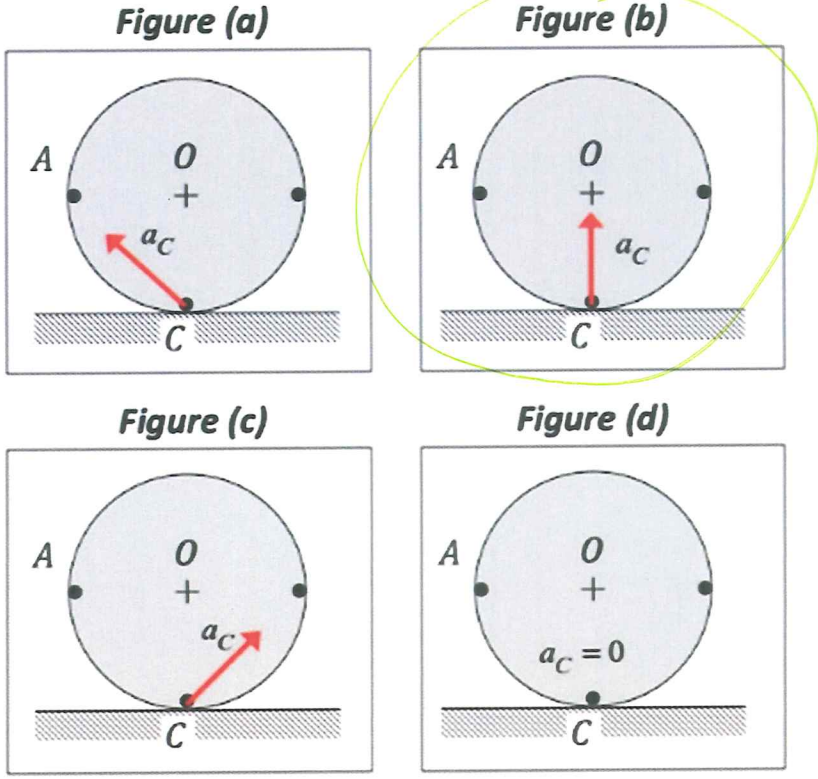


Question #3

- A circular disk rolls without slipping to the right on a stationary surface with its center O having a speed of v_O.
- Choose the figure that most accurately represents **the acceleration $\vec{a}_C$** of the contact point C on the disk.

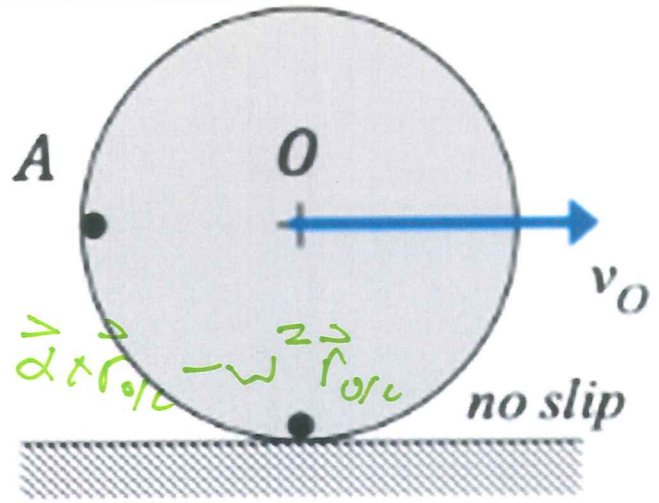


$\vec{a}_{cx} = 0$



needs an $\vec{a}$ up

Question #4



- A circular disk rolls without slipping to the right on a stationary surface with its center O having a **constant** speed of v_O.
- Choose the figure that most accurately represents **the acceleration $\vec{a}_A$** of the contact point C on the disk.

Figure (a)

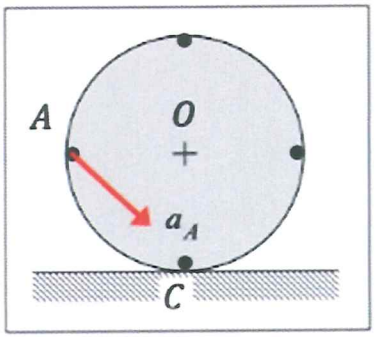


Figure (b)

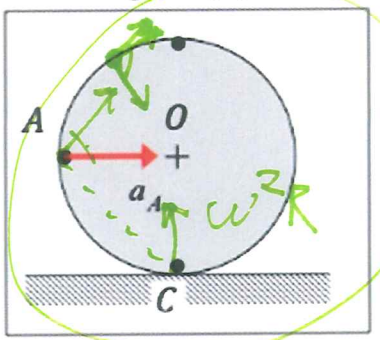


Figure (c)

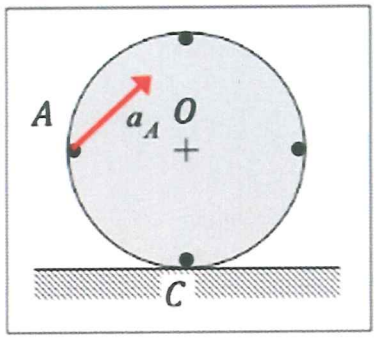
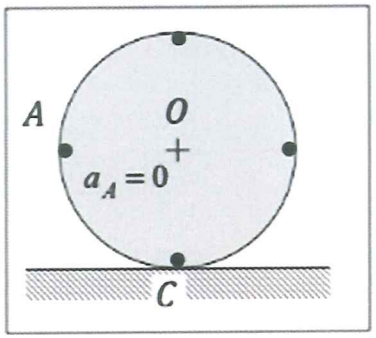
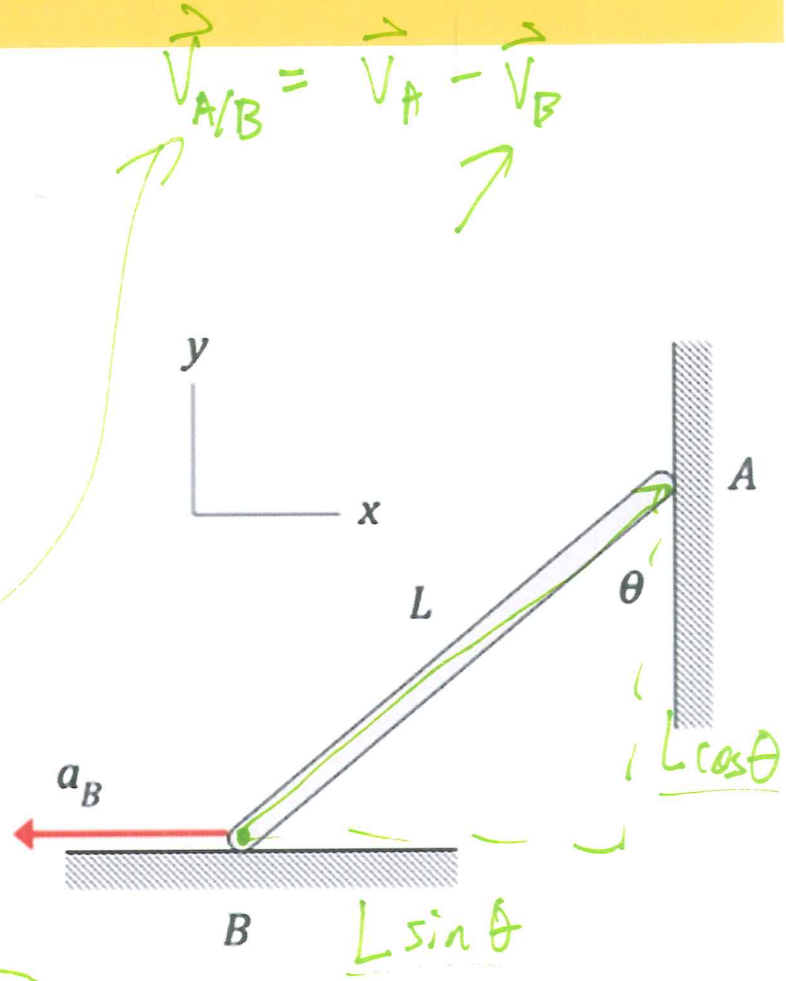


Figure (d)



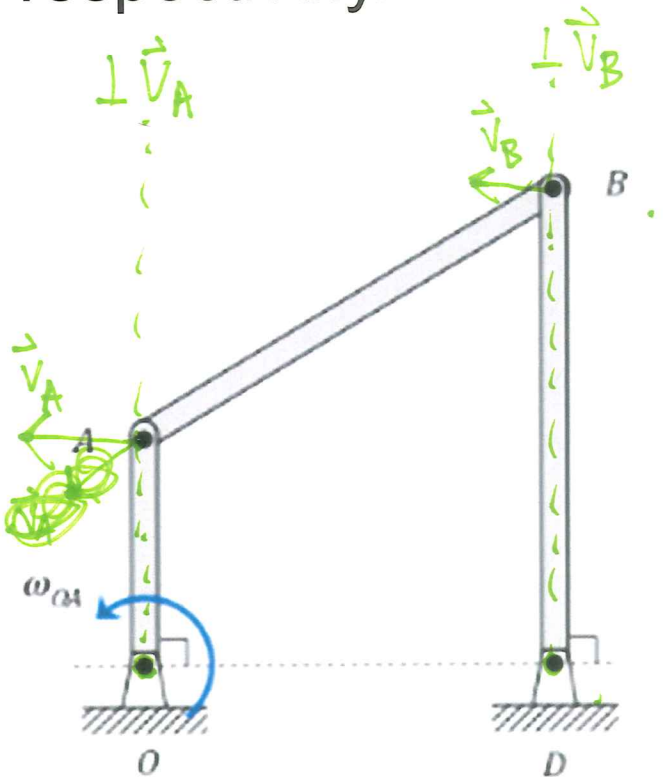
Question #5

- Bar AB moves with end B sliding along a flat horizontal surface, and end A sliding along a flat vertical wall. The bar is at rest, and end B is known to have an acceleration of a_B to the left.
- What is the correct expression below for the vector $\vec{r}_{A/B}$?
  - (a) $\vec{r}_{A/B} = -L\sin\theta\,\hat{\imath} + L\cos\theta\,\hat{\jmath}$
  - (b) $\vec{r}_{A/B} = -L\sin\theta\,\hat{\imath} - L\cos\theta\,\hat{\jmath}$
  - (c) $\vec{r}_{A/B} = +L\sin\theta\,\hat{\imath} - L\cos\theta\,\hat{\jmath}$
  - (d) $\vec{r}_{A/B} = +L\sin\theta\,\hat{\imath} + L\cos\theta\,\hat{\jmath}$



Questions #6

- A mechanism is made up of links OA, AB and BD. Link OA is rotating CCW with a rate of ω_{OA}. Let ω_{AB} and ω_{BD} be the angular speeds of links AB and BD, respectively. What is the value of ω_{AB}?
  - (a) $\omega_{AB} > 0$
  - (b) $\omega_{AB} < 0$
  - (c) $\omega_{AB} = 0$
  - (d) Not enough information



$\vec{r}_{A/IC} = \infty$

$\omega = \frac{|\vec{V}_A|}{|\vec{r}_{A/IC}|} = 0$

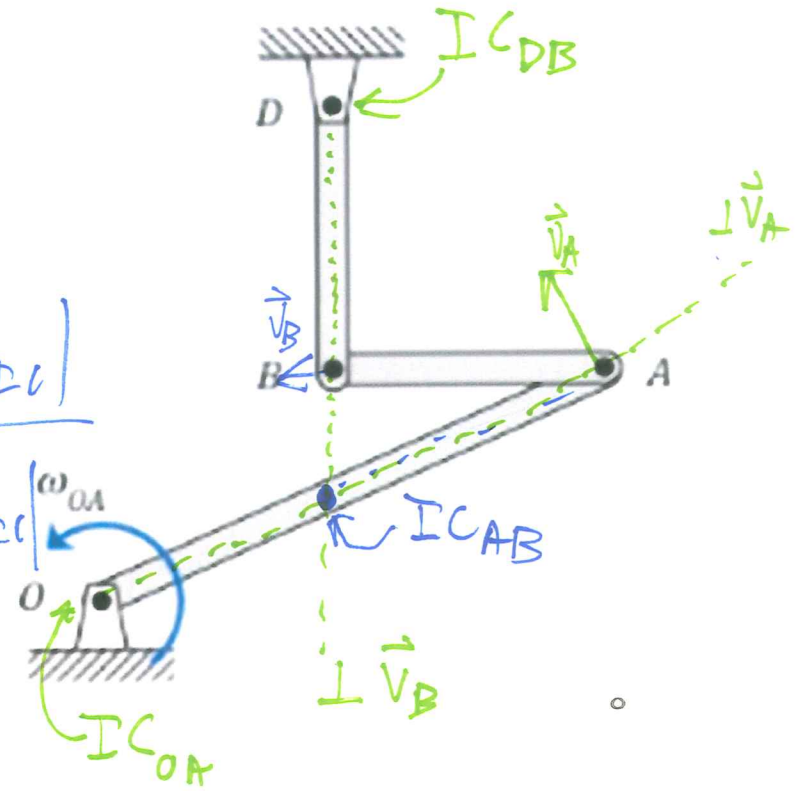
Questions #7

- A mechanism is made up of links OA, AB and BD. Link OA is rotating CCW with a rate of ω_{OA}. The figure provided has been drawn to scale. Let v_A and v_B be the speeds of pins A and B, respectively. Also, let ω_{AB} and ω_{BD} be the angular speeds of links AB and BD, respectively. Choose the response below that describes the relative sizes of v_A and v_B
  - (a) $v_A > v_B$
  - (b) $v_A = v_B$
  - (c) $v_A < v_B$
  - (d) Not enough information

$$|\vec{V}_B| = \omega_{AB} |\vec{r}_{B/IC_{AB}}|$$

$$|\vec{V}_A| = \omega_{AB} |\vec{r}_{A/IC_{AB}}|$$

$$\frac{|\vec{V}_B|}{|\vec{V}_A|} = \frac{|\vec{r}_{B/IC}|}{|\vec{r}_{A/IC}|}$$



Questions #8

- A mechanism is made up of links OA, AB and BD. Link OA is rotating CCW with a rate of ω_{OA}. The figure provided has been drawn to scale. Let v_A and v_B be the speeds of pins A and B, respectively. Also, let ω_{AB} and ω_{BD} be the angular speeds of links AB and BD, respectively. Choose the response below that describes the rotation direction of member AB.
  - (a) CCW
  - (b) CW
  - (c) Link AB is not rotating
  - (d) not enough information