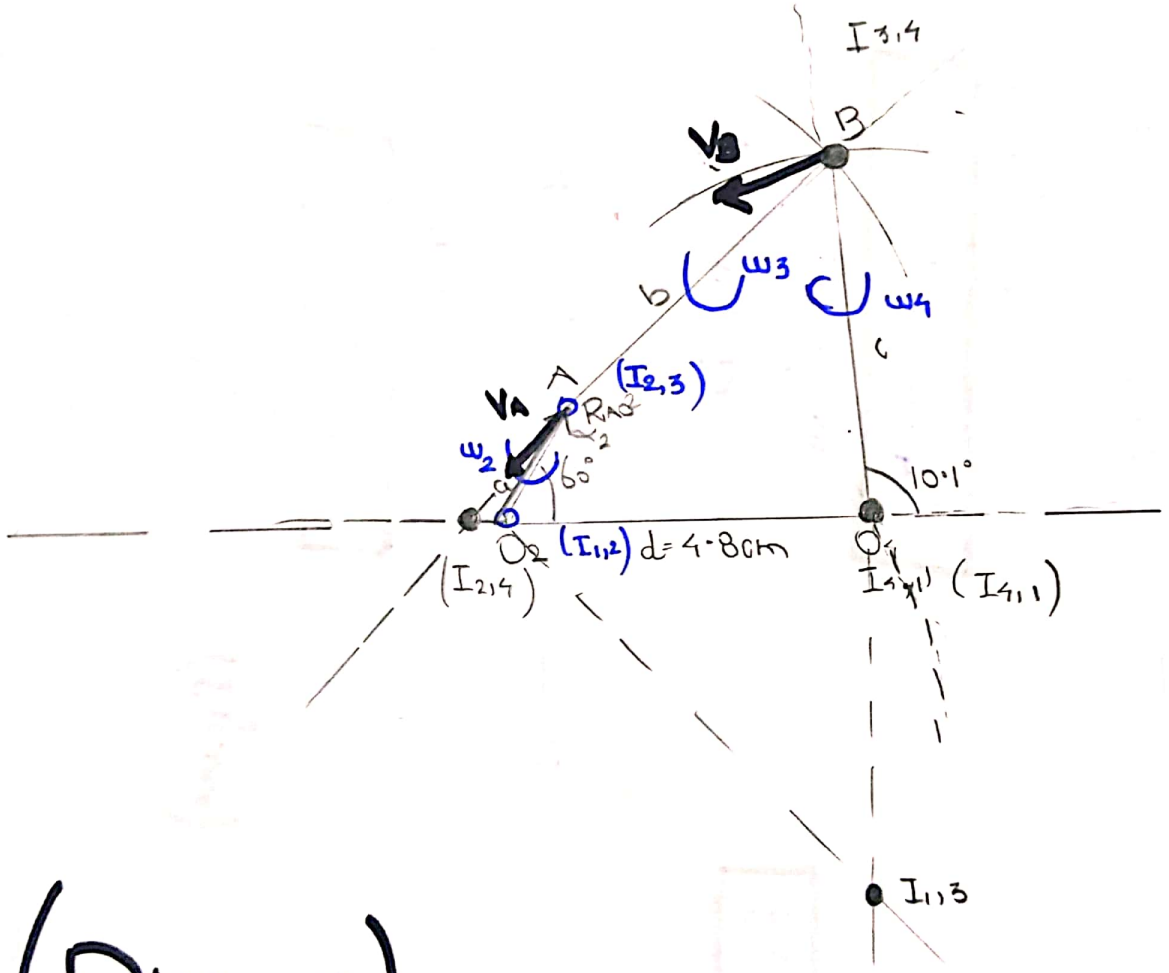
Velocity Analysis



(Diagram)

Given

$\omega_2 = 1.5 \text{ rad/s}$

$\alpha_2 = 1 \text{ rad/s}^2$

$a = 1.65, \quad b = 4.65, \quad c = 5, \quad d = 4.8$

$\theta_2 = 60^\circ, \quad \theta_4 = 10.1^\circ$

As $c = \frac{n(n-1)}{2} \rightarrow c = \frac{4(3)}{2}$

$c = 6$

↓

Six centre

Velocity Analysis

$|V| = V = r\omega$

→ Draw velocity vector V_A with its length equal to its magnitude V_A

$V_A = \alpha \omega_2$ (Ignore)

$= (1)(1.5)$

$\boxed{V_A = 1.5 \text{ m/s}}$

→ We Know that

$V_B = V_A + V_{BA} \quad — (1)$

$V_A = \omega_2 \cdot R_{AO_2}$

$\boxed{R_{AO_2} = 1.65}$

$V_A = (1.5) \cdot (1.65)$

$\boxed{V_A = 2.475 \text{ m/s}}$

Now using for

$V_A = \omega_3 \cdot R_{A(1,3)}$

We can find ω_3 since we know value of V_A

$\omega_3 = V_A / R_{A(1,3)}$

$\omega_3 = 2.475 / 6.2$

$\boxed{\omega_3 = 0.4 \text{ rad/s}}$

$$V_B = \omega_3 \cdot R_{BI(1,3)}$$

$$V_B = (0.4)(4.6)$$

$$\boxed{V_B = 1.89 \text{ m/s}}$$

$$\boxed{R_{BI(1,3)} = 4.6}$$

Now using V_B for ω_4

$$V_B = \omega_4 R_{BI(1,4)}$$

$$\omega_4 = V_B / R_{BI(1,4)}$$

$$\omega_4 = 1.89 / 5$$

$$\boxed{\omega_4 = 0.385 \text{ rad/s}}$$

$$V_{BA} = V_B - V_A \quad -(1)$$

Using $V_A = 2.4$ in (1)

$$V_{BA} = 1.89 - 2.4$$

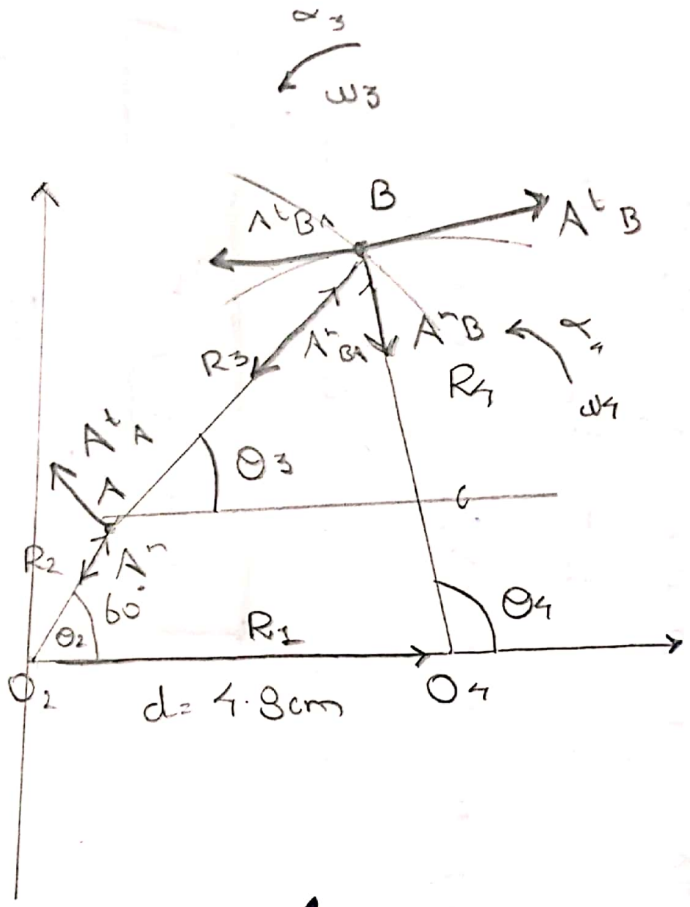
V_{BA} = As value is -ive So directions will be reversed.

$$V_{AB} = 2.4 - 1.89$$

(V_A, V_B)

$$\boxed{V_{AB} = 0.6 \text{ m/s}}$$

Acceleration Analysis



(Diagram)

$A_A^n = R_{AO_2} (\omega_2)^2$

We know that

$A_A^n = (1.65)(1.5)^2$

$A_A^n = 3.71 \text{ m/s}^2$

$A_A^t = R_{AO_2} \alpha_2$

$= (1.65)(1)$

$A_A^t = 1.65 \text{ m/s}^2$

$A_A = A_A^n + A_A^t = 3.71 + 1.65$

$\boxed{A_A = 5.36 \text{ m/s}^2}$

$A_B^t = 1.4 \text{ m/s}^2$

$A_B^n = R_{BO_4} \omega_4^2$

$= (5)(0.39)^2$

$A_B^n = 0.72 \text{ m/s}^2$

$A_B = A_B^n + A_B^t$

$A_B = 1.4 + 0.72$

$\boxed{A_B = 2.12 \text{ m/s}^2}$

$A_{BA}^n = R_{BA} \omega_3^2 = (4.65)(0.4)^2$

$A_{BA}^n = 0.77 \text{ m/s}^2$

$A_{BA}^t = 1.5 \text{ m/s}^2 \longrightarrow A_{BA} = A_{BA}^n + A_{BA}^t$

$\boxed{A_{BA} = 2.5 \text{ m/s}^2}$

$\alpha_3 = A_{BA}^t / R_{BA} = 1.5 / 4.65 = \boxed{0.96 \text{ rad/s}^2}$

$\alpha_4 = A_{B4}^t / R_{BO_4} = 1.4 / 5 = \boxed{0.28 \text{ rad/s}^2}$

Hence all values have been found.