(p162 in 4th ed.)

PROBLEM 1: Problem 3.26 (p139)

Given:

$R_{Ao2} = 0.25$ m

$\omega_2 = 36$ rad/s ccw

$\vec{V_4} = ?$

Scale: 1 cm = 1 m/s

Solution :

Figure P3.26 $R_{AO_2} = 250$ mm.
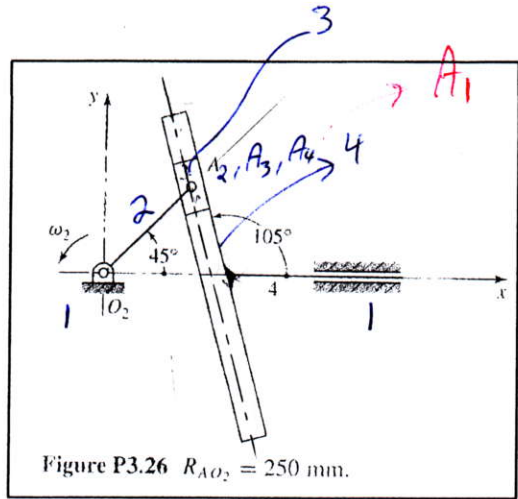
$* \quad \vec{V}_{A_2} = \vec{V}_{O_2} + \underbrace{\vec{\omega}_2 \times \vec{R}_{A_2 O_2}}_{\vec{V}_{A_2} \perp \vec{R}_{A_2 O_2}}$

$\vec{V}_{A_2} = \omega_2 R_{A_2 O_2} = 36 \times 0.25 = 9 \, m/s$

$* \quad \vec{V}_{A_3} = \vec{V}_{A_2}$

$* \quad \vec{V}_{A_4} = \vec{V}_{A_3} + \underbrace{\vec{V}_{A4/3}}_{\text{// axis of slot in link 4}}$

$* \quad \vec{V}_{A_4} = \vec{V}_{A_1} + \underbrace{\vec{V}_{A4/1}}_{\hookrightarrow \text{horizontal}}$

$\Rightarrow \boxed{V_{A_4} = 4.7 \times 1 = 4.7 \, m/s} \leftarrow$

$\vec{V}_{A4/3}$

A_2, A_3

$\vec{V}_{A_2} = \vec{V}_{A_3}$

$\vec{V}_{A4/3}$

A_4

$\vec{V}_{A_4}$

O_v

O_2

A_1

1
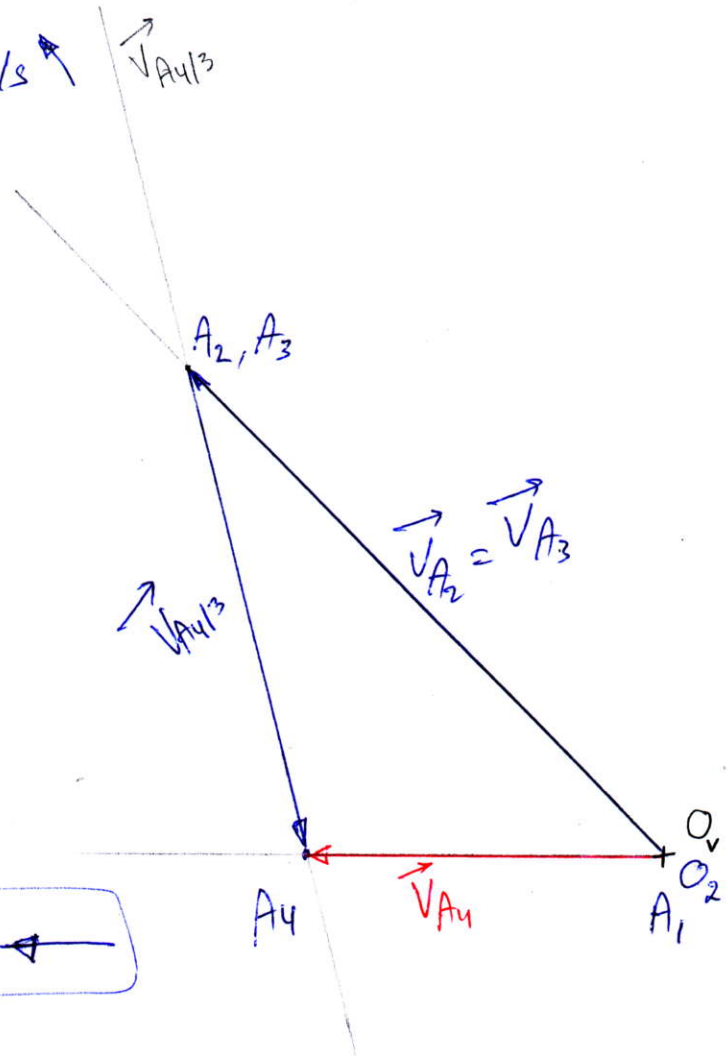
This problem is not illustrated in 4th ed.

PROBLEM 2: Problem 3.28 (p139)

Given

ω_2 = 30 rad/s cw

ω_3 = 20 rad/s cw

Position Scale: 1 cm = 2 cm

Velocity Scale: 1cm = 20 cm/s

Solution:

$n = 4$, $j_1 = 2$, $j_2 = 2$

$m = 3(4-1) - 2(2) - 2 = 3$

$*$ $\vec{V}_{P_2} = \cancel{\vec{V}_{A_2}}^0 + \vec{\omega}_2 \times \vec{R}_{P_2 A_2}$

$\vec{V}_{P_2} = 30 \times 2.7 \times 2 = 162 \ cm/s$

$*$ $\vec{V}_{P_3} = \cancel{\vec{V}_B} + \vec{V}_{P_3 B} \Rightarrow V_{P_3} = \omega_3 \times R_{P_3 B} = 204 \ cm/s$

$*$ $\vec{V}_{P_4} = \vec{V}_{P_2} + \vec{V}_{P_4/2}$

// link 2

$*$ $\vec{V}_{P_4} = \vec{V}_{P_3} + \vec{V}_{P_4/3}$

// link 3

$\Rightarrow |\vec{V}_{P_4}| = 11.65 \times 20$

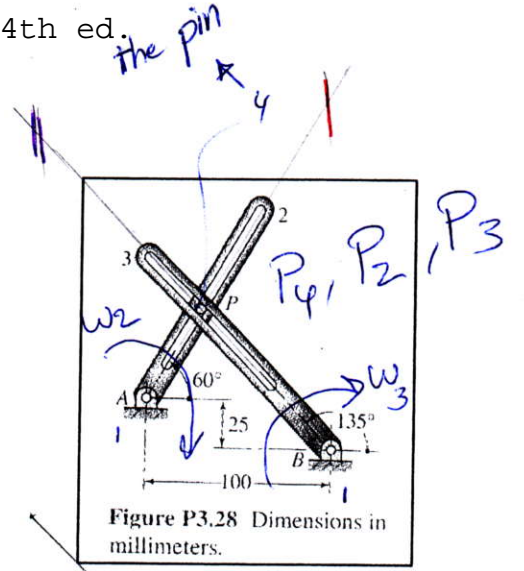$= 233 \ cm/s$ ➤

$\vec{V}_{P_4} = ?$

the pin

$R_{PA} = 2.7 \times 2$

$R_{PB} = 5.1 \times 2$

Figure P3.28 Dimensions in millimeters.