

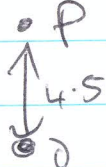
Plane

Rel Vel

1980

(2)

out. $O \rightarrow P$



$$\vec{v}_w = 8\sqrt{2}\hat{i} - 8\sqrt{2}\hat{j}$$

$$\vec{v}_a = a\hat{i} + \hat{j}$$

$$\vec{v}_{aw} = 18\cos\theta\hat{i} + 18\sin\theta\hat{j}$$

θ = angle \vec{v}_{aw} with horizontal, \leftarrow or sense.

$b=0$

$$\therefore \vec{v}_{aw} = \vec{v}_a - \vec{v}_w$$

$$18\cos\theta\hat{i} + 18\sin\theta\hat{j} = -8\sqrt{2}\hat{i} + 8\sqrt{2}\hat{j} + \hat{j}$$

$$\therefore 18\cos\theta = -8\sqrt{2}$$

$$\Rightarrow \theta = 128.9^\circ$$



$$18\sin\theta = 8 + 8\sqrt{2}$$

$$\Rightarrow 18(\sin\theta) = 8 + 8\sqrt{2}$$

$$\Rightarrow 14 = 8 + 8\sqrt{2}$$

$$\Rightarrow b = 14 - 8\sqrt{2}$$

$$b = 2.69$$

$$\therefore \text{Time} = \frac{4.5}{\text{Rel Vel}} = \frac{4.5}{2.69} = 1.67 \text{ hrs} = 100 \text{ minutes}$$

P to O: $\vec{v}_w = 8\sqrt{2}\hat{i} - 8\sqrt{2}\hat{j}$

$$\vec{v}_a = -a\hat{j}$$

$$\vec{v}_{aw} = 18\cos\theta\hat{i} + 18\sin\theta\hat{j}$$

again $\vec{v}_{aw} = \vec{v}_a - \vec{v}_w$

$$\Rightarrow \hat{i}: 18\cos\theta = -8\sqrt{2} \Rightarrow \theta = 128.9^\circ \text{ or } 231.1$$

$$\text{and } \hat{j}: 18\sin\theta = +8\sqrt{2} - a$$

$$\Rightarrow -18(\sin\theta) = 8\sqrt{2} - a$$

$$\Rightarrow -14 = 8\sqrt{2} - a$$

$$\Rightarrow 28\sqrt{2} = a - 14$$

$$\therefore a = 8\sqrt{2} + 14$$

$$\therefore \text{Time} = \frac{4.25}{8\sqrt{2} + 14} = \frac{4.25}{33.8} = 0.125 \text{ hrs} = 7.5 \text{ minutes}$$