

Ozon ATLAN

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1)

a)

$$\Sigma m v_1 + \Sigma \text{Imp}_{1 \rightarrow 2} = m v_2$$

$$m v_0 \cos 30^\circ + 0 = (m + M) v_2$$

$$(0,025) \cdot (368,06) = (2,5 + 0,025) \cdot v_2$$

$$v_{\text{son}} = 3,644 \text{ m/s}$$

b)

$$-m_m \cdot v_m \cdot \sin 30 + R_x \Delta t = m v_x$$

$$-0,025 \cdot 425 \cdot \sin 30 + R_x \Delta t = m \cdot 0$$

$$R_x \cdot \Delta t = 5,3125 \text{ Kg} \cdot \text{s}$$

$$m_m \cdot v_m \cdot \cos 30 - R_y \Delta t = m \cdot v_y$$

$$(0,025) \cdot 425 \cdot \cos 30 - R_y \cdot \Delta t = (0,025) \cdot (3,644)$$

$$R_y \cdot \Delta t = 9,11 \text{ Kg} \cdot \text{s}$$



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2)

$$a) r_{B/D} = (360 \times 10^{-3} \text{ m}) (-\cos 30^\circ i + \sin 30^\circ j) \\ = (-0,3117 i + 0,18 j)$$

$$v_D = 1,6 j$$

$$-v_{Bi} = v_D + (\omega_{ABD} \cdot k \times r_{B/D})$$

$$v_B = v_D + v_{D/D}$$

$$-v_i = 1,6 j + (\omega_{ABD} \cdot k \times (-0,3117 i + 0,18 j)) \\ = 1,6 j - 0,3117 \omega_{ABD} j - 0,18 \omega_{ABD} i$$

$$-v_B = -0,18 \omega_{ABD}$$

$$0 = 1,6 - 0,3117 \omega_{ABD}$$

$$v_B = 0,18 \omega_{ABD}$$

$$\omega_{ABD} = \frac{1,6}{0,3117} = \omega_{ABD} = 5,133 \text{ rad/s}$$

$$\boxed{\omega_{AD} = 5,133 \text{ rad/s}}$$

$$b) v_B = 0,18 \times \omega_{ABD}$$

$$\boxed{v_B = 0,924 \text{ m/s}}$$

$$c) v_A = \bar{CA} \times \omega_{ABD} \Rightarrow \bar{CA}^2 = (\bar{AE})^2 + (CE)^2 \\ \bar{CA}^2 = (240 \cdot \cos 30^\circ)^2 + ((240 + 360) \sin 30^\circ)^2 \\ \bar{CA} = \sqrt{207,85^2 + 300^2}$$

$$\boxed{\bar{CA} = 0,365}$$

$$\tan \alpha = \frac{AE}{CE}$$

$$\tan \alpha = \frac{240 \cos 30^\circ}{240 + 360 \sin 30^\circ}$$

$$\tan \alpha = \frac{207,85}{300}$$

$$\alpha = \tan^{-1}(0,6928) = \boxed{\alpha = 34,71^\circ}$$

$$v_A = \bar{CA} \times \omega_{ABD}$$

$$= 0,365 \times 5,133$$

$$\boxed{v_A = 1,873 \text{ m/s}}$$

[Signature]