

Nama : Muchammad Daniyal Kautsar

NIM : 21/479067 / TK / 52800

Prodi : Teknologi Informasi

Asesmen Fisika Mekanika Klasik

Kinematika 1Mobil A $\rightarrow v_A = 72 \text{ km/jam} = 20 \text{ m/s}$ Mobil B $\rightarrow v_{0B} = 0$; $a = 5.0 \text{ m/s}^2$

Perlu berapa meter hingga kedua mobil sejajar?

$$s = v_A \cdot t$$

$$s = v_{0B} \cdot t + \frac{1}{2} \cdot a \cdot t^2$$

$$v_A t = v_{0B} \cdot t + \frac{1}{2} a t^2$$

$$20 \cdot t = 0 \cdot t + \frac{1}{2} \cdot 5.0 t^2$$

$$20t = \frac{1}{2} \cdot 5t^2$$

$$40t = 5t^2$$

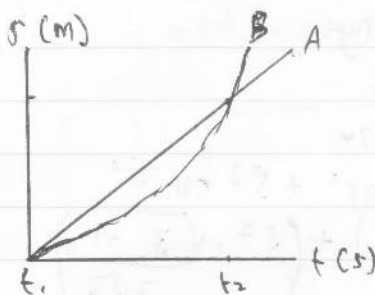
$$8 = t$$

$$s = v_A \cdot t$$

$$= 20 \cdot t$$

$$= 20 \cdot 8 = 160$$

$$= 1,6 \cdot 10^2 \text{ m (2 angka penting)}$$



A merupakan model kecepatan konstan

B merupakan model percepatan konstan

Kinematika 2Panjang kaki = $0,7 \text{ m}$. $a = 35 \text{ m/s}^2$; Titik nol ketika kaki lurus.

Tentukan tinggi maksimal antelope dan ilustrasi dengan diagram.

* Posisi jongkok hingga kaki lurus

$$v_f^2 = v_0^2 + 2as$$

$$v_f^2 = 0 + 2 \cdot 35 \cdot 0,7$$

$$v_f^2 = 70 \cdot 0,7$$

$$v_f = 7 \text{ m/s}$$

* Kaki lurus hingga melompat, asumsi $g = 10 \text{ m/s}^2$

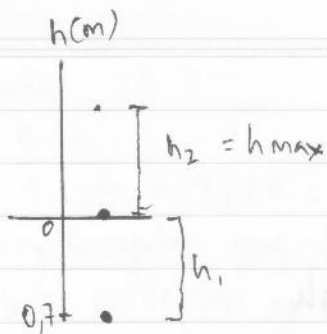
$$v_f^2 = v_0^2 - 2gs$$

$$0 = 7^2 - 2 \cdot 10 \cdot s$$

$$20s = 49$$

$$s = \frac{49}{20} = 2,45 \text{ m}$$

Date

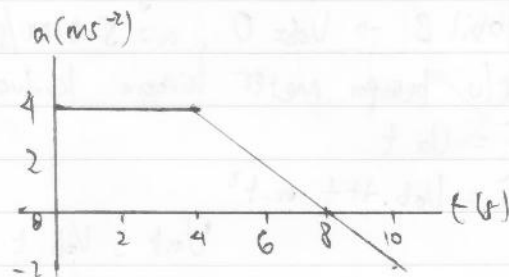


Muchammad Danigal Kharan
21/479067/TK/52800

Kinematika 3

$$V_0 \text{ bola} = 36 \text{ km/jam} = 10 \text{ m/s}$$

Berapa kec pada detik 8?



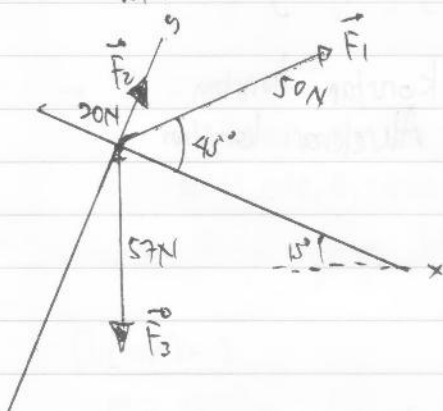
→ kec detik ke 4.

$$\begin{aligned} V_4 &= V_0 + a \cdot t \\ &= 10 + 4 \cdot 4 \\ &= 26 \text{ m/s} \end{aligned}$$

→ kec detik ke 8

$$\begin{aligned} V_8 &= V_4 + a \cdot t \\ &= 26 + \frac{4}{2} \cdot 4^2 \\ &= 26 + 8 = 34 \text{ m/s} \end{aligned}$$

Vektor 1



Tentukan resultan vektornya

$$\begin{aligned} \Sigma R_x &= F_{1x} + F_{3x} \\ &= 50 \cos 45^\circ + 57 \cos 75^\circ \\ &= \left(50 \cdot \frac{\sqrt{2}}{2} \right) + \left(57 \cdot \frac{\sqrt{3}-1}{2\sqrt{2}} \right) \\ &= \frac{100\sqrt{2} + 57\sqrt{6} - 57\sqrt{2}}{4} \\ &= \frac{43\sqrt{2} + 57\sqrt{6}}{4} \end{aligned}$$

$$\begin{aligned} \Sigma R_y &= F_{1y} + F_2 - F_{3y} \\ &= 50 \sin 45^\circ + 20 - 57 \sin 75^\circ \\ &= 50 \cdot \frac{\sqrt{2}}{2} + 20 - \left(57 \cdot \frac{\sqrt{3}+1}{2\sqrt{2}} \right) \\ &= \frac{100\sqrt{2} + 40 - 57\sqrt{6} - 57\sqrt{2}}{4} \\ &= \frac{43\sqrt{2} + 40 - 57\sqrt{6}}{4} \end{aligned}$$

$$R = \sqrt{\sum R_x^2 + \sum R_y^2}$$

$$R = \sqrt{\left(\frac{43\sqrt{2} + 57\sqrt{6}}{4}\right)^2 + \left(\frac{43\sqrt{2} + 80 - 57\sqrt{6}}{4}\right)^2} \quad ; \text{ misal } a = 43\sqrt{2}$$

$$b = 57\sqrt{6}$$

$$R = \sqrt{\frac{(a+b)^2 + (80+a-b)^2}{4}}$$

$$= \sqrt{\frac{a^2 + b^2 + 2ab + a^2 + b^2 - 2ab + 160(a-b)}{4}}$$

$$= \sqrt{\frac{2(a^2 + b^2) + 160(a-b)}{4}}$$

$$= \sqrt{\frac{2((43\sqrt{2})^2 + (57\sqrt{6})^2) + 160(43\sqrt{2} - 57\sqrt{6})}{4}}$$

$$= \sqrt{\frac{2(3698 + 19494) + 160(60,8 - 129,8)}{4}}$$

$$= \sqrt{\frac{2(23192) + 160(-69)}{4}}$$

$$= \sqrt{\frac{46384 - 11040}{4}}$$

$$= \sqrt{\frac{35344}{4}} = 188/4 = 47 \text{ N}$$

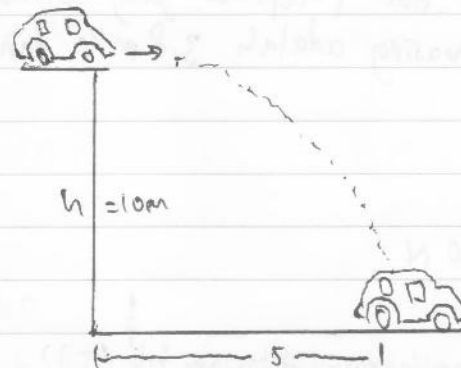
Kinematika 20 1

$$v_x = 72 \text{ km/jam} = 20 \text{ m/s}$$

$$h = 10 \text{ m}$$

$$\text{Asumsi } g = 10 \text{ m/s}^2$$

Berapa jauh mobil akan mendarat?



$$\rightarrow h = \frac{1}{2} g t^2 \Leftrightarrow t = \sqrt{\frac{2h}{g}}$$

$$s = v_x \cdot t$$

$$s = v_x \cdot \sqrt{\frac{2h}{g}}$$

$$s = 20 \cdot \sqrt{\frac{2 \cdot 10}{10}}$$

$$s = 20 \cdot \sqrt{2} \text{ m}$$

\therefore Mobil akan mendarat sejauh $20\sqrt{2}$ meter.

Kinematika 20 2

$$f = 2400 \text{ rpm} = 2400/60 = 40 \text{ Hz}$$

$$\text{diameter} = 4.0 \text{ cm}; r = 4/2 = 2.0 \text{ cm} = 2.0 \cdot 10^{-2} \text{ m}$$

Berapa v linear (v) pada permukaan poros?

$$\rightarrow v = \omega \cdot r$$

$$= 2\pi f r = 2 \cdot \pi \cdot 2 \cdot 10^{-2} \cdot 40$$

$$= 1,6\pi \text{ m/s}$$

$$= 1,6 \cdot 3,14 = 5,024 \text{ m/s}^2$$

$$\approx 5 \text{ m/s}^2$$



Kinematika 203

$$r = 9 \text{ m}$$

$$f = 4 \text{ rpm} = 4/60 = 0,067 \text{ Hz}$$

Hitung kecepatan yang dirasakan orang yang menaikinya.

Hitung percepatan yang dirasakan orang yang menaikinya.

$$\begin{aligned} \rightarrow v &= \omega r = 2\pi r f \\ &= 2\pi \cdot 9 \cdot 0,067 \\ &= 1,206 \pi \text{ m/s} \\ &= 3,78684 \approx 3,8 \text{ m/s} \end{aligned}$$

$$\rightarrow a = \frac{v^2}{r} = \frac{3,8^2}{9} = 1,60 \text{ m/s}^2$$

\therefore Kecepatan dan percepatan yang dirasakan orang yg menaikinya masing masing adalah $3,8 \text{ m/s}$ dan $1,6 \text{ m/s}^2$

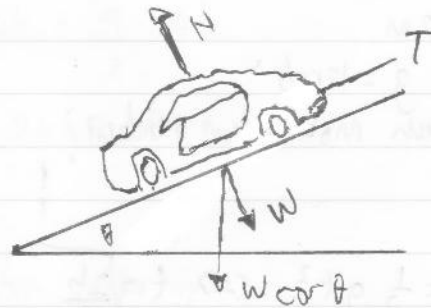


Dinamika 1

$$W = 15.000 \text{ N}$$

$$\theta = 20^\circ$$

Berapa gaya yang diterima tali (T)?



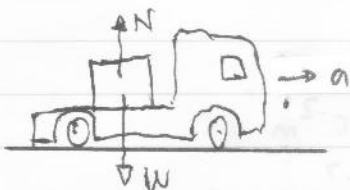
$$\begin{aligned} \rightarrow T &= W \cdot \sin \theta \\ &= 15.000 \cdot \sin 20^\circ \\ &\approx 15.000 \cdot 0,3420 \approx 5130 \text{ N} \end{aligned}$$

\therefore Gaya yang diterima tali adalah 5130 N

Dinamika 2

$$m = 100 \text{ kg}; \text{ siri} = 50 \text{ cm}$$

$$\mu_s = 0,4; \mu_k = 0,2$$



Hitung percepatan maksimal mobil agar balok tidak bergerak.

$$\mu_s = 0,4$$

$$\text{asumsi } g = 10 \text{ m/s}^2$$

$$\Sigma F = ma$$

$$f_s = m \cdot a$$

$$\mu_r \cdot N = m \cdot a$$

$$\mu_r \cdot m \cdot g = m \cdot a$$

$$0,4 \cdot 10 = a$$

$$a = 4 \text{ m/s}^2$$

\therefore percepatan maksimal mobil adalah 4 m/s^2