ML Physik, 62e, Do, 18.11.2010

(1) $g_{Mond} = 1.62\ N/kg$; $F_G = 100\ N$

$$F_G = g_{Mond} \cdot m \Rightarrow m = \frac{F_G}{g_{Mond}}$$

$$F_G(Erde) = m \cdot g_{Erde} = F_G \frac{g_{Erde}}{g_{Mond}} = \underline{\underline{605.5\ N}}$$

(2) $\rho_{Al} = 2'700\ kg/m^3$, $\rho_{Au} = 19'320\ kg/m^3$

$$\rho = \frac{m}{V} \Rightarrow V = \frac{m}{\rho}$$

$$V_{Al} = V_{Au}$$

$$\frac{m_{Al}}{\rho_{Al}} = \frac{m_{Au}}{\rho_{Au}} \quad / \cdot \rho_{Au}$$

$$\frac{\rho_{Au}}{\rho_{Al}} \cdot m_{Al} = m_{Au} = \underline{\underline{7.15\ kg}}$$

(3) $\longrightarrow$ Bleikugel, wenn gleich grosse Kugeln;

$r_1 = 1cm$ / $r_2 = 2cm$: $F_L = \frac{1}{2} c_w \rho_L \cdot A \cdot v^2 = mg$

$$\frac{1}{2} c_w \rho_L \cdot \pi R^2 v^2 = \rho \cdot \frac{4}{3} \pi R^3 g \quad / : R^2 : \pi$$

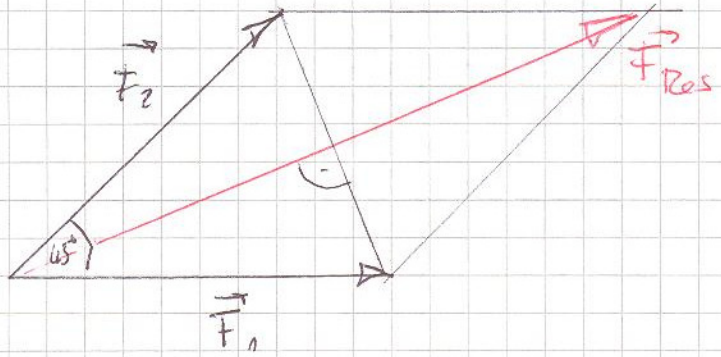
$$\frac{1}{2} c_w \rho_L v^2 = \rho \frac{4}{3} R g$$

$$v = \sqrt{\frac{8}{3} \frac{\rho R g}{c_w \rho_L}}$$

Pb, $R = 1cm$: $v = 71.41\ m/s$

Al, $R = 2cm$: $v = 49.27\ m/s$

(4)



(4) $\cos 22.5° = \frac{\frac{1}{2}F_{Res}}{200N}$ $\cdot 200N \cdot 2$

$460N \cdot \cos 22.5° = F_{Res} = \underline{\underline{369.55N}}$

(5) $E = P \cdot t = 160W \cdot 24h \cdot 14 = 53'760Wh$

$= 53.76 KWh$

à $10 Rp. = 5.376 Fr \hat{=} \underline{\underline{5.40 Fr}}$

(6) $P = \frac{E}{t}$, $E = E_{kin} = \frac{1}{2}mv^2$, $t = 10s$

$P = \frac{mv^2}{2 \cdot 10s} = \frac{800kg \cdot (55.5)^2}{2 \cdot 10s} = \underline{\underline{123.46 KW}}$

(7) $E_{kin} = E_{Reibung} = f_{ge} \cdot m \cdot g$

$\frac{1}{2}mv^2 = f_{ge} \cdot m \cdot g \cdot s$

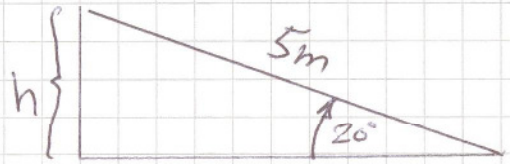
$v^2 = 2 f_{ge} \cdot g \cdot s$

$v = \sqrt{2 f_{ge} \cdot g \cdot s}$

$= \sqrt{2 \cdot 0.5 \cdot 9.81 \cdot 100m} \hat{=} 31.32 m/s$

$\hat{=} \underline{\underline{112.76 km/h}}$

(8)



$\sin 20° = \frac{h}{5m}$

$5m \cdot \sin 20° = h = 1.71m$

a) $\frac{1}{2} m v^2 = mgh \quad / : m$

$\frac{1}{2} v^2 = gh$

$v^2 = 2gh$

$v = \sqrt{2gh} = \sqrt{2g \cdot 5 \cdot \sin 20°}$

$= \sqrt{10g \cdot \sin 20°} \cong \underline{\underline{5.79 \, m/s}}$

b) $E_{pot} = E_{Reib}$

$mgh = F_{Reib} \cdot s$

$m \cdot g \cdot 5 \cdot \sin 20° = m \cdot g \cdot f_{st} \cdot s \quad / : (mg)$

$5 \cdot \sin 20° = f_{st} \cdot s$

$\frac{5 \cdot \sin 20°}{f_{st}} = s \cong \underline{\underline{8.55m}}$