

514

$$m = 18 \text{ kg}$$

$$s = 30 \text{ m}$$

$$\mu = 0.08$$

$$v = ?$$

$$W = F \cdot s$$

$$F = \mu \cdot F_N$$

$$W = \frac{mv^2}{2}$$

$$F_N = mg$$

$$v^2 = \frac{2W}{m} = \frac{2}{m} F \cdot s = \frac{2s}{m} \mu mg = 2s\mu g$$

$$v = \sqrt{2s\mu g} = \sqrt{2 \cdot 30 \cdot 0.08 \cdot 9.82} =$$

$$v = \sqrt{47.136} = 6.7 \text{ m/s}$$

515

$$W = mgh \approx 20000$$

$$P = \frac{W}{t} = \frac{20000}{40} = 500 \text{ W}$$

516

$$W = mgh$$

$$P = \frac{W}{t}$$

$$m = 80 \text{ kg}$$

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

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

$$t = 3 \text{ s}$$

$$P = \frac{80 \cdot 10 \cdot 10}{3} \approx 2667 \text{ W}$$

517

$$W_k = \frac{mv^2}{2}$$

$$P = \frac{W}{t}$$

$$m = 82 \text{ kg}$$

$$v = 11 \text{ m/s}$$

$$t = 4.5 \text{ s}$$

$$P = \frac{82 \cdot 11^2}{2 \cdot 4.5}$$

$$P = 1102 \text{ W} = 1.1 \text{ kW}$$

518

$$P = \frac{W_p}{t} = \frac{mgh}{t} = \frac{68 \cdot 10 \cdot 1.1}{0.15}$$

$$P = 4987 \text{ W} \approx 5 \text{ kW}$$

519

$$W = 80 \cdot mgh \quad m = 66 + \frac{1000}{80}$$

$$W = 80 \cdot 10 \cdot 3 \left(66 + \frac{1000}{80} \right) \quad h = 3 \text{ m}$$

$$W = 188 \text{ kJ}$$

a)

Om människans verklings-
grad $\eta = 0,25$ måste han
äta matvarande

$$\frac{188}{0,25} = 752 \text{ kJ}$$

b)

$$P = \frac{188 \text{ kJ}}{3600} = 52 \text{ W}$$

$$P = \frac{W_{\text{nyttig}}}{t}$$

520 Om den blir varmare innebär det större värmeförluster $\Leftrightarrow$ sämre verkningsgrad.

521 $P_{\text{motor}} = 90 \text{ W}$

$$P_{\text{lyft}} = \frac{W_p}{t} = \frac{80 \cdot 10 \cdot 0.4}{4} = 80 \text{ W}$$

$$\eta = \frac{80}{90} = 89\%$$

522

$$W_{\text{nyttig}} = \text{verkningsgrad} \cdot \text{mängd bensin} \cdot \text{energin}$$

$$W_{\text{nyttig}} = 0.35 \cdot 0.1 \cdot 31 \text{ MJ} = 108 \text{ kJ}$$

$$W_k = \frac{m v^2}{2} = \frac{1500}{2} \left(\frac{70}{3.6} \right)^2$$

$$W_k = 283 \text{ kJ}$$

Svar: Nej det behövs mer än dubbelt så mycket bensin.