

1. a) kleiner

b) grösser

2. a) $W = F \cdot s = 90 \text{ N} \cdot 40 \text{ m} = \underline{3'600 \text{ J}}$ $P = \frac{W}{t} = \frac{3600 \text{ J}}{30 \text{ s}} = \underline{120 \text{ W}}$

b) $W = F \cdot s = 180 \text{ N} \cdot 40 \text{ m} = \underline{7'200 \text{ J}}$ $P = \frac{W}{t} = \frac{7200 \text{ J}}{60 \text{ s}} = \underline{120 \text{ W}}$

c) $W = F \cdot s = 180 \text{ N} \cdot 20 \text{ m} = \underline{3'600 \text{ J}}$ $P = \frac{W}{t} = \frac{3600 \text{ J}}{25 \text{ s}} = \underline{144 \text{ W}}$

3. a) **Christine** verrichtet **Hubarbeit** an **sich selbst**.

b) $W_{\text{Hub}} = m \cdot g \cdot h = 45.7 \text{ kg} \cdot 9.81 \frac{\text{N}}{\text{kg}} \cdot 607 \text{ m} = 272'000 \text{ J} = \underline{272 \text{ kJ}}$

c) $P = \frac{W}{t} = \frac{272'000 \text{ J}}{3600 \text{ s}} = \underline{75.6 \text{ W}}$

4. a) **Der Automotor** verrichtet **Beschleunigungsarbeit** am **Auto**.

b) $W_{\text{Beschleunigung}} = \frac{1}{2} \cdot m \cdot v^2 = \frac{1}{2} \cdot 1'200 \text{ kg} \cdot (27.8 \frac{\text{m}}{\text{s}})^2 = \underline{463 \text{ kJ}}$

c) $P = \frac{W}{t} = \frac{463 \text{ kJ}}{10 \text{ s}} = \underline{46.3 \text{ kW}}$

5. a) **Ken** verrichtet **Spannarbeit** an **der Feder**.

b) $W_{\text{Spann}} = \frac{1}{2} \cdot D \cdot s^2 = \frac{1}{2} \cdot 450 \frac{\text{N}}{\text{m}} \cdot (0.024 \text{ m})^2 = \underline{0.13 \text{ J}}$

c) $P = \frac{W}{t} = \frac{0.13 \text{ J}}{0.2 \text{ s}} = \underline{0.65 \text{ W}}$

6. $P = \frac{W_{\text{Hub}}}{t} = \frac{m \cdot g \cdot h}{t} = \frac{75.0 \text{ kg} \cdot 9.81 \frac{\text{N}}{\text{kg}} \cdot 1.00 \text{ m}}{1.00 \text{ s}} = \underline{736 \text{ W}}$

7. $W = P \cdot t = 60 \text{ W} \cdot 3600 \text{ s} = \underline{216 \text{ kJ}}$

8. a) $F_L = \frac{1}{2} \cdot c_W \cdot \rho_{\text{Luft}} \cdot v^2 \cdot A = \frac{1}{2} \cdot 1 \cdot 1.29 \frac{\text{kg}}{\text{m}^3} \cdot \left(\frac{24.1}{3.6} \frac{\text{m}}{\text{s}} \right)^2 \cdot 0.50 \text{ m}^2 = 14.453 \text{ N} = \underline{\underline{14 \text{ N}}}$

b) $s = v \cdot t = 6.7 \frac{\text{m}}{\text{s}} \cdot 1.0 \text{ s} = \underline{\underline{6.7 \text{ m}}}$

c) $W = F \cdot s = 14.45 \text{ N} \cdot 6.7 \text{ m} = 96.83 \text{ J} = \underline{\underline{97 \text{ J}}}$

d) $P = \frac{W}{t} = \frac{96.83 \text{ J}}{1.0 \text{ s}} = 96.83 \text{ W} = \underline{\underline{97 \text{ W}}}$

9. $t = \frac{W_{\text{Hub}}}{P} = \frac{m \cdot g \cdot h}{P} = \frac{48 \text{ kg} \cdot 9.81 \frac{\text{m}}{\text{s}^2} \cdot 8.0 \text{ m}}{320 \text{ W}} = \underline{\underline{12 \text{ s}}}$

10. $P \cdot t = W = F \cdot s \Rightarrow s = \frac{P \cdot t}{F} = \frac{500 \text{ W} \cdot 3600 \text{ s}}{200 \text{ N}} = \underline{\underline{9.00 \text{ km}}}$