4. DYNAMIKA: Tarcie. Praca, moc, energia - odpowiedzi

4.1. a) $F_H = \frac{mV_1}{t_1}$; b) $F_H = \frac{mV_1}{t_2}$

4.2. $F = g(M + m)(\mu_{DW} + \mu_{DS})$

4.3. a) $\alpha = \mathrm{arctg}\left(\frac{v^2}{Rg}\right)$; b) $\mu = \frac{v^2}{Rg}$

4.4. $\mu_S = \frac{F_S}{mg} = 0{,}5$; $\mu_K = \frac{F_K}{mg} = 0{,}15$

4.5. $S = \frac{v_0^2}{2\mu g}$

4.6. $a = \frac{F}{m}\cos\alpha - \mu\left(g - \frac{F}{m}\sin\alpha\right) = 3{,}96\,\frac{m}{s^2}$

4.7. $a = g\,\frac{m_2 - \mu m_1}{m_1 + \mu m_2}$

4.8. $v = \sqrt{2\mu g l}$

4.9. droga hamowania nie zależy od masy: $S = \frac{v^2}{2\mu g}$ (por. zadanie 4.5)

4.10. $m = \frac{2W}{v^2}$

4.11. $a = \frac{2l}{\Delta t^2}$; $F = \frac{2ml}{\Delta t^2}$; $P = \frac{2ml^2}{\Delta t^3}$

4.12. $W = FS$; $P = Fv$

4.13. $W = 5mgh$

4.14. $m = \frac{\eta P \Delta t}{gh}$

4.15. $W = D(s_2 - s_1) + \frac{B}{2}(s_2^2 - s_1^2) + \frac{C}{3}(s_2^3 - s_1^3)$

4.16. $W = \frac{Fl_0}{2}$

4.17. $S = \frac{v^2 + g\mu L}{2g\mu}$

4.18. $W = \frac{1}{2}mgl$

4.19. Moc jest maksymalna gdy $v = \frac{v_0}{3}$. $W = vt\,\frac{aS\rho(v_0 - v)^2}{2} = 3{,}38 \cdot 10^5$J