HW answers Chapters 10. 11. 13. 15

Chap 10 #44. ⓐ $t = 1.95\ s$

ⓑ time would be reduced by 3.64 %

#56. ⓐ $V_f = \sqrt{\frac{10}{7} gh}$

ⓑ $V_f = \sqrt{2gh}$

ⓒ The time to roll is longer by a factor of 1.18

#76. ⓐ $a_{cm} = \frac{4F}{3M}$ ⓑ $f = \frac{1}{3} F$ ⓒ $V_f = \sqrt{\frac{8Fd}{3M}}$

#86 ⓑ $a = \frac{2Mg(\sin\theta - \mu \cdot \cos\theta)}{2M + m}$

Chap 11. #30. ⓐ $\omega_f = \frac{I_1}{I_1 + I_2} \omega_i$ ⓑ $\frac{K_f}{K_i} = \frac{I_1}{I_1 + I_2}$

Chap 13. #12. $\frac{\rho_M}{\rho_E} = \frac{2}{3}$

#26. $\vec{g} = \frac{2MGr}{(r^2 + a^2)^{3/2}}$

#40. ⓐ $T = 2\pi \sqrt{\frac{(R_g + h)^3}{GM_g}}$ ⓑ $v = \sqrt{\frac{GM_g}{R_g + h}}$

ⓒ $\Delta E_{min} = GM_g \cdot m \left[\frac{R_g + 2h}{2R_g(R_g + h)} \right] - \frac{2\pi^2 R_g^2 m}{(86400 s)^2}$

Chap 15. #26. in Tokyo: $T_T = 2\pi \sqrt{\frac{L_T}{g_T}}$

in Cambridge: $T_C = 2\pi \sqrt{\frac{L_C}{g_C}}$

$\frac{g_C}{g_T} = 1.0015$