

天體運動

Exercise Sec.1

01. 6.4m/s^2

02.

(a) $1.6 \times 10^7 \text{ m/s}^2$

(b) 1.6×10^6 倍

03.

(a) 500s

(b) $3 \times 10^4 \text{ m/s}$

04.

(a) 300 倍

(b) 180 倍

(c) 150 倍

(d) 450 倍

05. 9.99m/s^2

06.

(a) 4960 s

(b) 2480 s

07.

(a) $2^{-\frac{3}{4}} = \sqrt{\frac{1}{\sqrt{8}}} = \sqrt{\frac{1}{\sqrt{2}}}$

(b) 凌晨 3 點

(c) 夜間 9 點

08. D

Exercise Sec.2

01. 6.4m/s^2

02. A

03.

(a) $T = 2\pi\sqrt{\frac{R^3}{GM_e}}$

(b) $T = 2\pi\sqrt{\frac{R^3}{GM_e}}$

Exercise Sec.3

01. $T^2 \propto R^5$

02. $6000\pi/\text{day}$

03. 1:27

04. $6000\pi/\text{day}$

05. 1:27

Exercise Sec.4

01. $\sqrt{(0.25GMr)}$

02. $2(\text{光年})^2$

03. X、X、X、X、X、O、O

04.

(a) 8 年

(b) 4A.U.

Exercise Sec.5

01.

(a) $\sqrt{\frac{8GM}{15S}}$

(b) $\sqrt{\frac{4GM}{3S}}$

Exercise Sec.6

01.

(a) $\frac{-GMm}{r_1}$

(b) $\frac{+GMm}{2r_1}$

(c) $\frac{-GMm}{2r_1}$

(d) $\frac{+GMm}{2r_2} - \frac{GMm}{2r_1}$

02. $\frac{1}{\sqrt{2}}$

03.

(a) 3:1

(b) $+\frac{1}{2} m V^2 \times (9-1)$

(c) $-\frac{1}{2} m V^2 \times (9-1)$

(d) $-\frac{3}{2} m V^2$

(e) $\frac{Gmm}{6m V^2}$

04.

(a) -1.5

(b) -2

(c) -2

(d) +1.5

(e) -0.5

(f) -0.5

05. $\frac{2L}{R}$

Exercise Sec.7

01.

(a) $\frac{-GMm}{d}$

(b) $\frac{GMm}{2d} \times \frac{m}{M+m}$

(c) $\frac{-GMm}{2d}$

(d) 拋物線