

1

問 1

$$v_0 = \sqrt{gR}$$

$$T_0 = 2\pi\sqrt{\frac{R}{g}}$$

問 2

$$v' = \sqrt{2gR}$$

問 3

$$v_p = \frac{m + \Delta m}{m} v_0$$

問 4

$$\Delta E = \frac{(m + \Delta m)\Delta m}{2m} v_0^2$$

(この問題では正負を問わない)

問 5

$$(1) : \sqrt{\frac{r_A}{R + r_A}}$$

$$(2) : \sqrt{\frac{R^2}{r_A(R + r_A)}}$$

問 6

$$\frac{T}{T_0} = \sqrt{\frac{1}{8} \left(1 + \frac{r_A}{R}\right)^3}$$

問 7

$$\text{エネルギー} : -\frac{mgR^2}{r_A + R}$$

問 8

$$b = a\sqrt{1 - \frac{\pi^2}{36}}$$

問 1

(1)

$$\text{速さ} : \sqrt{\frac{2qdE}{m}}$$

(2)

$$\text{座標} : \left(\frac{2}{B_0}\sqrt{\frac{2mdE}{q}}, 0\right)$$

(3)

$$\text{時間} : \sqrt{\frac{2dm}{qE}} + \frac{\pi m}{qB_0}$$

(4)

$$\text{仕事} : qEd$$

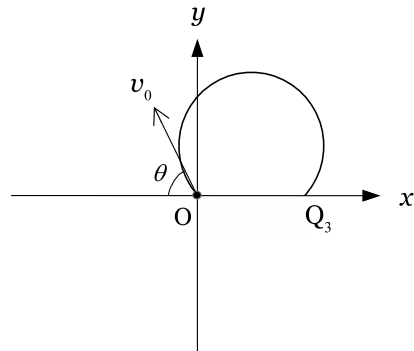
(5)

$$\frac{m_\alpha}{m_\beta} = 2\frac{v_\beta r_\alpha}{v_\alpha r_\beta}$$

(6)

$$\text{中心} : \left(\frac{mv_0}{qB_0} \sin \theta, \frac{mv_0}{qB_0} \cos \theta\right)$$

$$Q_3 : \left(\frac{2mv_0 \sin \theta}{qB_0}, 0\right)$$



(7)

$$\text{時間} : \frac{2m(\pi - \theta)}{qB_0}$$

2

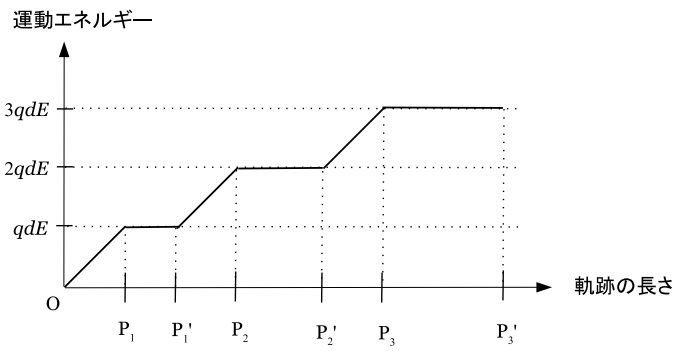
問2

(1)

領域1 : 裏から表

領域2 : 表から裏

(2)



(3)

$$r_n = \sqrt{\frac{2nmdE}{qB_0^2}}$$

(4)

$$t_n = \frac{\pi m}{qB_0}$$

(5)

$$B_{n,N} = B_0 \sqrt{1 + \frac{N}{n}}$$

(6)

$$\frac{t_{n,N}}{t_n} = \sqrt{\frac{n}{n+N}}$$