

物理

以下は解答（表式）の一例であり，別表式や導出過程などは省略する．

1

[1] (1) $-\frac{mg}{\ell}x_1$ (2) $-2kx_1$ (3) $-\left(2k + \frac{mg}{\ell}\right)x_1$ (4) $\frac{2\pi}{\sqrt{\frac{g}{\ell} + \frac{2k}{m}}}$

(5) $|A| \sqrt{\frac{g}{\ell} + \frac{2k}{m}}$

[2] (6) $-\frac{mg}{\ell}x_1$ (7) $\sqrt{\frac{g}{\ell}}$ (8) $-\frac{mgA_1}{\ell} + k(A_2 - A_1)$

(9) $-\frac{mgA_2}{\ell} - 2k(A_2 - A_1)$ (10) $\frac{mg}{\ell} + \frac{k(A_1 - A_2)}{A_1}$

(11) $\frac{mg}{\ell} - \frac{2k(A_1 - A_2)}{A_2}$ (12) $-2A_1$ (13) $\sqrt{\frac{g}{\ell} + \frac{3k}{m}}$ (14) 0

(15) $\sqrt{\frac{g}{\ell} + \frac{k}{m}}$

2

[1] (1) $\frac{(R_2 + R_3)V_1 - R_3V_2}{R_1R_2 + R_2R_3 + R_3R_1}$ (2) $\frac{(R_1 + R_3)V_2 - R_3V_1}{R_1R_2 + R_2R_3 + R_3R_1}$ (3) $\frac{R_2V_1 + R_1V_2}{R_1R_2 + R_2R_3 + R_3R_1}$

[2] (4) $\frac{R_1(R_2 + R_3)}{R_1 + R_2 + R_3}$ (5) $\frac{R_3(R_1 + R_2)}{R_1 + R_2 + R_3}$ (6) $\frac{R_2(R_3 + R_1)}{R_1 + R_2 + R_3}$

(7) $\frac{R_1R_3}{R_1 + R_2 + R_3}$ (8) $\frac{R_1R_2}{R_1 + R_2 + R_3}$ (9) $\frac{R_2R_3}{R_1 + R_2 + R_3}$

(10) $\frac{V}{R_C + \frac{(R_B + R_4)(R_A + R_5)}{R_B + R_4 + R_A + R_5}}$

[3] (11) $\frac{R_2 \cdot R_3}{R_1}$ (12) $\frac{(R_x + r_1 + r_2)R_1}{R_2}$ (13) $\frac{R_1}{R_2}(r_2 + R_x) - r_1$ (14) R_x

3

[1] (1) $h \tan \alpha$ (2) $\sin \alpha$ (3) $\sin \beta$ (4) $\frac{h}{n}$

[2] (5) $\sin \phi$ (6) $\sin \theta$ (7) $\frac{\cos \theta}{n \cos \phi}$ (8) $-q_2 \tan \theta$ (9) $-\frac{q_2}{\cos^2 \theta}$

(10) $h \tan \phi$ (11) $\frac{h}{\cos^2 \phi}$ (12) $-\frac{h \sqrt{(1 - n^2 \sin^2 \phi)^3}}{n \cos^3 \phi}$ (13) $h(n^2 - 1) \tan^3 \phi$

(14) $\frac{1}{n}$ (s1) \leq (15) $\frac{h}{\sqrt{n^2 - 1}}$ (s2) \geq (16) $-\frac{h}{n}$

(o1) a (o2) a (17) $h^2 - (n^2 - 1)x^2$ (18) 4