

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

$$\begin{aligned}
 [1] \quad (1) \quad & \frac{L}{v_x} \quad \text{or} \quad \frac{L}{v_0 \cos \theta} \quad (2) \quad \frac{v_y}{v_x} L - \frac{1}{2} g \left(\frac{L}{v_x} \right)^2 \quad (3) \quad \frac{v_0^2 \pm \sqrt{v_0^4 - g(2hv_0^2 + gL^2)}}{gL} \\
 (4) \quad & g(h + \sqrt{h^2 + L^2}) \\
 [2] \quad (5) \quad & h - \frac{1}{2} g \left(\frac{L}{v_x} \right)^2 \quad (6) \quad \frac{h}{L} \quad (7) \quad \sqrt{\frac{h^2 + L^2}{2h}} g \\
 [3] \quad (8) \quad & -kV'_{n-1} \quad (9) \quad \left(1 - \frac{k}{m} \Delta t\right)^n \left(-\frac{mg}{k}\right) \quad (10) \quad \left(1 - \frac{k}{m} \frac{t}{n}\right)^n \left(-\frac{mg}{k}\right) + \frac{mg}{k} \\
 (11) \quad & \frac{mg}{k} (1 - e^{-\frac{k}{m}t})
 \end{aligned}$$

2

$$\begin{aligned}
 [1] \quad (1) \quad & \frac{\mu N^2 S}{l} \quad (2) \quad \frac{\mu_1}{\mu} \quad (3) \quad 1 + \frac{\mu_1}{\mu} \quad (4) \quad \frac{\mu_1}{\mu + \mu_1} \\
 [2] \quad (5) \quad & \frac{\varepsilon_0 S}{d} \quad (6) \quad \frac{\varepsilon_1}{\varepsilon_0} \quad (7) \quad \frac{\varepsilon_0 + \varepsilon_1}{2\varepsilon_0} \quad (8) \quad \frac{2\varepsilon_1}{\varepsilon_1 + \varepsilon_0} \\
 [3] \quad (9) \quad & -IR \quad (10) \quad I_{1s}R_1 - I_{1c}L\omega \quad (11) \quad I_{1c}R_1 + I_{1s}L\omega \quad (12) \quad I_{2s}R_2 + \frac{I_{2c}}{C\omega} \\
 (13) \quad & I_{2c}R_2 - \frac{I_{2s}}{C\omega} \quad (14) \quad I_{3s}R_3 \quad (15) \quad I_{3c}R_3 \quad (16) \quad A(A-1) + B^2 \\
 (17) \quad & B \quad (18) \quad \frac{1}{\sqrt{LC}} \quad (19) \quad (b)
 \end{aligned}$$

3

$$\begin{aligned}
 [1] \quad (1) \quad & p - \frac{Mg}{S} \quad (2) \quad \frac{3}{2} p z_1 S \quad (3) \quad \text{熱容量} : \frac{5p(z_e - z_1)S}{2(T_X - T_e)} \quad (3) \quad \text{比熱} : \frac{5p(z_e - z_1)S}{2m(T_X - T_e)} \\
 [2] \quad (4) \quad & p(z_1 - z_2)S \quad (5) \quad z_1 - \frac{3V_B}{5S} \quad (6) \quad \left(1 + \frac{2V_B}{5z_1S}\right)T \\
 [3] \quad (7) \quad & \frac{3}{2} (p_A z_A + p_B z_B)S \quad (8) \quad (p_A \Delta h - p_B \Delta z_B)S \quad (9) \quad \frac{3}{2} [p_A(z_A - \Delta h) + p_B(z_B + \Delta z_B)]S \\
 (10) \quad & \frac{p_A}{p_B} \Delta h \quad (11) \quad \frac{3}{2} p_A S \Delta h \quad (12) \quad \frac{3}{2} p_B \Delta V \quad (13) \quad \frac{p_A}{p_B} S \Delta h \quad (14) \quad T_A \\
 (15) \quad & \frac{(p_A \Delta h + p_B z_B)T_A T_B}{p_A T_B \Delta h + p_B T_A z_B}
 \end{aligned}$$