

ch 18. 8, 17, 18, 34, 54, 56.

ch 19. 4, 14, 21, 26, 27, 28, 37, 51.

8. $Q = cm\Delta T$. $\Delta T_B = 20^\circ\text{C}$.

$m_B = 2\text{kg}$. $\Delta T = 20^\circ\text{C}$ $\frac{Q}{m} = 16 \times 5 = 80 \text{ kJ/kg}$.

$\therefore Q_B = C \cdot \Delta T \cdot m = 80 \times 2 = 160 \text{ kJ}$ $\therefore Q_A = -160 \text{ J}$.

又 $\Delta T_A = -60^\circ\text{C}$ $C_A = \frac{Q_A}{m_A \Delta T_A} = 670 \text{ J/kg} \cdot ^\circ\text{C}$.

17. (a) 通过 A $W = 3V_0 \cdot P_0 = 3 \times 60 = 180 \text{ J}$.

(b) 通过 B $W = \frac{5}{4} P_0 \times 30 \times \frac{1}{2} = \frac{15}{8} P_0 = \frac{15}{8} \times 60 \times 1 = \frac{225}{2} = 112.5 \text{ J}$.

(c) 通过 C $W = 3V_0 \times \frac{1}{4} P_0 = \frac{3}{4} P_0 V_0 = \frac{3}{4} \times 60 \times 1 = 45 \text{ J}$.

18 (a). $P_{\text{cond}} = \frac{Q}{t} = kA \frac{T_H - T_C}{L}$ $\therefore P_{\text{cond}} \cdot \frac{L}{kA} = T_H - T_C$.

$= \frac{A(T_H - T_C)}{\frac{L}{k_1} + \frac{L}{k_2} + \frac{L}{k_3}} = k_2 A \frac{\Delta T_2}{L_2}$ $\Delta T_2 = 16.51^\circ\text{C}$.

(b). $P_{\text{cond-a}} = 19.82 \frac{k_1}{L_1} \cdot A$ $P_{\text{cond-b}} = 21.23 \frac{k_1}{L_1} \cdot A$

b 更大

(c). $\Delta T_2' = 14.48^\circ\text{C}$

34. $P_{\text{rad}} = \sigma \epsilon A T^4$ $2A = 4\pi R^2$ $P_{\text{rad}} = \frac{Q}{t}$.

$Q = \sigma \epsilon A T^4 t$ $t = 18 \text{ min} = 18 \times 60 = 1080 \text{ s}$.

$N = 500$ $\therefore Q' = \frac{Q}{t}$

又 $\lambda = Q_1 = 4.18 \text{ J}$.



$$54. \Delta L = L \alpha \Delta t$$

$$L_2 = L_1 = L (1 + \alpha \Delta T)$$

$$D(1 + \alpha_{Cu} \Delta T) = d(1 + \alpha_{Al} \Delta T) \quad \alpha_{Cu} = 17 \times 10^{-6} \quad \alpha_{Al} = 23 \times 10^{-6}$$

$$T_f = \frac{d(1 - \alpha_{Al} T_{100}) - D(1 - \alpha_{Cu} T_0)}{D \alpha_{Cu} - d \alpha_{Al}} = 50.38^\circ \text{C}$$

$$Q = cm \Delta T \quad m_{Al} = \frac{m_{Cu} c_{Cu} \Delta T_{Cu}}{c_{Al} \Delta T_{Al}} = 9.6 \text{ g}$$

$$56. Q = cm \Delta T \quad Q_{\text{vapor}} = m_{\text{steam}} \cdot L_v$$

(a)

$$\Delta T \approx Q_{\text{net}} = 9836 \text{ J}$$

$$(b) Q = cm \Delta T = 4632 \text{ J}$$

$$(c) Q_{\text{net}} = 10300 \text{ J}$$

$$cm \Delta T \quad \Delta T \approx T_{\text{fb}} = 989.48^\circ \text{C}$$

