

(a) : Required amount of work, Q is

$$= m_i s_i \Delta t + m_i L_i + m_w L_w \Delta t + m_s L_s + m_s s_s \Delta t$$

As, $m_i = m_w = m_s = m_s$,

$$Q = 10^{-3} \times 10 \times 2100 + 10^{-3} \times 3.35 \times 10^5 + 10^{-3} \times 4180 \times 100$$
$$+ 10^{-3} \times 2.25 \times 10^6 + 10^{-3} \times 1920 \times 10$$

$$\Rightarrow Q = (21 + 335 + 418 + 2250 + 19.2) \Rightarrow Q = 3043.2 \text{ J}$$