Consider the circuit shown in the diagram.

(a) How much voltage is there across the 5 ohm resistor?
\[ V = V_0 + V_3 \]
\[ i_1 = i_{R_2} + i_{R_3} \]
\[ i_{12} = i_3 \]
\[ 50 = i_3 (R_{12} + R_3) \]
\[ 50 = i_3 (5 + 5) \]
\[ 5 = i_3 \]
\[ V_3 = i_3 R_3 = 5(5) = 25 \text{ V} \]

(b) How much current flows through the bottom 10 ohm resistor?
\[ V_q = i_q R_q \]
\[ i_q = \frac{V_q}{R_q} = \frac{5V}{10\text{ ohm}} = 0.5 \text{ A} \]
\[ V = V_q = V_{03} \]

(c) How much power is supplied by the battery?
\[ P = iV \]
\[ i = \frac{V}{R_{tet}} = \frac{50}{5} = 10 \]
\[ P = 10(50) = 500 \text{ W} \]

(d) How much energy is converted to heat in 25 seconds by all of the resistors?
\[ \frac{dE}{dt} = \frac{dE}{dt} \]
\[ dE = P \, dt = \frac{dt}{(i_2)^2 R} = 25(100)(5) = 12500 \text{ J} \]