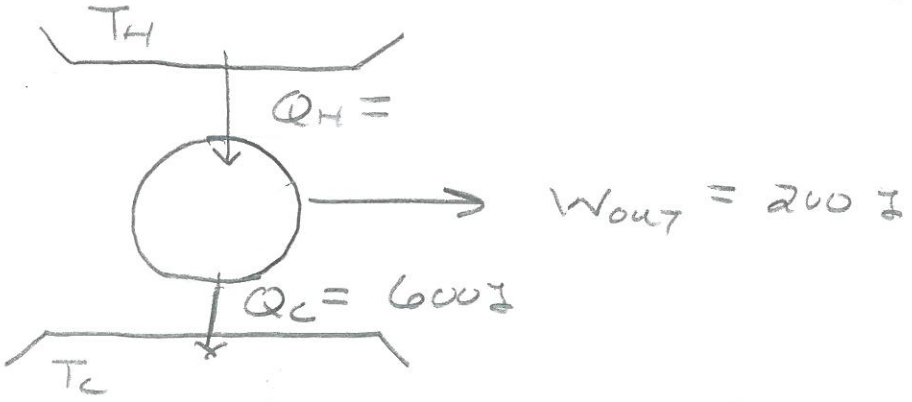

a.) $Q_H = Q_C + W_{out} = 800\,J.$

$$\eta = \frac{W_{out}}{Q_H} = 0.25 = 25\%$$

b.) $T_H = 400°C = 673K$

$$\eta_C = 0.25 = 1 - \frac{T_C}{T_H}$$

So

$$\frac{T_C}{T_H} = 1 - \eta_C$$

$\therefore$ $T_C = T_H(1-\eta_C) =$ 504.7K = 231.7°C