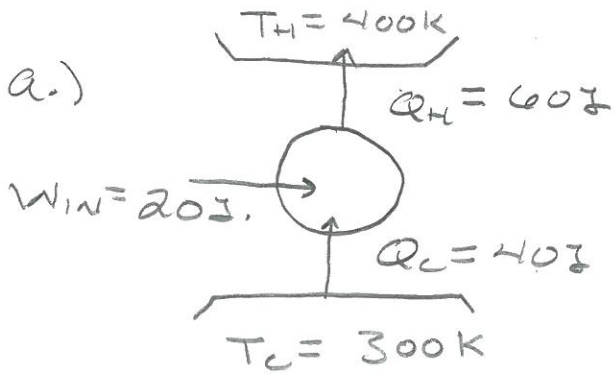
a.)



1st $Q_C + |W_{IN}| = Q_H$

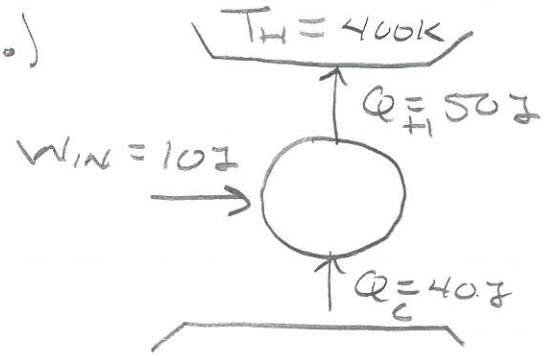
2nd OK

$K_C = \frac{T_C}{T_H - T_C} = 3$

$K = \frac{Q_C}{W_{IN}} = 2$

OK

b.)



1st $Q_C + |W_{IN}| = Q_H$

OK

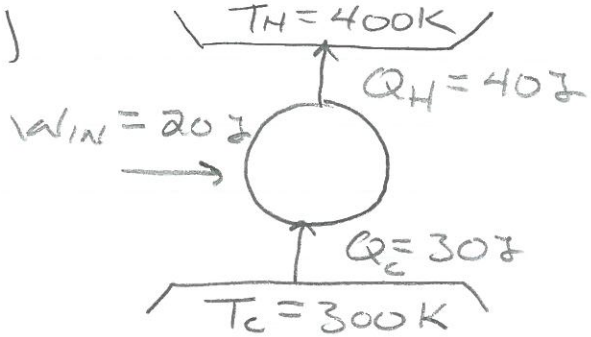
2nd

$K_C = \frac{T_C}{T_H - T_C} = 3$

$K_C = \frac{Q_C}{W_{IN}} = 4 > K_C$

violated

c.)



1st $Q_C + W_{IN} \neq Q_H$

violated.

2nd $K_C = \frac{T_C}{T_H - T_C} = 3$

$K = \frac{Q_C}{W_{IN}} = 1.5 < K_C$

OK