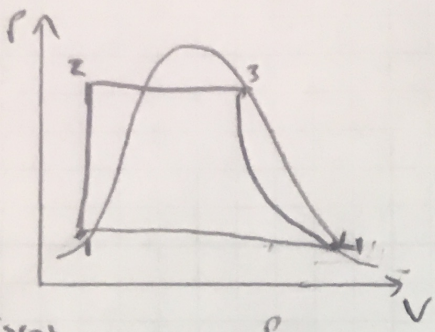
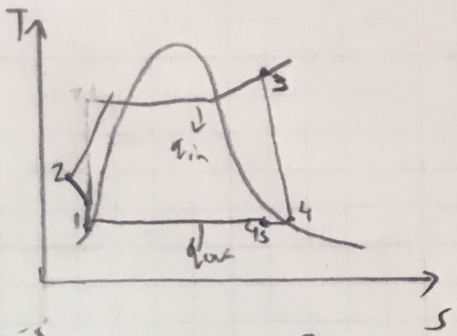
Ch. 10 # 10, 25, 34, 41, 53

10.10)





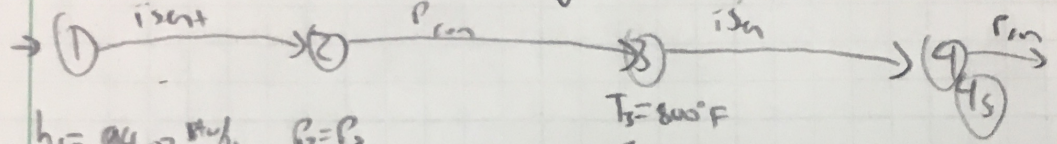


table 4.6

$h_1 = 94.02$ Btu/lbm $P_2 = P_3$

$v_1 = .01623$ ft³/lb $P_2 = 150$ psi.

$h_2 = h_3$

$h_2 = 1363.1$ Btu/lbm

$T_3 = 800°F$

$P_3 = 150$ psi.

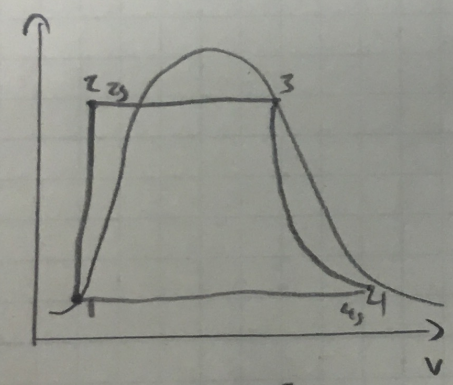
$h_3 = 1363.1$ Btu/lbm

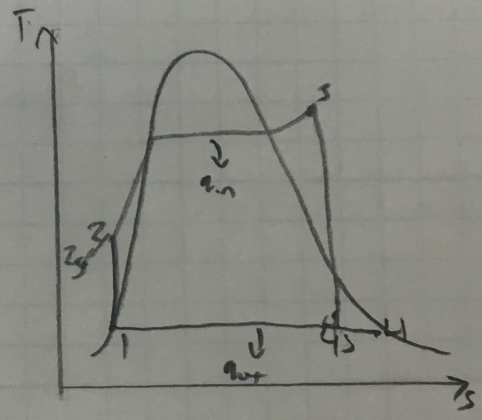
$P_{4s} = P_4$

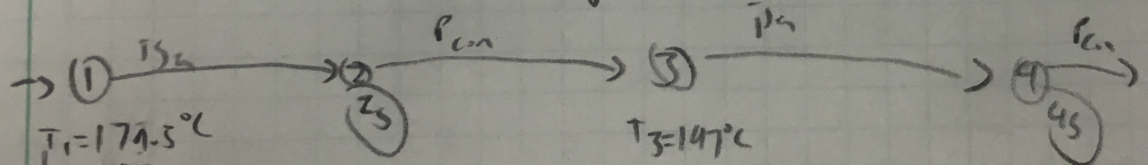
$T_{4s} = T_1$

a) $= W_{net} = \dot{m} w_{net}$ b) $W_t = W_{out}$ c) $Q_{in} = m(q_{in})$ d) $\eta_{th} = \frac{W_{net}}{q_{in}}$

10.25)







$T_1 = 179.5°C$

$h_1 = 273.61$ kJ/kg

$P_1 = 410$ kPa

$T_3 = 147°C$

$P_3 = 3250$ kPa

$h_3 = 761.54$ kJ/kg

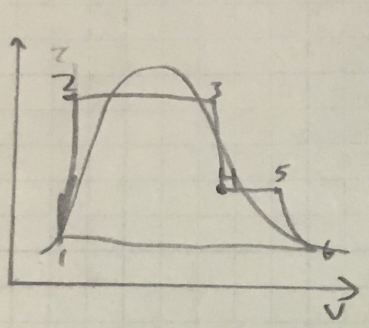
$T_4 = 179.5°C$

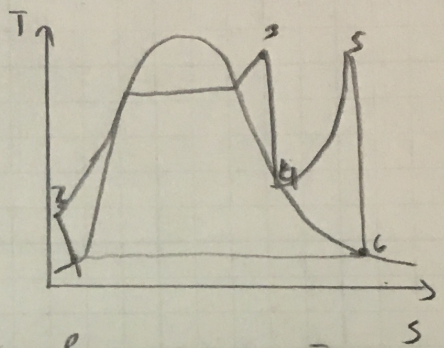
$P_4 = 410$ kPa

$h_4 = 609.74$ kJ/kg

a) $= \eta_{th} = \frac{h_3 - h_4}{h_3 - h_{4s}}$ b) $W_{net} = W_{out} - W_{in}$ c) $\eta_{th} = \frac{W_{net}}{q_{in}}$

10.34)





(1) isen → (2) P_{con} → (3) isen → (4) P_{con} → (5) Isen → (6) P_{con}

(1) $P_1 = 100 kPa$
$T_1 = 99.6 K$
$h_1 = 417.5 kJ$
$s_1 = 1.3020 \frac{kJ}{kg}$
$v_1 = .001043 \frac{m^3}{kg}$

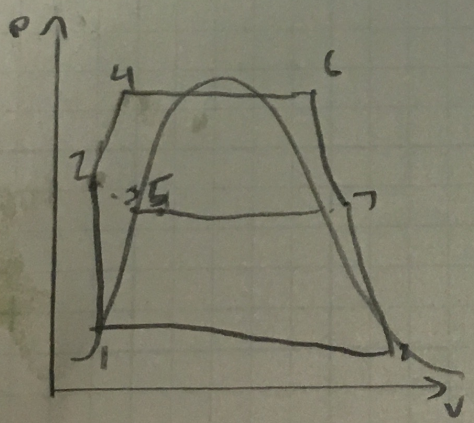
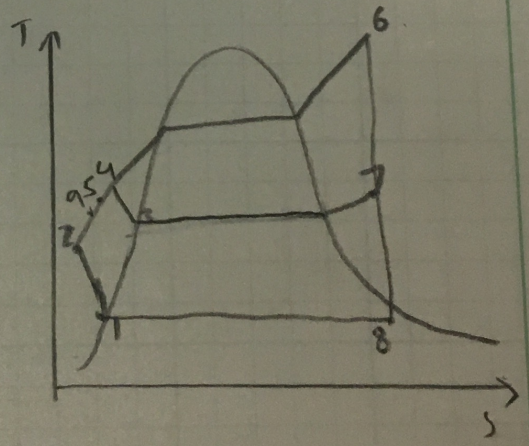
(2) $P_2 = 15000 kPa$
$s_2 = s_1$
$s_2 = 1.3020 \frac{kJ}{kg}$

(3) $P_3 = 15000 kPa$
$T_3 = 450°C$
$h_3 = 3157.9 \frac{kJ}{kg}$
$s_3 = 6.143 \frac{kJ}{kg}$

(4) $P_4 = 2000 kPa$
$s_4 = s_3$
$s_3 = 6.143 \frac{kJ}{kg}$

(5) $P_5 = 2000 kPa$
$T_5 = 450°C$
$h_5 = 3350.1 \frac{kJ}{kg}$
$s_5 = 7.261 \frac{kJ}{kg}$

(6) $P_6 = 100 kPa$
$s_6 = s_5$
$s_6 = 7.28 \frac{kJ}{kg}$

a) $\dot{W}_p = \dot{m} w_p$ b) $\dot{W}_{net} = \dot{m}(W_{net})$ c) $Q_{reheat} = \dot{m} q_{in}$ d) $\eta_{th} \frac{w_{net}}{q_{in}}$

16.46)