

	1	2	3	4	4A
P	410	3250	3250	410	410
h	273	278.68	761.5	689.7	670.4
v	0.0018				
s					

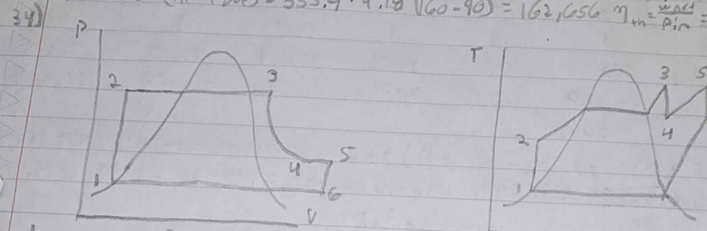
$$\eta_T = \frac{h_3 - h_4}{h_3 - h_{4s}} = \frac{761.5 - 689.7}{761.5 - 670.4} = 78.8\%$$

$$h_2 = v_1(P_2 - P_1)/m_g + h_1$$

$$h_2 = 0.0018 \cdot (3250 - 410)/0.9 + 273 = 278.68$$

$$\dot{W}_{net} = \dot{W}_T - \dot{W}_P = \dot{m}(h_3 - h_4) - \dot{m}(h_2 - h_1) = 305.6((761.5 - 689.7) - (278.68 - 273)) = 20,206$$

$$\dot{P}_{in} = \dot{m} \cdot C_p \cdot (T_{in} - T_{out}) = 555.9 \cdot 4.18(160 - 90) = 162,165.6 \quad \eta_m = \frac{\dot{W}_{net}}{\dot{P}_{in}} = \frac{20,206}{162,165.6} = 12.4\%$$



	1	2	3	4	5	6
T	99.61		450	212	450	99.6
P	100	15,000	15,000	2000	2000	99.6
h	417.51	433	3157.9	2703.3	3358	100
s	1.30	s2=s1	6.1434	s4=s3	7.28	s6=s5
v	0.001043					

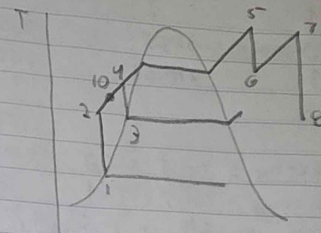
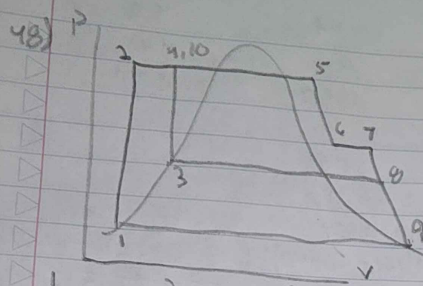
$$h_2 = v_1(P_2 - P_1) + h_1 = 0.001043(15,000 - 100) + 417.51 = 433 \quad T_6 = T_5 = 99.6$$

$$x_4 = \frac{s_4 - s_f}{s_{fg}} = \frac{6.1434 - 2.44}{3.892} = 0.9497 \quad h_4 = h_f + x_4 \cdot h_{fg} = 417.5 + 0.9497 \cdot 1689.8 = 2703.3$$

$$\dot{W}_P = \dot{m}(h_2 - h_1) = 1.74(433 - 417.5) = 26.97 \quad \dot{W}_{net} = \dot{m}(h_3 - h_4) + (h_5 - h_6) - (h_2 - h_1)$$

$$\dot{W}_{net} = 1.74(3157.9 - 2703.3) + 3358 - 2646 - 433 + 417.5 = 2003$$

$$\dot{P}_R = \dot{m} \dot{P}_{in} = \dot{m}(h_5 - h_4) = 1.74(3358 - 2703.3) = 1140 \quad \eta_{th} = \frac{\dot{W}_{net}}{\dot{P}_{in}} = \frac{2003}{1140} = 34\%$$



	1	2	3	4	5	6	7	8
P	20	8	1	3	1	20	1	20
h	251.42	254.5	762.51	3116	2852	2221.7	762.5	762.5
s	0.832		2.138	6.745	$s_5 = s_4$	$s_6 = s_4$	7.2359	7.2359
v	0.001017		0.001127					

$$w_p = h_2 - h_1 = v_1(P_2 - P_1) \quad h_2 = v_1(P_2 - P_1) + h_1 = 0.001043(15,000 - 100) + 251.42 = 433$$

$$x_4 = \frac{s_4 - s_3}{s_{fg}} = \frac{6.745 - 2.138}{3.892} = 0.9497 \quad h_4 = h_f + x_4 \cdot h_{fg} = 908.47 + 0.9497 \cdot 1889.8$$

$$h_4 = 2723.3$$

$$x_6 = \frac{s_6 - s_f}{s_{fg}} = \frac{7.2359 - 1.303}{6.056} = 0.987 \quad h_6 = h_f + x_6 \cdot h_{fg} = 417.5 + 0.987 \cdot 2257 = 2646.1$$

$$y = \frac{h_3 - h_2}{h_g - h_f} = \frac{762.5 - 254.5}{2852 - 762.5} = 0.2437 \quad w_T = (h_4 - h_5) + (1 - y)(h_5 - h_6)$$

$$w_T = 3116 - 2852 + (1 - 0.2437)(2852 - 2221.7) = 791$$

$$P_{in} = h_4 - h_2 = 3116 - 762.5 = 2353.5$$

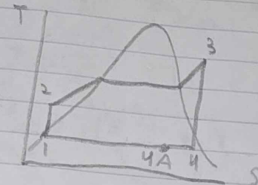
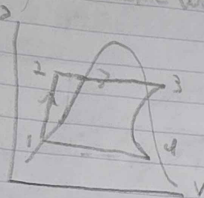
HW 2.1

MET 350

Daniel Martinez

10) $v_{turb} = h_{sen} - h_{esh} - q_{out}$ so removing heat from the steam will affect turbine work.

10) p



	1	2	3	4
P	2	1500	1500	2
h	99.02	99	1363	922.7
v	0.01623	99	0.4355	
s	0.175	1.5064	1.5064	1.744

table A-5

table A-7E

table A-6E

$s_4 = s_3$

$$s_4 - s_f = 1.5064 - 0.175 = 0.763 \quad h_{4s} = h_f + x_{4s} \cdot h_{fg} = 99 + (0.763 \cdot 1021.7) = 878.8$$

$$x_{4s} = \frac{s_4 - s_f}{s_{fg}} = \frac{0.763}{1.744} = 0.4355$$

$$\eta_T = \frac{h_3 - h_{4s}}{h_3 - h_4}$$

$$h_4 = 1363 - 0.9(1363 - 878.8) = 922.7$$

$$P_{in} = h_3 - h_2 = 1363 - 99 = 1264$$

$$P_{out} = h_4 - h_1 = 922.7 - 99.02 = 823.7$$

$$W_{net} = P_{in} - P_{out} = 1264 - 823.7 = 440.3$$

$$\dot{m} = \frac{W_{net}}{h_3 - h_4} = \frac{440.3}{1363 - 922.7} = 5.44$$

$$\eta_m = \frac{W_{net}}{P_{in}} = \frac{440.3}{1264} = 34.8\%$$

25) p

