Test 2 Reflection:

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The comprehensive problem on analyzing a regenerative Rankine steam cycle with feedwater heating effectively tested my ability to apply the first and second laws of thermodynamics to practical power plant systems. Performing energy and mass balances while calculating cycle performance parameters like utilization factor, turbine work, and heat transfer rates required correctly utilizing the governing thermodynamic principles. Deriving the utilization factor linked to evaluating second law efficiencies and maximum theoretical work potentials. Overall, methodically working through the analysis of this real-world cycle configuration synthesized multiple objectives - applying thermodynamic laws to steam power plants, developing intuition for energy systems, and defining thermal efficiencies and availability concepts. Successfully solving such an integrated problem demonstrates competency in utilizing fundamental thermodynamics for design and performance evaluation of energy conversion cycles.

For the Calculations I used an excel sheet to calculate all the states. I just made a mistake with the last state, which I took from the table instead of considering the process as Isenthalpic.

State	P	h	h actual	% Diff
	(kPa)	(kJ/kg)	(kJ/kg)	
1	15	225.94	225.94	0.0%
2	660	226.594	226.533	0.0%
3	660	686.664	686.664	0.0%
4	5500	692.0112	692.011	0.0%
5	5500	3428.9	3428.9	0.0%
6	660	2847.36	2852.159	-0.2%
7	150	2580.569	2580.717	0.0%
8	15	2246.019	2246.025	0.0%
9	150	467.13	467.13	0.0%
10	15	225.94	467.13	-51.6%

I calculated the Y value using excel and got it correct. For the Work done by the turbine I used (y) instead of (1-y) and threw off my answer by 58%. Subsequently the mass flow rate was also off by 58% as it was calculated using the incorrect value. This cascading effect continued with all of the subsequent calculations as they all required mass flow rate. My formulas were all correct, but my answers were not.

For my summary and analysis sections I feel that I had good observations and conclusions based on what I found in my calculations.

Grading:

After working out my grade in excel and including the homework scores the lowest grade I would give myself is **78%** per the rubric. I have an excel sheet with the breakdown:

WRITING RUBRIC		
Purpose	0.5	0.5
Drawings	1	1
Sources	1	1
Design considerations	1	1
Data and variables	0	0.5
Procedure	2	2
Calculations	2	2
Summary	0.5	0.5
Materials	0.5	0.5
Analysis	1	1
TOTAL	9.5	10
PROBLEM 1)		
Actual cycle diagram	1	1
P-v and T-s diagrams	0.8	2
State calculations (10 of them)	2	2
Double interpolation for state 6	0.5	1
Calculate y1	1	1
Turbine work	1	1
Mass flow rate	0	1
Heat rate at space heating	1	1
Heat released in condenser	1	1
Utilization factor	2	2
Final results	0	1
TOTAL	10.3	14
Final Grade:	78%	

Discussion Points:

a. Issues Encountered and Troubleshooting: I should have realized that the mass flow rate was really high.

b. Steps Taken to Complete the Test: I ran through the test about a few times, moving things around, and recalculating whenever I found an error, I referenced the homework problems and the class examples.

c. New Concepts Learned: I have learned how to calculate utilization factor.

d. Application in Engineering: I learned how to interpolate in excel.

e. Personal Application: I will use these skills in my career and for any personal projects I do.

f. Importance in Professional Career: Engineers have to look at the big picture, and at all the small details when designing or maintaining a system.

g. Future Use of Information or Skills: I have learned not only Thermodynamics principles but also how to look at a problem as a comprehensive whole. This will be invaluable in all aspects of life.

h. Application in Work or Other Courses: I'm sure you will make me use this in my senior design project.

i. Areas of Success or Improvement: I have strengths in analysis and conclusions while there is always area for improvement in my calculations and procedure.

j. Intersection with Field or Career: I have no idea if I will be working in an industry where I will need to know Thermodynamics, but if I do I will know who to call, and what book to reference.

k. Time Management: I spent about 2 hours on the pretest, and then a couple more here and there over the week after the feedback email, for about 12 total, with the most time being spent on Tuesday, as I had the day off work.

In summary, I feel that I did alright in this test despite having to redo sections multiple times and making some simple mistakes.