This test demonstrates my progress toward several course learning objectives, particularly my ability to analyze thermodynamic cycles, apply energy balances, and interpret property diagrams such as P-v and T-s diagrams. The problem required evaluating an ideal regenerative Rankine cycle with feedwater heaters, which directly tested my understanding of cycle efficiency, turbine work, and the effects of regeneration.

I showed strength in understanding how the system operates as a whole. Specifically, I correctly determined the relationship between the two cases and concluded that Case 1 has higher thermal efficiency and less net work than Case 2. This demonstrates my ability to apply thermodynamic principles and evaluate system performance, which is a key objective of the course.

When comparing my work to the provided solution, my approach and final conclusions were mostly correct, but I made two main types of mistakes. In my P-v and T-s diagrams, I correctly drew the shapes and processes, but I failed to label all phases. I missed identifying two phases. This mistake likely happened because I focused more on drawing the process paths rather than carefully verifying each state and phase region. I should have carefully gone through each state point and confirmed all the phase labeling were there. Another mistake that I saw I made while comparing the solutions were, some of my numerical values were slightly off compared to the solution. These errors were likely due to small mistakes in reading property tables or during the calculations. Although my final trends were correct, these inaccuracies affect the exact answers compared to the solution. I should have double checked property values, units, calculations and rounding to ensure accuracy.

If I were taking this test again, I would carefully label every phase on diagrams before moving on, double check property values and rounding, make sure calculation inputs are correct.

Based on the rubric and the correctness of my work, I believe my grade should fall in the “Meets Standard” on some of them like diagrams and calculations, but “Exceeds Standard” for the rest of the test. Main things that I was doing correctly I saw were **c**orrect overall approach, proper understanding of regeneration and system behavior, correct final analysis regarding efficiency and net work during the case of malfunction, and clear following of rubric and its rules. For things I was doing incorrectly were like mentioned previously, missing labels in the diagram and minor calculation differences. While my conceptual understanding was strong, the missing details and calculation errors prevented me from “Exceeds Standard” on all aspects of the test.

a. What issues did you encounter in completing the test? How did you troubleshoot them?

One issue I encountered was like mentioned P-v and T-s diagrams. I missed to label some of the phases in the diagram resulting in phase 2 and 7b to be nonexistent on the diagram.

b. What steps did you take to complete the whole test? Would you change something?

I first analyzed the system, then drew the diagrams, followed by naming and writing what needs to be counted in the calculations and what can be neglected. If I were to improve, I would spend more time verifying diagrams before starting calculations and make sure all the calculations are correct.

c. What new concepts have you learned?

I gained a deeper understanding of regenerative cycles, especially how feedwater heaters improve efficiency and how extraction points affect system performance.

d. Where you think engineers use those concepts (provide specific examples)?

These concepts are used in power plants, where engineers design steam cycles to maximize efficiency. For example, thermal engineers optimize turbine extraction points and feedwater heating to improve plant performance. Although like mentioned in class in real life application these efficiencies are also similar like the test and never go over ~30%

e. Where do you think you will be using everything you learned?

I will use these concepts in future thermodynamics and energy systems courses, as well as in engineering design projects like hvac and other fields.

f. Do you think what you learn is important for your professional career?

Yes, this material is important because thermodynamic efficiency and its systems are fundamental in mechanical engineering fields such as power generation, hvac, automobiles, and propulsion.

g. How, when, where and why you might use this information or skill in the future?

I may use this knowledge when working on systems involving heat transfer and energy conversion, such as designing engines, turbines, or thermal systems.

h. Have you been able to apply concepts you have learned in the course to what you do at work or in other courses?

I have not yet been able to apply the concepts learned in this class due to no classes I take right now and future have no involvement with thermodynamics and its applications.

i. What areas did you feel you were most successful, or improved the most?

I was most successful in understanding the overall system behavior and correctly comparing the two cases.

j. How do you see this course's content intersecting with your field or career?

As a student who has interned and will be working at a Commercial Mechanical Contractor, the concepts learned in this class will definitely cross paths again due to hvac and other energy systems the contractor may have for a project.

k. How much time did you spend on the test? How was the time organized? What would you do differently? Why?

I spent about 5-6 hours spanning over couple days,most of the time was spent on procedure and calculations as that was the main and hardest part. In the future, I would spend more time on P-v and T-s diagrams to ensure correctness as I also had a mistake on diagrams during my first test.

	Self Grade	Rubric	Total W
Purpose	0.5	0.5	10
Drawings & Diagrams	0.75	1	10
Sources	1	1	10
Design considerations (assumptions, safety, cost, etc)	1	1	10
Data and variables	0.5	0.5	10
Procedure	2	2	10
Calculations	1.5	2	10
Summary	0.5	0.5	10
Materials	0.5	0.5	10
Analysis	1	1	10
			10
Total	9.25	10	10

Problem 1)	Self Grade	Rubric	Total W
P-v and T-s diagrams	1.75	2	18
State calculations	3.75	4	18
Calulate y6, y7, and y9	3	3	18
Net work	2	2	18
Thermal effciecy	1	1	18
Realize that y7 is zero and that 4=5	2	2	18
Calulate y6, and y9	1	1	18
New net work and thermal efficient	1	1	18
Final results	2	2	18
Total	17.5	18	18

Final grade
87.02777778

Left to right,
Table 1:Writing Rubric Table , Table 2:Problem 1 Grading Table, and Table 3:Final Grade Table

Grading:

Purpose: 0.5/0.5

The objective of the problem was clearly stated before starting the analysis. I explained what needed to be determined.

Drawings: 0.75/1

The diagrams were correct, but one thing that I missed was identifying phase 2 and 7b on both P-v and T-s diagrams..

Sources: 1/1

The textbook was used as a reference..

Design considerations (assumptions, safety, cost, etc): 1/1

I pointed out all the necessary considerations for this problem like water being pure, no heat loss in piping, and etc.

Data and Variables: 0.5/0.5

All relevant given data such as inlet temperatures, inlet pressures, extraction pressure, and condenser pressure and x value were clearly identified and used in the calculations.

Procedure: 2/2

The solution followed a logical sequence: state determination, thermodynamic relations, and performance calculations. Some steps could have been explained more clearly and concise, but the message is still clear.

Calculations: 1.75/2

The final answers were off by few like specific net work and thermal efficiency, but all the y's were the same. I believe the numbers weren't similar because of different rounding, different calculations, and possible wrong input into the calculator while solving. But at the end both had similar numbers and the fully functional plant had higher efficiency with lower net work on both my work and solutions.

Summary: 0.5/0.5

Final results were put in the table.

Materials: 0.5/0.5

All materials (water) was listed.

Analysis: 1/1

The results were analyzed when comparing both cases, met the required details described in rubric.

Total: 9.25/10