

Rhiley Silvis

MET 350

Professor Ayala

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Test 2 Reflection

This test demonstrated my work toward developing my understanding of the first and second laws of thermodynamics. It showcased my ability to apply these laws to Rankine cycles with superheating, re-heating, and regeneration to steam power plants. Lastly, it also tested my ability to troubleshoot and make alterations to my calculations to accommodate disturbances with system components.

After reviewing the first question, I noticed a mistake I made. I did not account for both states 3 and 4 being saturated liquids. It makes sense that they would both have to be liquids for the pump to function. This mistake showed itself in my graphs and calculations for the mass of water in lines z and y. Mass in line y should've equated to zero since h_3 and h_4 are equal, I came up with 8% because my states were incorrect. This one mistake affected the remaining answers because they all use the flow rate of y. Looking at the formulas I used all seem correct, therefore if I used zero for y I could have achieved the correct answer.

For the second problem, all the graphs I created for the system were correct. This aided me in achieving the correct mass flow rate for line y. With the correct mass flow rate I was able to find all the necessary data to find the correct delta T and thermal efficiency.

As far as the grade I think I got on the test for the formatting portion. I seemed to clearly state the purpose of each problem correctly. For diagrams, I drew everything correctly besides the incorrect placement of state 3 on the first problem. I used different colors for the varying pressures in the system which greatly helped me visualize what was taking place. Sources was pretty straightforward because for these problems only one source, the textbook, is needed. Design considerations were all outlined clearly for the problems receiving full credit. For data and variable is should be listed all information given in the tables for the problem. Noted for next test, all data given to solve the problem will be listed. Also I did not list what states were now equal due to FWHs being inoperable. Procedure and calculations I feel were clearly illustrated for each state. I added tacks for each new state and how I achieved each value including unit

conversions and all formulas. Summary and analysis improved from my last test. I felt creating these summaries and analyzing the results for this test because I was comparing two instances with the same system. These conclusions I wrote were incorrect due my results for problem one being incorrect, for this I removed some points.

WRITING PORTION (Applied to the whole test, not to particular problems)

1. Purpose	0.5/10.0 out of 0.5/10.0
2. Drawings	1.0/10.0 out of 1.0/10.0
3. Sources	1.0/10.0 out of 1.0/10.0
4. Design considerations	1.0/10.0 out of 1.0/10.0
5. Data and variables	0.25/10.0 out of 0.5/10.0
6. Procedure	2.0/10.0 out of 2.0/10.0
7. Calculations	2.0/10.0 out of 2.0/10.0
8. Summary	0.4/10.0 out of 0.5/10.0
9. Materials	0.5/10.0 out of 0.5/10.0
10. Analysis	0.8/10.0 out of 1.0/10.0
TOTAL	9.45/10.0 out of 10.0/10.0

PROBLEM 1)

1. P-v and T-s diagrams	0.9/10 out of 1/10
2. Realize that some states are not needed	1/10 out of 1/10
3. State calculations (at least 11 of them)	2/10 out of 2/10
4. Calculate "y" and get $y=0$	0/10 out of 1/10
5. Calculate "z"	0/10 out of 1/10
6. Calculate ΔT water	1/10 out of 1/10
7. Thermal efficiency (W_{net} & Q_{in})	2/10 out of 2/10
8. Final results	0/10 out of 1/10
TOTAL	6.9/10 out of 10/10

PROBLEM 2)

1. P-v and T-s diagrams	1/9 out of 1/9
2. Realize that some states are not needed	1/9 out of 1/9
3. State calculations (at least 8 of them)	2/9 out of 2/9
4. Calculate "y"	1/9 out of 1/9
5. Calculate ΔT water	1/9 out of 1/9
6. Thermal efficiency (W_{net} & Q_{in})	2/9 out of 2/9
7. Final results	1/9 out of 1/9
TOTAL	9/9 out of 9/9

Total for the test

$$\left(\frac{9.45}{10}\right) + \left(\frac{80}{2}\right)\left(\frac{6.9}{10} + \frac{9}{9}\right) = 9.45 + 67.6 = 77.05$$

Reflecting on the test, I felt relatively prepared and familiar with the material. The curveball for this test was dealing with malfunctions within the system. At first, I panicked but decided to redraw the system diagram to accommodate the problem. After doing this I noticed that the calculations required wouldn't differ from what I already knew. On the first test, I jumped right into finding reference material. For this test, I spent time analyzing the problems first and drew my conclusions which I feel helped me with the process of solving the problem. I think a few more practice problems before the test I could've caught my issue with state 3 on problem 1. This would have improved my grade tremendously since that's where almost all errors derived from. So far, I have enjoyed the structure of the tests, and I think it is greatly improving my skills in analyzing rather than just routinely performing the same equations.