MET 350 Thermal Applications

Jeffre Redmond

Test 2 Reflection

1) How and why the test demonstrates your work toward one, or more, of the course learning objectives. Be specific on the course objectives you decide to mention.

The questions on this test apply to various learning objectives such as understanding how to apply first and second laws of thermodynamics. By utilizing the first law I calculated heat and work in the turbine, pumps, and boiler. Utilizing the second law I applied it through isentropic expansion and efficiency considerations. This problem is an ideal regenerative Rankine cycle with superheating and two feedwater heaters which required me to analyze the turbine extraction percentage and feedwater heating. Additionally, I calculated thermal efficiency by identifying the network output and heat input. Lastly, I demonstrated the understanding of vapor power cycles due to the multiple states in this cycle utilizing saturated and superheat tables.

2) How your test compares against the available solution. State the mistakes you made and what you will do next time to avoid making same mistakes. Please point out exactly where you made the mistake, say why you made the mistake, and how you should have done it. If you were taking this test again, what advice would you give yourself to ensure that you had a successful test?

Overall, I was very close on this test, process wise I was spot on the only error I made which then through my answer off was my enthalpy for 7a was 720.87 kJ/kg instead of the correct value of 417.51 kJ/kg. Having this error through some of my calculations off such as finding the "y" value percentage which then compounded into the "z" value. Other than this small mistake everything else was correct.

3) What your grade should be. Base it on the writing rubric provided in the test and the correctness of your solution. What are the strengths and weaknesses of your test?

For both questions based on the rubric my score is 94% with all categories being in the exceeds standards except for the data and variables with meets standard due to forgetting to put in the quality for the known variables and the calculations section being a meets standards due to the calculation error of the enthalpy for 7a.

4) Discuss the following:

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

The biggest issue I had when taking this test was that I accidentally got the wrong entropy for part 8 which through off a few of my data that relied on it. I caught this mistake after going back and double checking in the steam tables. This caused me to have to go back and recalculate my problem.

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

For each question I first completed the drawings of the PV and TS diagrams then added the different stages and attempted to find both pressure and temperature for each stage. This then allowed me to solve the questions with the use of the first law of thermodynamics.

c. What new concepts have you learned?

I didn't learn any new concept just what was practiced in class. I utilized previous questions we had completed to help solve these problems.

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

I think many of these concepts are used in the design phase of Rankine cycle steam plants. Utilizing these calculations, you could see how much steam you need to send to each feed water heater to optimize the plant's efficiency. Overall, you would still need to build a prototype to ensure the components can handle the systems operating parameters.

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

I would use this in a job where we were designing steam engine plants from infancy and wanted to get the theoretical data before proceeding.

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

In my current professional career, I don't really deal a whole lot with steam generation. The only boilers I typically deal with are for heating and ventilation. So the steam isn't used to produce power only to transfer its heat.

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

I don't think in the near future I will be utilizing this information gained in this course in my career field.

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 wouldn't really apply this information in my day-to-day job, but I could see the uses of it had I not already taken heat transfer.

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

I feel I am getting better at utilizing the tables and am getting more comfortable determining how to find enthalpy for each stage of the cycle.

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

So far in the course I don't see much use of the Rankine cycles in my career but understanding how to find out what state the fluid is in seems will be beneficial in future sections.

k. How much time did you spend on the test? How was the time organized? What

would you do differently? Why?

I spent about 3 hours finishing this test. I feel I organized the paper well and the data is very legible. I learned from the last test to ensure that I add each section required by the rubric.