MET 350: Test 2 Reflection

Carter Fishback 25 Mar 2019

1) Test two was structured to assess our abilities as engineers to thoroughly understand the different cycles that do not use pure gas as the fuel. Concepts on test one only considered superheated gasses and no mixtures in the cycles. Water was assumed as the primary source of fuel and could exists as one of two states within a cycle. Those two states were saturated liquid and superheated vapor. We were taught how to analyze Rankine systems that consisted of one or more of the following: superheating, reheating, regeneration. Each configuration involved different, but similar calculations to define each state within a cycle. To solve such problems, we were also given the 2nd Law of Thermodynamics and energy availability equations to assist in finding the thermal efficiency of such cycles.

2) Comparing my test to that of the solutions, I found that I made two outlying errors. One was made when creating the P-v and T-s diagrams of the full system. The other mistake was calculating the net work of the full system.

When drawing the diagrams for the first system described, I considered that state 7_b was a saturated liquid. However, I also assumed that 7_a had to be a saturated liquid as well. I considered this because of the state being located after the closed FWH. I realized after reviewing the solutions that the state was a saturated liquid but was not specified to be located on the bell curve itself.

During the calculation of the net work for the system of Case 1, I included the mass fraction, y, into the equation. This was done with the assumption that since the mass flowing through that pipe is fixed, it had to be considered. However, the solutions make it clear that he total mass of the system is flowing through that extraction point first and therefore, y, did not have to be multiplied into (h_6-h_7).

3) Recommended Grade:

Writing		Problem 1	
Purpose (0.5/10.0)	0.5	P-v and T-s Diagrams (2/18)	1.8
Drawings (1.0/10.0)	1	State Calculations, All 11 (4/18)	3.9
Sources (1.0/10.0)	1	Calculate y6 (z), y7 (y), y9 (1-y-z) (3/18)	3
Design considerations (1.0/10.0)	1	Net Work (2/18)	1.5
Data and variables (0.5/10.0)	0.4	Thermal Efficiency (1/18)	0.7
Procedure (2.0/10.0)	2	Realize that y7 (y) is 0 and 4=5 (2/18)	2
Calculations (2.0/10.0)	2	Calculate y6 (z), , y9 (1-y-z) (1/18)	1
Summary (0.5/10.0)	0.3	New Net Work and Thermal Efficiency (1/18)	1
Materials (0.5/10.0)	0.5	Final Results (2/18)	1.5
Analysis (1.0/10.0)	1		
Total Points (x/10.0)	0.97	Total Points	0.911111111
Final Grade	82.58888889		

4) When first introduced to the Rankine cycle and its many variations, I was very unsure about how I felt solving those problems. After completing the homework problems and reviewing the examples completed in class, I was much more confident going into the test. I realized that many of the problems we had already completed were very similar to one another in the calculations.

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This confidence in solving the problems helped prevent any major issues from emerging on test day.

During the test I made sure to take advantage of the professor's extra help opportunity by submitting my detailed procedure about how I was going to solve the problem. Doing so, Dr. Ayala, reviewed all others that took the opportunity as well and disseminated a few points to look out for. Those points were tailored to the questions that were asked and trend mistakes that he saw in the procedures submitted. This opportunity assisted me in pacing myself to complete the work on time, as well as, double check my work more thoroughly.

The new concepts that were covered on test 2 were not much different than those on test 1. Water was considered as the fuel the Rankine cycle which was the key concept. Tables were used much more as water creates the necessity to consider it in either a liquid, gas, or mixture. Steam that is applied to a turbine can create energy. This is why the importance of water as a fuel applies. Engineers are able to use these concepts in industrial applications such as a steam power plant. I believe that my passion to help design or modify a cycle to be more efficient can use the lessons from this test to assist me in my goal. There is always room for improvement in any system and by doing so, will help limit the amount of energy required to run it.

I spent approximately 4 hours on this test. A majority of the time was spent on formatting and calculating the states at each point in the cycle. However, I did not complete the test in one sitting which I believed to have helped. By working on it over the course of 2-3 days, I was able to check my work more easily and ensure that the answers I was getting made sense.