Reflective essay

Test 1

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1. The test reflects my understanding of course objectives that pertain to how to apply and use the 1st law, how to treat and understand reheating and regeneration parts of engine cycles as well as the thermodynamic laws behind jet propulsion engines under ideal conditions.
2.
    a. In Problem 1, throughout the problem from the diagram, given variables, and assumptions that are correct, however, in the last question of the problem an incorrect equation formula was used when trying to find the thermal efficiency under the regenerator efficiency being 100%. In the problem, going off the basis that it is under cold air assumptions, a Brayton Cycle with regeneration, I assumed I would use the equation 1-(T1/T4) * (P2/P1) ^k-1/k. I was confident in using this equation because it was intended for use under cold air assumptions from the class as the source. However, this was incorrect because if it has 100% efficiency then the state temperatures at 3 and 6 need to be calculated. By recalculating them to I should have used the same thermal efficiency formula I used before which was correct and then recalculated my heat addition and net work done.
    b. In problem 2, in the process of approaching the problem while using the efficiencies between states 2-3 and 4-5, I used an incorrect formula to calculate for the actual temperature in those states. As a result of this, following the next step in the calculations using pressures found in the tables and interpolation the pressure became incorrect giving later in the problem an incorrect final velocity, T3a, T5a, P5, P6, and V6, in the end resulting in a much larger than the actual force. However, if that mistake was corrected the overall process would have been near the actual. Another mistake made was the lack of writing clearly the interpolation calculations performed between the pressures for the temperatures. If taken back in time the best advice to give myself for this exam would be to write out in clear words what is happening in the problem regardless of how well I understand it without writing that out, as well as to prepare at least 3-4 pages for a single problem to properly space things out. In these pages I would advise myself to double check my equations beforehand to not make that error again.
3. Grading:

    1. Purpose 0.5/10.0
    2. Drawings 1.0/10.0
    3. Sources 1.0/10.0
    4. Design considerations 0.7/10.0

5. Data and variables 0.5/10.0
6. Procedure 1.0/10.0
7. Calculations 1.4/10.0
8. Summary 0.1/10.0
9. Materials 0.4/10.0
10. Analysis 1.0/10.0

TOTAL **6.52/10.0**

PROBLEM 1)

1. P-v and T-s diagrams 2/11
2. HX effectiveness for previous problem 1/11
3. State calculations (with regeneration) 2/11
4. Realize that regeneration hurts 0/11
5. State calculations (without regeneration) 2/11
6. Power 0/11
7. Final results 0.5/11

TOTAL **8/11**

PROBLEM 2)

1. P-v and T-s diagrams 2/8
2. State calculations 4/8
    A. Use wc_act = wt_act
    B. Use efficiencies to get states
    C. Cp & Cv variable
    D. P5
3. Propulsion efficiency (before and after) 0.5/8
4. Final results 0/8

TOTAL **6.5/8**

Grade = **6.52** + (80/2) * (**6.5/8** + **8/11**) + 9.798 = **77.91**

The reasoning behind these scores is due to a lacking summary, a messy and unorganized procedure, and a mistaken assumption leading to a mistaken calculations and design misunderstanding. The strengths on the test are that I understand the process, what is happening, how the system flows. My weaknesses come in the form of calculations errors combined with not writing details down and conceptual misunderstanding.

4. From this exam and reflection, I have learned the importance of writing down every single detail as well as thoughts on the process and its function. The importance being that not all people who go through the same problem are going to make the same assumptions or have the same thought process when solving or calculating it. For instance, making the assumption to use constant specific heats or variable specific heats while providing similar answers, the process and formulas used will be very different. In a professional setting, these details and small aspects may be crucial and learning it now

is far more beneficial than learning it later on in work. Writing down all thoughts in a clear manner can be beneficial to others that may read over your work or simply to help you sort out your own process through the problem. In the test I tried to go through it methodically and clearly, but only realized later how much I missed and how little space I gave myself when correcting them and reflecting on it. The total amount of time dedicated to the test was three days, a day each to each problem followed by a third day for review and calculation check; In hours during those days, the time is reduced to 2-3 hours. While it was a long time, I believe it was necessary to focus intently during that time and spread it out to not cause an overload, however, despite that I still made errors. The test itself was well structured and tested my comprehension of the concepts that were talked about in the class. In a way the test was both similar and different, in that the process was the same, but figuring out the way to make it look the same, changing the perspective a bit made the problem more similar than different.