Colby 350 Test 1 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.

- This test demonstrates my work towards Brayton cycles with intercooling-Reheating-Regeneration with effectiveness and total power produced as well the efficiency of jet propulsion cycles.

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?

- The first part of the test to find effectiveness was correct on my part and matched perfectly. Now the thermal efficiency was already calculated for us in practice problem 9-133 and we had to find Wnet. The way I calculated Wnet was by first using mass flow rate equation (P/W) which gave me 2.66 kg/s which is wrong because for some reason my calculator messed up my answer and didn't give me the correct result. Which I should have double checked. I did plug in the correct values for the mass flow rate equation though. The to figure out Wdot net I used the equation of mass flow rate times Wnet of the system. My Wnet is wrong due to me not calculating it and using the one that was given to us which his 226.801 kJ/Kg. So ultimately my power Wdot net is wrong by over 180 kW.
- For the second part of the test to calculate for propulsive efficiency I used the correct equations for jet propulsion where we use velocity of aircraft and force to calculate for Wdot Power. The force I used came directly from the practice problem solved for us in 9-142. My force is wrong since I used the previous one instead of calculating my own. The way I solved for Qin was (mass flow rate)(Cp)(T4-T3). I plugged that in to my jet propulsion equation using Wdot P and Qdot in. Which ultimately gave me a 34% efficiency.
- Then for the second part part B to find propulsive efficiency with a compressor efficiency of 80 percent and a turbine efficiency of 85 percent. I found h values using tables or calculations and to find Qdot in I did (mass flow rate)(Cp)(h4-h3a). and use the same Wdot P I then got a 46 % jet propulsion efficiency.
- Overall, I was pretty satisfied with the work I have done even though I got the wrong answers I still showed good work. The only thing I would change is knowing to recalculate for temperature five using the efficiency I calculated to get. I thought I had a pretty successful test and showed good work.

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?

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

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

TOTAL **10/10.0**

PROBLEM 1)

1. P-v and T-s diagrams 2/11
2. HX effectiveness for previous problem 1/11
3. State calculations (with regeneration) .5/11
4. Realize that regeneration hurts 2/11
5. State calculations (without regeneration) 1/11
6. Power 1/11
7. Final results 0.3/11

TOTAL **7.8/11**

PROBLEM 2)

1. P-v and T-s diagrams 2/8
2. State calculations .5/8
   - Use wc_act = wt_act
   - Use efficiencies to get states
   - Cp & Cv variable
   - P5
3. Propulsion efficiency (before and after) .5/8
4. Final results .5/8

TOTAL **3.5/8**

FINAL GRADE: (if everything is correct)

9.5 + (80/2)*(7.8/11+3.5/8) = 55.36

4) Discuss the following:

a. I did not encounter really any issues and thought what I was doing was correct.

b. I would probably take longer in completing the test and not just doing it for two days.

c. I have learned about the efficiency of jet propulsion cycles.

d. One example is aerospace applications such as aircraft jet propulsion.

e. Gas turbine engines are mainly used to power aircraft, trains, ships, electrical generators, pumps, gas compressors, and tanks.
f. I think anything I learn is important for my professional career it just matters on what job I get to apply this information.
g. Gas turbine engines are used to convert natural gas or other fuels to mechanical energy.
h. I have not because all of these concepts are new to me other than
i. I definitely improved in finding h values on tables and as well as finding efficiency.
j. I see it intersecting very well because I want to work for NASCAR as my dream job.
k. I spent about collectively 12 hours on the test. I thought I managed my time very well to complete the test over the span of my two days. Maybe start the test earlier in the week instead of the last two days.