# Test 1 Reflection

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?

In test 1, this test demonstrated multiple objectives described in the syllabus:

1. Apply thermodynamics laws to gas turbines Engines using ideal cycles, reheating regeneration, and inter-cooling cycles.
2. Define the thermal efficiency, second law efficiency, and energy availability.

For example, the first question. I was asked to decide which option would be best to use: a Brayton cycle with a regenerator (heat exchanger), a Brayton cycle without the regenerator, Brayton cycle with a two stage compressor with an intercooler, Brayton cycle with a compressor pressure ratio decreased to 8.58 rather than 10, and a Brayton cycle with a maximum temperature reaching 895.48 degree celsius rather than 800 degree celsius. Stated above from the objective in the syllabus, this is a direct correlation to apply thermodynamics laws to gas turbines Engines using ideal cycles, reheating regeneration, and inter-cooling cycles.

In comparison with the solution to Test 1 and my test.

Question 1a: Find Heat Addition

Instead of using: Cp(T4-T3) , I used the took the wrong temperature. I used Cp(T3-T5) which gave me a 10 degree difference. My answer was 480 degrees rather than 490 degrees. When I solved for efficiency, my answer was 49% vs. 48%

Question 1b: Find Heat Addition

Instead of using: Cp(T4-T3) , I used the wrong temperature. I used Cp(T3-T2) which gave me a 490.67 degrees Kelvin vs. 529.96 KJ/Kg. When solving for efficiency, when having the wrong heat addition value, it will give you an inaccurate efficiency value. The correct answer is 1.3391 which is impossible and I calculated -39%, which I figured made the engine less efficient.

Question 1e: Find Heat Addition

Instead of using: Cp(T4-T3) , I used the wrong temperature and equation which gave me a negative answer for heat addition. At that point, I should’ve realized something was wrong because it is impossible to have a loss of work when solving for work net. I calculated -47.22 rather than 529.96 KJ/Kg. When solving for efficiency, when having the wrong heat addition value and work net, it will give you an inaccurate efficiency value. The correct answer is 53% with a heat exchanger effectiveness of 93%. I calculated and 9.8% efficient and -34% heat exchanger effectiveness. After comparing my answers, I now see where I calculated incorrectly!

If I were to take the test again, I would make sure I understood exactly where heat addition is happening and heat rejection. I believe that was where my errors came from, other than those minor mistakes, I believe that I was quite successful on this test.

Based on the rubric

Purpose: 5%

Drawings & Diagram: 10%

Sources: 5%

Design: 6%

Data and variable: 5%

Procedure: 22%

Calculations: 17%

Summary: 5%

Materials: 5%

Analysis: 8.5%

**Grade: 85.5%**

My strengths were I believed I understood the questions completely.

My weakness would be to think just a little bit harder and actually analyze my results and see if they make sense.

Discuss the following:

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

* My approach in trying to solve the question. Used lecture notes, my notes, ask you questions

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

* I went somewhere quiet where I could I focus and think. It took me almost the whole entire time to solve those 2 questions. No, I don’t think I would change anything.

c. What new concepts have you learned?

* How to solve a Brayton cycle with different variables within the system!

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

* Automotive industry. I was able to relate and understand what was going on in the engine because my car operates with a turbocharger and intercooler.

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

* In the automotive industry

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

* Absolutely!

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

* R&D, for a car manufacture. I would like to work with engineers who design and decide which motor goes into what car. Why did they choose that motor, how will it make X amount of horsepower and torque, what can we do to make it faster and more reliable, etc.

h. Have you been able to apply concepts you have learned in the course to what you do at work or in other courses?

* Yes

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

* Brayton Cycle

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

* Direct correlation to engine tuning and performance. I can now solve and understand why heat soak happens, efficiency of turbos, etc.

k. How much time did you spend on the test? How was the time organized? What would you do differently? Why?

* I spent maybe a total of 20 hours. I started Thursday around 9PM til 12AM, Friday 8PM til 2AM, Saturday approximately 5 hours, and Sunday approximately 3 hours. Wouldn’t do anything different.