**Final Exam**

MAE 478, Spring 2017

**Date:** Friday, May 5, 2017 in same classroom (11:00am-1:00pm).

**Test Rules:**

1. You will be allowed to use your calculator during this test.
2. You will be allowed to create and use three one-page crib sheets during the test in order to write down important formulas or notes.
3. Talking/texting is prohibited.
4. The test will conclude exactly at 1:00pm. I will start picking up tests at that time.

**Test Hints:**

1. You should be able to solve problems involving converging-diverging nozzles.
2. You should be able to solve problems relating to burn rate and pressure.
3. You should be able to classify each of the missiles discussed in the missile of the day handouts. (E.g. are they air-to-air, anti-tank, ground-to-air, etc.).
4. You should understand the various parts of liquid rocket engines and solid rocket motors.
5. You should be able to sketch schematics for the different liquid engine cycles and discuss the various advantages and disadvantages of each.
6. You should understand, be able to sketch, and define the geometry of the propellant grain configurations I went over in class.
7. You should understand and be able to apply the equations and methods used in internal ballistics analysis of propellant grain configurations.
8. You should understand the terminology associated with propellant grain design and combustion.
9. You should understand the various types of solid propellant, and their various advantages and disadvantages.
10. You should be able to identify and sketch the various types of thrust vector control.
11. You should understand how missiles are controlled using aerodynamic control surfaces and 2D supersonic airfoil theory.
12. You should understand how to calculate the load factor of a missile.