**Henry Hunt**

Exam 1

**Problem 1:**

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| Solving For: | Answer: |
| 1. v2 | 2958.5 m/s or 9706.4 ft/s |
| 1. vth | 1255.2 m/s or 4117.9 ft/s |
| 1. Ideal Nozzle Exit Area | 0.020147 m^2 or 31.23 in^2 |
| 1. Ideal Specific Impulse | 301.6 seconds |
| 1. Actual Specific Impulse | 292.5 seconds |
| 1. Ideal C­F | 1.6 (unitless) |
| 1. Actual C­F | 1.56 (unitless) |
| 1. Actual Nozzle Throat Area | 0.0023174 m^2 or 3.59 in^2 |
| 1. Nozzle Area Ratio | 8.87 (unitless) |
| 1. Actual Exit Area | 0.020558 m^2 or 31.86 in^2 |
| 1. Ideal Exit Mach | 3.2 (unitless) |
| 1. Ideal Exit Temp | 1745.1 °K or 3141.1 °R |

**Problem 2:**

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| Solving For: | Answer: |
| 1. Nozzle Area Ratio | 18.737 (unitless) |
| 1. Optimum Mach Number at the Nozzle Exit | 3.839 (unitless) |
| 1. T1/T3 | 2.693 (unitless) |

**Problem 3:**

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| Solving For: | Answer: |
| 1. Mach Number at the Nozzle Exit | 4.771 (unitless) |
| 1. Static Temperature at the Nozzle Exit | 286.44 °K or 515.6 °R |
| 1. Static Pressure at the Nozzle Exit | 12123.86 Pa or 1.76 psi |
| 1. Velocity at the Nozzle Throat | 612.1 m/s or 2008.039 ft/s |
| 1. Velocity at the Nozzle Exit Plane | 1541.5 m/s or 5057.386 ft/s |
| 1. Theoretical Max Velocity at the Nozzle Exit Plane/Can this value be reached? | 1774.7 m/s or 5822.4 ft/s  The value of 1774.7 m/s **can't** be reached because the required temperature at this speed will fall  below the gas 'liquefaction' temperature. |