Assignment #6

1. Consider a rocket motor with a throat area ***A*\* = 0.11 m2**. The pressure and temperature of the gas in the combustion chamber are ***P*0 = 20 atm** and ***T*0 = 3517 K** respectively. The exit pressure, ***P*e**, is equal to the pressure at a standard-day altitude of 18 km.

Calculate

(a) the exit velocity ***V*e**,

(b) specific impulse ***I*sp**,

(c) mass flow ****

(d) thrust ***T***

**(e)** exit Mach number ***M***

Assume the rocket is flying at 18 km, ***R* = 519.1 J/(kg K)**, **γ = 1.22**, and ***c*p = 2879 J/kg K**.

Hint: Pe  = 7560 N/m2 at 18 km altitude. See example 4.5 in Anderson’s book.