ME 24-221
Thermodynamics I

Quiz No: 4
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15 minutes
Open textbook, closed notes

Consider the mixing chamber shown below. Two steady streams of air enter the chamber. Stream 1 has a mass flow rate of 0.1 kg/s, and is at 100 kPa, 600 K. Stream 2 has a mass flow rate of 0.6 kg/s and is at 100 kPa, 700 K. The streams are mixed together and exit the chamber in state 3. The condition in state 3 is 100 kPa, 900 K.

1. Find the exit mass flow rate of air in kg/s.
2. Find the volumetric flow rate at the exit in m^3/s.
3. Find the rate of heat transferred to the mixing chamber in kW.

You may assume air to be an ideal gas. However, you *may not* assume C_p and C_v to be constant. Use the air tables to find values of internal energy and/or enthalpy.