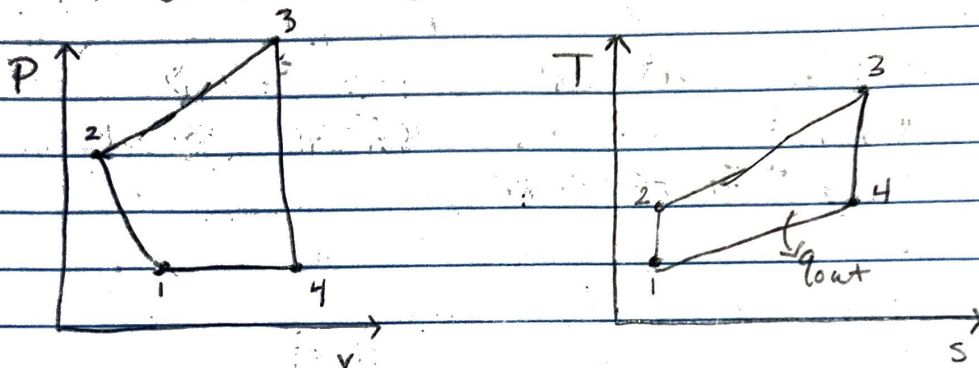


Anthony Sumner MET 350 Test 1

1. Purpose: Calculate the thermal efficiency and heat exchanger effectiveness. Determine the air mass flow rate of air in kg/s for a net power output of 500kW. Also find out what the thermal efficiency if the heat exchanger operates at 100%.

Drawings and Diagrams:



Sources:

Chapter 9 Gas Power Cycles: Brayton Cycle

Homework 1.4 Solutions

Table A-2

Table A-17

Design Considerations:

- Ideal cold air Brayton Cycle assumptions applicable
- Air is an ideal gas with variable specific heats.

Data and Variables:

$$T_1 = 310\text{K} \quad P_2 = 5\text{bar} \quad T_3 = 760\text{K} \quad T_4 = 1140\text{K}$$

$$P_1 = 1\text{bar}$$

$$k = 1.4$$

$$R = 0.287 \text{ kJ/kg} \cdot \text{K}$$

$$C_p = 1.005 \text{ kJ/kg} \cdot \text{K}$$

$$C_v = 0.718 \text{ kJ/kg} \cdot \text{K}$$

$$= 0.8$$