

Saturday

Thermodynamics Test Two
Spring Semester 2007
Open Book

Time: 60 minutes

May 19, 2007
Dr. Walid C. Assaf

Question One: (50%)

A piston cylinder set up contains 2 kg of water at 200°C and 10 MPa. The piston is moved slowly (reversibly) to expand the water in an isothermal process to a pressure of 200 kPa. Heat transfer takes place with a heat reservoir at 200°C. (a) Sketch the process on P-V diagram and calculate both (b) heat transfer and (c) total work.

4910 kJ

1290 kJ

sketch

Question Two: (50%)

A steady state steady flow of Ammonia goes through a device in a polytropic process with an inlet state of 150 kPa, -20°C and an exit state of 400 kPa, 80°C. Find and clearly box in the answers, (a) polytropic exponent n, (b) the specific work and (c) the heat transfer. Neglect KE and PE effects.

(d) Draw diagram for the Control Volume, draw T, S diagram. Identify all pertinent terms and values.

n = 1.538

Q = 73.3 kJ/kg

w = -140 kJ/kg