

Example Exam

SOLUTION

ChE 3172

Exam III
Open Books and Notes

July 22, 1999

I. 40 points

Calculate the amount of work required to compress ethylene gas from 1 bar and 300°K to 18 bar in a single, adiabatic compressor that has an efficiency of 0.80. Also, find ΔS across the compressor. You may assume that ethylene behaves as an ideal gas.

II. 60 points

Steam enters an adiabatic turbine at $P_1 = 11,000 \text{ kPa}$ and $T_1 = 650^\circ\text{C}$ and exhausts at $P_2 = 50 \text{ kPa}$. The turbine efficiency is 0.85.

A. 50 points

Find H_2 , S_2 , T_2 and x_2 (the quality) for the exhaust steam.

B. 10 points

How many horsepower does the turbine produce if $m = 10 \text{ kg/min}$?