ENSC 461

Assignment #8 (Vapor Power Cycles)

Assignment date:

Due date:

Consider a reheat-regenerative vapor power cycle with two feedwater heaters, a closed FWH and an open FWH. Steam enters the first turbine at 8.0 MPa, 480C and expands to 0.7 MPa. The steam is reheated to 440C before entering the second turbine, where it expands to the condenser pressure of 0.008 MPa. Steam is extracted from the turbine at 2 MPa and fed to the closed feedwater heater. Feedwater leaves the closed heater at 205C and 8.0 MPa, and condensate exits at 2 MPa. The condensate is trapped into the open feedwater heater. Steam extracted from the second turbine at 0.3 MPa. The stream exiting the open feedwater is saturated liquid at 0.3 MPa. The net power output of the cycle is 100 MW. There is no stray heat transfer from any component to its surroundings. If the working fluid experiences no irreversibilities as it passes through the turbines, pumps, steam generator, reheater, and condenser, determine: a) the thermal efficiency, b) the mass flow rate of the steam entering the first turbine, in kg/h.