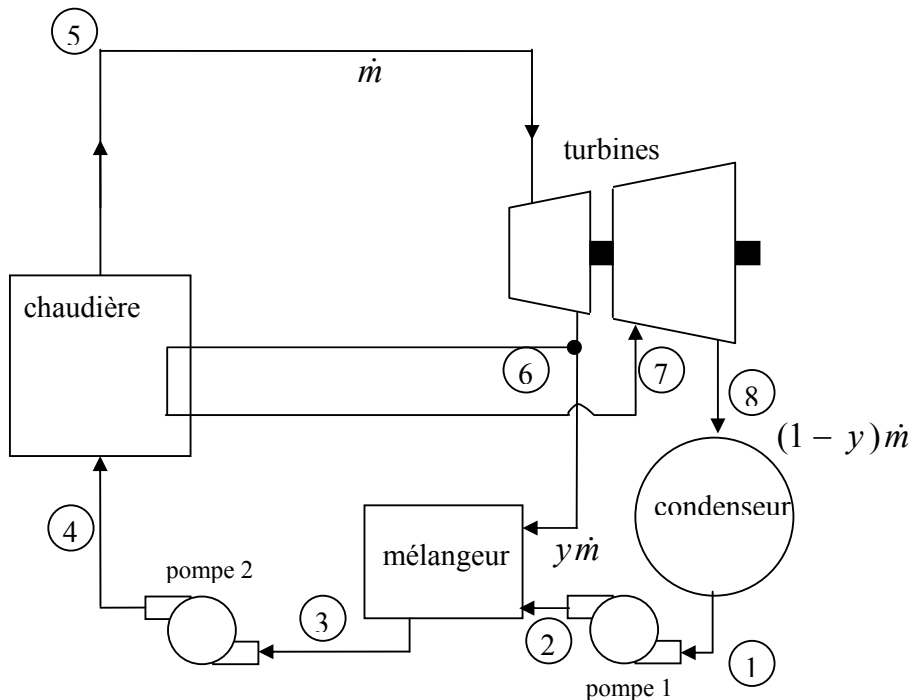


Problèmes (10-49) et (13-61) (5^{ème} édition)

10-49 A steam power plant operates on an ideal reheat-regenerative Rankine cycle and has a net power output of 80 MW. Steam enters the high-pressure turbine at 10 MPa and 550°C and leaves at 0.8 MPa. Some steam is extracted at this pressure to heat the feedwater in an open feedwater heater. The rest of the steam is reheated to 500°C and is expanded in the low-pressure turbine to the condenser pressure of 10 kPa. Show the cycle on a T - s diagram with respect to saturation lines, and determine (a) the mass flow rate of steam through the boiler and (b) the thermal efficiency of the cycle. Answers: (a) 54.5 kg/s, (b) 44.4 percent

Note: turbines et pompes sont adiabatiques et réversibles



13-61 An insulated tank that contains 1 kg of O_2 at 15°C and 300 kPa is connected to a 2-m³ uninsulated tank that contains N_2 at 50°C and 500 kPa. The valve connecting the two tanks is opened, and the two gases form a homogeneous mixture at 25°C. Determine (a) the final pressure in the tank, (b) the heat transfer, and (c) the entropy generated during this process. Assume $T_0 = 25^\circ\text{C}$.

Answers: (a) 444.6 kPa, (b) 187.2 kJ, (c) 0.962 kJ/K

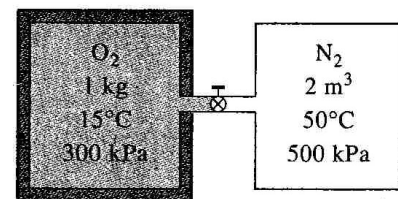


FIGURE P13-61