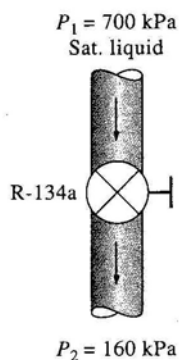


**Problèmes pour TD3 se trouvant seulement dans 5<sup>ème</sup> édition du livre de Çengel et Boles**

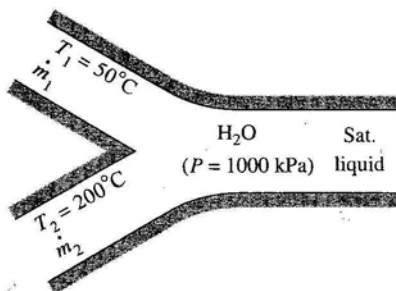
5-57 Air enters the compressor of a gas-turbine plant at ambient conditions of 100 kPa and 25°C with a low velocity and exits at 1 MPa and 347°C with a velocity of 90 m/s. The compressor is cooled at a rate of 1500 kJ/min, and the power input to the compressor is 250 kW. Determine the mass flow rate of air through the compressor.

5-66 Refrigerant-134a is throttled from the saturated liquid state at 700 kPa to a pressure of 160 kPa. Determine the temperature drop during this process and the final specific volume of the refrigerant. *Answers:* 42.3°C, 0.0344 m<sup>3</sup>/kg



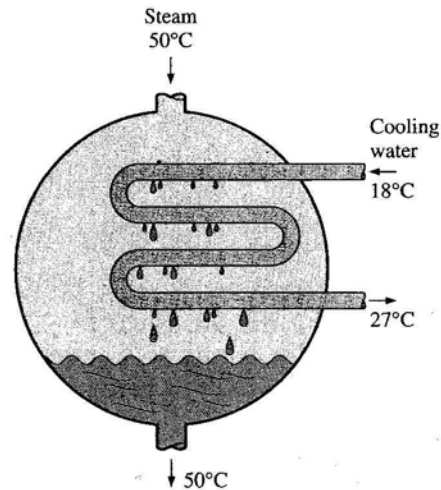
**FIGURE P5-66**

5-77 In steam power plants, open feedwater heaters are frequently utilized to heat the feedwater by mixing it with steam bled off the turbine at some intermediate stage. Consider an open feedwater heater that operates at a pressure of 1000 kPa. Feedwater at 50°C and 1000 kPa is to be heated with superheated steam at 200°C and 1000 kPa. In an ideal feedwater heater, the mixture leaves the heater as saturated liquid at the feedwater pressure. Determine the ratio of the mass flow rates of the feedwater and the superheated vapor for this case. *Answer:* 3.73



**FIGURE P5-77**

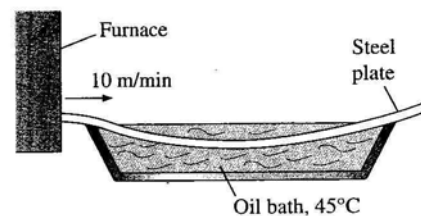
5-86 Steam is to be condensed in the condenser of a steam power plant at a temperature of 50°C with cooling water



**FIGURE P5-86**

from a nearby lake, which enters the tubes of the condenser at 18°C at a rate of 101 kg/s and leaves at 27°C. Determine the rate of condensation of the steam in the condenser. *Answer:* 1.60 kg/s

5-103 A long roll of 2-m-wide and 0.5-cm-thick 1-Mn manganese steel plate ( $\rho = 7854 \text{ kg/m}^3$  and  $c_p = 0.434 \text{ kJ/kg} \cdot ^\circ\text{C}$ ) coming off a furnace at 820°C is to be quenched in an oil bath at 45°C to a temperature of 51.1°C. If the metal sheet is moving at a steady velocity of 10 m/min, determine the required rate of heat removal from the oil to keep its temperature constant at 45°C. *Answer:* 4368 kW



**FIGURE P5-103**