## FE-Style Questions

**35-FE1:** A boiler feedpump accepts saturated liquid a 9.59 kPa and boosts the pressure to 1 MPa. The isentropic efficiency of the pump is 60%. The energy per unit mass added by the boiler feed pump is most nearly  
  
 a) 800 J/kg

b) 1000 J/kg  
 c) 1700 J/kg

d) 2400 J/kg

**35-FE2**: For the problem above, the temperature of the water leaving the boiler pump is most nearly  
  
 a) 45.2 C  
 b) 45.4 C  
 c) 46.1 C  
 d) 47.0 C

## Practice Problems

**35-1:**  A classroom contains 6000 cubic feet of air-water vapor mixture at 1 atm total pressure. The dry bulb temperature is 70 °F and the wet bulb temperature is 65 °F. Assuming a closed constant total pressure system, determine:

1. relative humidity
2. partial pressure of water vapor
3. dew point
4. amount of water that must be added or removed from the room to achieve 40% relative humidity at the same dry bulb temperature.

**35-2:**  1000 cubic feet per hour of moist air at atmospheric pressure, 80 °F, and 70% relative humidity is to be cooled to 50 °F at constant total pressure. Find whether or not this can be done without the removal of water from the air. If it cannot, determine the minimum amount of water that must be removed in lbm/hr.

## Answers

**35-1:** rh~0.77, P\_w,1 = 0.2794 [psia], T\_dp = 62.43 [F], m\_w removed = 2.626 [lbm]

**35-2:** You will have to remove water from the air, at roughly a rate of 0.54 [lbm/hr]

**35-FE1:** Should be around 1700 J/kg

**35-FE2:** T\_pump\_outlet ~ 45.4 [C]