NAME: STUDENT ID:

Problem

(1.1) Room contains air (ideal gas) at 25°C and 100 kPa at a relative humidity of 80%. Determine: (10 points)

(a) The partial pressure of dry air.

(b) The specific humidity.

(c) The enthalpy per unit mass of the dry air. (C_p = 1.005 kJ/kg °C).

(1.2) Steam is the working fluid in an ideal Rankine cycle. Saturated vapor enters the turbine at 8.0 MPa and saturated liquid exits the condenser at a pressure of 0.01 MPa. The net power output of the cycle is 100 MW. Determine for the cycle (10 points)

(a) The thermal efficiency,

(b) The mass flow rate of the steam, in kg/h,

(c) The rate of heat transfer into the working fluid as it passes through the boiler, in MW,