

ME 201

Thermodynamics

Homework 23, Due Friday, May 5, 2006 Extra Credit worth 10 points

1. Complete the following table for the properties of an air/water vapor mixture.

$T_{\text{dry bulb}}$ (°C)	$T_{\text{wet bulb}}$ (°C)	Rel.Hum. (%)	ω (kg/kg of dry air)	$h_{\text{a-v}}$ (kJ/kg of dry air)
15	.	20	.	.
35	25	.	.	.
10	10	.	.	.
20	.	.	0.007	.
.	.	50	.	70

2. Air enters an evaporative cooler at 30°C and 20% relative humidity. How much liquid water (in kg/kg of dry air) at 15°C must be evaporated to cool the air to 20°C and a relative humidity of 70%? (HINT: Neglect the enthalpy brought in with the liquid water)