Name: _____

ARE 346N Building Environmental Systems

Quiz 1 **January 28, 2010**

Closed book, closed notes 4 Questions

1. (1 Pt)
Which statement is true (circle the right answer):

- wet bulb temperature (WBT) is **always lower** than dry bulb temperature (DBT)

- wet bulb temperature (WBT) is **always higher** than dry bulb temperature (DBT)

- **wet bulb temperature (WBT) cannot be higher than dry bulb temperature (DBT)**

- wet bulb temperature (WBT) **cannot be lower** than dry bulb temperature (DBT)

2. (2 Pts)
List the there environmental parameters that are controlled in buildings by HVAC systems:

Temperature , RH , Air velocity

3. (2 pt)
List the methods that human body uses to release the energy (List at least three methods):

Convection from skin, Radiation from Skin, Evaporation from Skin, Evaporation from Lung, Convection from Lung , Conduction from Skin

4) (4 pts)
House A: annually uses 1000 kWh of electric energy and quantity of natural gas that produces 2000 kWh of heat energy.
House B annually uses 2000 kWh of electric energy and quantity of natural gas that produces 1000 kWh of heat energy.
If the furnace efficiency in both houses is 80%, which house contributes more to CO2 emission?
A
B Correct answer is B

Convert e3verything to primary energy:
A: Electric 1000 kWh of end use EE → 1/0.33*1000 kWh = 3000 kWh of primary energy
Gas 2000 kWh for heating → 1/0.8*2000 kWh = 2500 kWh of primary energy
Total primary energy: 5500 kWh

B: Electric 2000 kWh of end use EE → 1/0.33*2000 kWh = 6000 kWh of primary energy
Gas 1000 kWh for heating → 1/0.8*1000 kWh = 1250 kWh of primary energy
Total primary energy: 7250 kWh