Name: _____

NATS 101 Introduction to Weather and Climate, Section 54, Fall 2005
Quiz #0 (practice): Thursday, 8 September 2005.

1. Heat Transfer Methods [30]

Name the type of heat transfer (conduction, convection, or radiation) associated with each of the following observations:

a. Smoke rises from a chimney.

convection

b. The handle of a cast iron pan feels hot after the pan has been heated for some time.

conduction

c. You are warmed as the sun comes out from behind a cloud.

radiation

d. The branches of the tree above a campfire sway gently.

convection

2. Temperature and Temperature scales [20]

a. Convert 68°F to Celsius using the following formula: $T(°C) = 5/9 \times [T(°F) - 32]$

T(°C) = 5/9 x [68°F - 32] = 5/9 [36]

T(°C) = 20°C

b. Convert the answer you obtained in part (a) to Kelvin using the following formula: $T(K) = T(°C) + 273$

T(K) = 20°C + 273

T(K) = 293 K

c. Why can't temperatures ever fall below 0 K (absolute zero)?

Temperature results from the vibration of atoms/molecules. At absolute zero, all molecular motion stops. So nothing can get colder than 0K.

3. Composition of the Atmosphere [10+3]

a. Name three greenhouse gases in the earth's atmosphere.

Methane (CH_4), Carbon dioxide (CO_2), Water vapor (H_2O), Nitrous oxide (N_2O), Chlorofluorocarbons (CFCs)

E.C. What range of the electromagnetic spectrum do they absorb in?

Infrared

4. Satellite Images [25+3]

Refer to the two satellite images projected on the screen. These are from Tuesday, 6 Sep 2005.

a. In the visible satellite image there appears to be significant cloud coverage off the west coast of South America, but in the IR image the cloudy area appears gray. What can you infer about the height of these cloud tops?

The cloud tops are not very high. Brighter colors in IR images imply colder temperatures. Colder T's occur higher in the atmosphere.

b. Both figures show bright clouds over Venezuela and northern Brazil (northern part of South America). What can you infer about the temperature of the tops of these clouds?

Brighter clouds in the IR image imply colder temperature.

c. From the IR image, how does the temperature of the cloud-free western US and Baja California Mexico compare to the temperature of the water off the coast of California and Baja?

The land is darker than the ocean, implying that the land is warmer than the water.

E.C. What are the three bright features in both the IR and visible images off the coast of Florida in a southwestward to northeastward line?

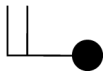
Hurricanes/tropical storms/tropical depressions

5. Meteorological Charts [15]

For the following surface wind observations, give the wind direction according to the accepted convention and give its speed in knots in the spaces provided.

a.  This represents a **northeasterly (southwestward)** wind at **15** knots.

b.  This represents an **easterly (westward)** wind at **5** knots.

c.  This represents a **westerly (eastward)** wind at **20** knots.

d.  This represents a **southerly (northward)** wind at **10** knots.