NAME: _____ SECTION _____

Atmospheric Sciences 101 Fall 2014
Homework #7 (Due Thursday, 4 December 2014)

1. Land/Sea Breezes [3]

Here we will draw a series of similar diagrams depicting the air circulation in a '**Land breeze**' situation.

A. Indicate the relative air temperatures over the water in the very early morning before dawn. [1]

B. Draw a diagram depicting how these temperatures change the pressure surfaces over water and land at the surface and aloft. Include symbols to indicate relative high and low air pressure and arrows indicating the direction of the pressure gradient force. [1]

C. Finally, draw a diagram showing the direction of air movement (both horizontal and vertical) at the surface and aloft. [1]

2. Forces Affecting Air Flow [4]

Below is an air parcel in between two 500mb heights lines.

A. Carefully draw arrows indicating the direction and relative strength (use the length of the arrow to indicate) of the pressure gradient force and Coriolis force (for the Northern Hemisphere). Draw a third arrow showing the wind direction. Label all arrows. [1.5]

_____ 5600m

_____ 5640m

B. What would you expect to happen to the magnitude of the velocity (wind speed) if the 500mb height along the 5600 metre contour was decreased to 5560 metres while the height along the 5640 metre contour remained unchanged? [0.5]

Below is an air parcel in between two surface isobars.

Carefully draw arrows indicating the direction and relative strength of the pressure gradient force, Coriolis force (for the Northern Hemisphere) and friction. Draw a fourth arrow showing the wind direction. Label all arrows. [2]

_____ 1016mb

_____ 992mb

3. Frontal structure and profiles [3]

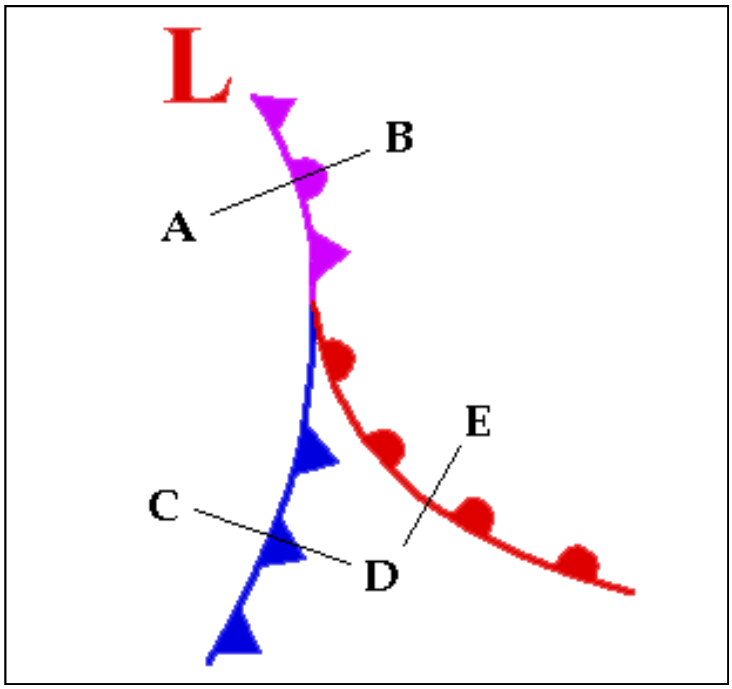
A. On the figure below, what fronts do the following represent? [1]

The structure intersected by the LINE A – B: _____

The structure intersected by the LINE C – D: _____

The structure intersected by the LINE D – E: _____

B. On the figure below, indicate the relative temperatures of each air mass. (Hint: There are three air masses involved. One each is “cold”, “cool”, or “warm”.) [1]



C. In the spaces provided, diagram the vertical profiles of the three fronts indicated in the above figure. Indicate the relative temperatures of the air masses in each of the figures. Be sure to accurately represent the shape of the fronts in the vertical. [1]

A – B **C – D** **D – E**