NAME: _____ **SECTION** _____

Atmospheric Sciences 101 Spring 2013
Homework #7 (Due Thursday, 6 June 2013)

1. Frontal structure and profiles

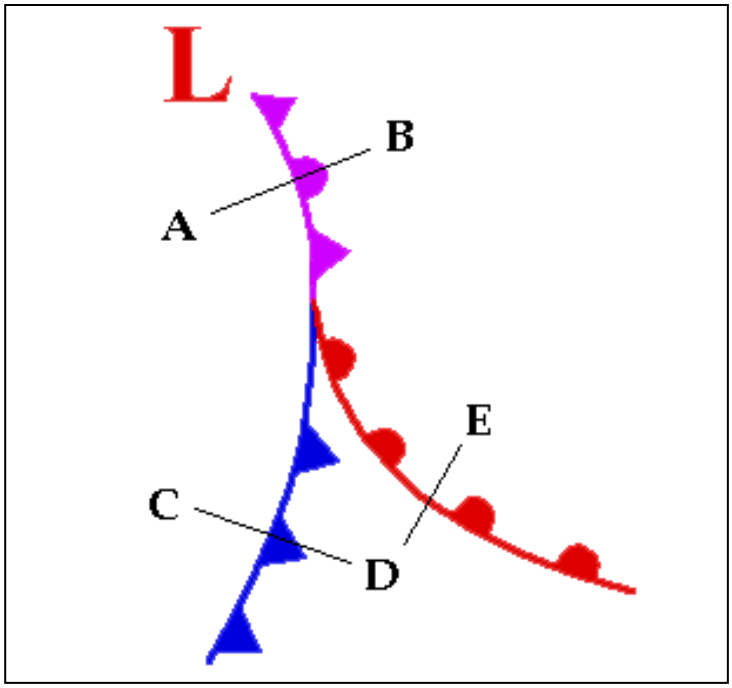
a) On the figure below, what type of fronts do the following represent? [1]

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]

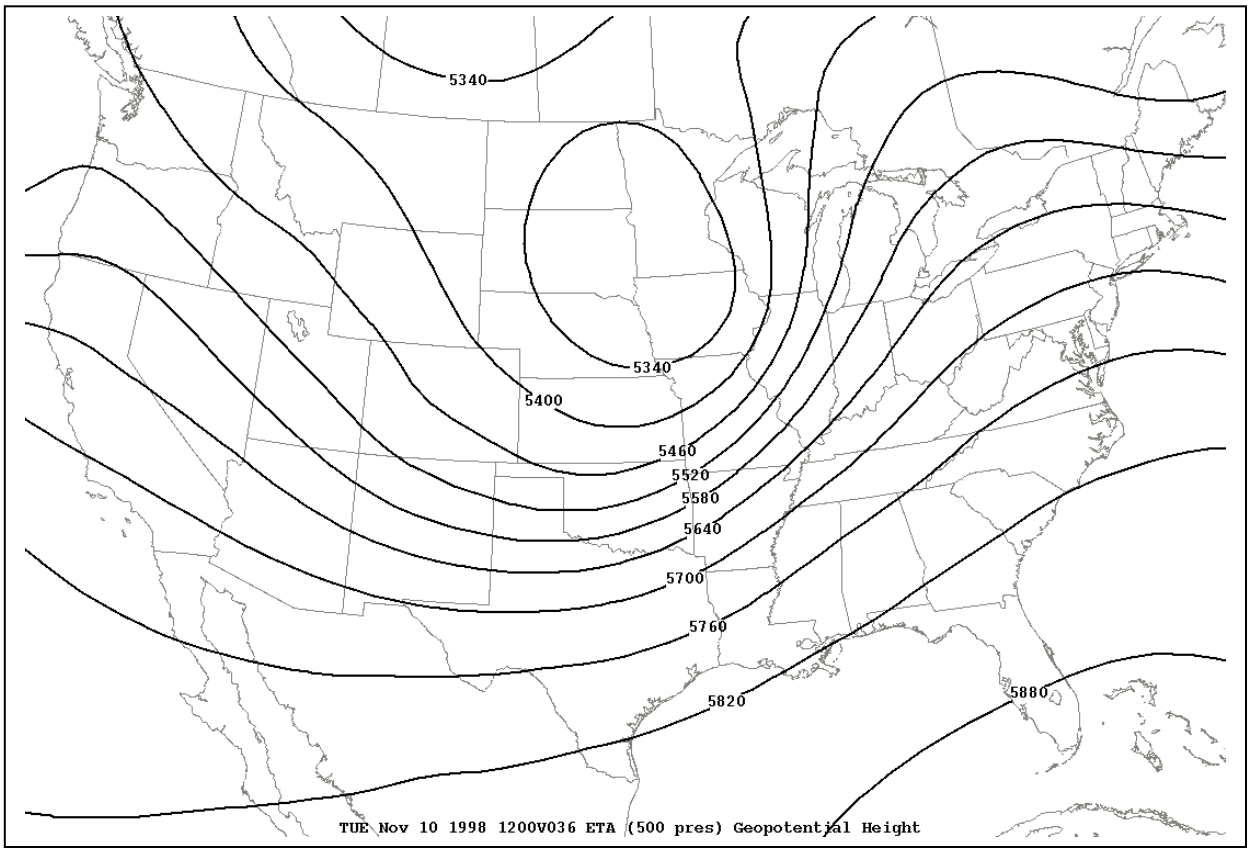


c) In the spaces provided, diagram the vertical profiles of the cross-sections through the three fronts indicated in the above figure. Indicate the relative temperatures of the air masses in each of the figures. Be sure to accurately represent the shape of the fronts in the vertical. [1]

A – B **C – D** **D – E**

2. The following diagram shows a map of 500mb heights. On the map below, include the following features:

a) The trough axis. [0.5]
b) The best location for the development or intensification of a surface mid-latitude cyclone (indicate on the map with symbol $\mathbf{L_D}$). [0.5]
c) The location where you would expect the strongest winds (indicate on the map with symbol **JET**). [0.5]
d) Use an arrow to indicate the approximate direction of the wind between the 5520m and 5580m isoheights at the "four corners" (intersection of Utah, Colorado, New Mexico and Arizona borders). [0.5]



3. Thunderstorms and Tornadoes

A. Explain why air mass (single cell) thunderstorms are short-lived in comparison with squall lines and supercells. [1]

B. What makes the air behind a gust front cold? [1]

C. What specific type of thunderstorm is characterized by the presence of a mesocyclone? [0.5]

4. Tropical Cyclones

A. Why do tropical storms not form on the equator? [1]

B. Name two conditions that are conducive to tropical cyclone development. [1]

C. What is the area of heavy precipitation surrounding the eye of a hurricane called? [0.5]