1. Flow around Low Pressure Centres.

A. Flow around a low pressure centre in either the Northern or Southern Hemisphere is termed cyclonic. Why do we not simply describe the flow direction as counter-clockwise? [2]

B. What vertical air motion would you expect above a low pressure centre in which the surface pressure is falling. Explain. [2]

2. Upper Level Support for Mid-Latitude Cyclones

A. How do jet streams and waves in the upper level flow initiate and intensify a mid-latitude cyclone? (HINT: consider convergence and divergence in the column of air above the surface low.) [2]

B. Where relative to an upper level trough is the most favourable location for the intensification of mid-latitude cyclones? If you wish, you may include a simple diagram in your answer. Is the air in the in this region aloft divergent or convergent? [2]
3. **Mid-Latitude Cyclone Structure.**

A. On the figure below, what do the following represent? [2]
   
i. The structure intersected by the LINE A – B: ________________________________________
   
   ii. The structure intersected by the LINE C – D: ________________________________________
   
   iii. The structure intersected by the LINE D – E: ________________________________________
   
   iv. The region designated by the “L” _________________________________________________

B. On the figure below, indicate the relative temperatures in the three regions. [2]

4. Frontal structure. In the spaces provided, diagram the vertical profiles of the three structures along the three transects indicated in the figure above (question 3). 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. [4]
5. The Jet Stream

This diagram shows the 200mb heights in a column of air that is cold to the north and warm to the south.

A. Mark with a dot the 600mb height on both the cold side and warm side. The 600mb height will be approximately half way between the 1000mb surface (the ground) and the 200mb surface. [1]

B. Draw a line to connect your dots. This is the 600mb surface. Which pressure surface (1000mb, 600mb or 200mb) has the steepest slope? [1]

C. The pressure gradient force is proportional to the slope of a constant pressure surface. Which pressure surface will have the strongest geostrophic wind? [1]

D. What will be the direction of the geostrophic wind? (Remember in meteorology that winds are name for the direction from which they arise. A southerly wind comes from the south.)