Instructions: Complete the following problems showing all necessary work. Answers that are not legible or do not show the necessary work will be given a grade of zero.

1. H&H 1.2
2. H&H 1.4
3. H&H 1.6
4. H&H 1.7
5. H&H 1.11

6. Use the surface weather map for 00 UTC 16 October 2007 posted on the class web page to answer the following questions.

6a. Calculate the horizontal components of the pressure gradient force and Coriolis force at Redwood Falls, MN (give your answer in component form).

6b. Calculate the horizontal acceleration of an air parcel at this location if the pressure gradient and Coriolis forces are the only forces acting on the air parcel.

6c. In what direction will the air parcel accelerate due to the pressure gradient force alone?

6d. In what direction will the air parcel accelerate due to the Coriolis force alone?

6e. In what direction will the air parcel accelerate due to the net force (pressure gradient force and Coriolis force) acting on the air parcel?

6f. What force (give your answer in component form) is needed so that the air parcel does not experience any acceleration?

7. Use the 500 mb weather map for 00 UTC 16 October 2007 on the class web page to answer the following questions.

7a. Calculate the horizontal pressure gradient force at the three labeled points on this map (give your answer in component form – you may assume that the y axis is parallel to the left and right edges of the map and the x axis is parallel to the top and bottom edges of the map).

7b. Calculate the wind (in component form) that is required to give a Coriolis force that exactly balances the pressure gradient forces calculated in problem 7a. (Hint: The latitude at points A and C is 48 deg N and at point B is 53 deg N).

7c. Calculate the wind speed and wind direction for the winds calculated in problem 7b. Give the wind direction in degrees using standard meteorological notation.

7d. What is the direction of the wind in problem 7b relative to the 500 mb height contours?