

1. a) (1 point) The cloud type now above this UBC building is \_\_\_\_\_ .  
b) (4 points) Based on the clouds and weather that you see out the window **now**, what type of weather system is happening or approaching, and what is your weather forecasts for 6 h from now?

Now:

Future:

2. What effects do the Coast Mountains in BC have on the local weather along the BC west coast ...

a) (2 points) ... for strong synoptic conditions with approaching mid-latitude cyclones in winter?

b) (2 points) ...for summer conditions of high pressure, clear skies, and light to calm synoptic-scale winds?

3. In a hurricane (typhoon, tropical cyclone) the pressure in the eye near sea level is very low compared to the surrounding air farther from the eye. But at the top of the hurricane eye, the pressure is higher than its surroundings.

a) (4 points) Why is the eye pressure high (relative to pressure outside the eye) at the storm top?

b) (4 points) What affect does this high pressure aloft have on the evolution of the hurricane?

Name: \_\_\_\_\_

4. Analyze the following weather maps of temperature ( $^{\circ}\text{C}$ , at left) and pressure (kPa, at right). They are for the same weather system. Draw isotherms every  $2^{\circ}\text{C}$  (start at  $4^{\circ}\text{C}$ ), and isobars every 0.2 kPa (start at 99.4 kPa).  
a) (12 points) use pencil, and draw lightly, for both maps.

4	5	7	8	9	10	11
3	5	7	9	10	11	12
4	5	10	14	16	16	14
5	5	12	15	18	20	20
6	7	14	16	18	21	21
8	10	15	16	18	20	21
10	14	15	17	18	19	20
14	15	16	17	18	19	19

99.9	99.8	99.8	99.9	100.0	100.1	100.2
99.8	99.7	99.6	99.7	99.8	100.0	100.1
99.9	99.6	99.3	99.6	99.7	99.8	100.0
99.9	99.8	99.5	99.8	99.9	99.9	100.0
100.0	99.8	99.6	99.9	100.0	100.1	100.1
100.0	99.8	99.8	100.0	100.1	100.2	100.3
100.0	99.8	100.0	100.1	100.2	100.3	100.4
100.0	100.0	100.1	100.2	100.3	100.4	100.5

- b) (1 point) On the temperature map, label any warm centers with “W”, and cold centers with “C”.  
c) (2 points) With a dark thick line, draw appropriate fronts on the temperature map, and label the fronts with the appropriate symbols.  
d) (1 point) On the pressure map, label any low “L” and high “H” centers  
e) (2 points) On the pressure map, draw vectors showing the boundary-layer (near surface) wind directions at the points indicated by the small boxes.

f) (3 points) At the point on the temperature map shown by the small box, what is the likely current clouds and weather? (Hint, consider both maps to help you decide.)

g) (4 points) At that same point on the temperature map, what is your forecast clouds and weather for the next 6 hours? ...and explain why.

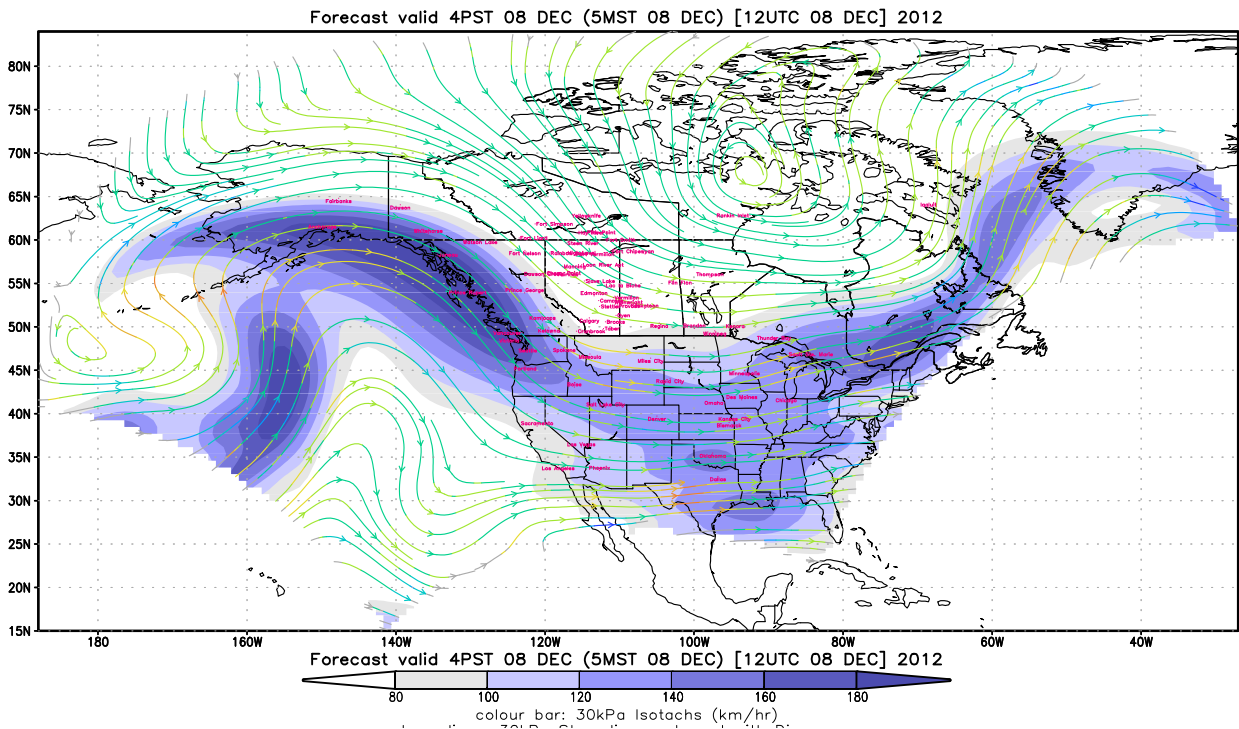
5. (5 points)

What causes the jet stream, such as in the next figure, to meander north and south? (short answer)

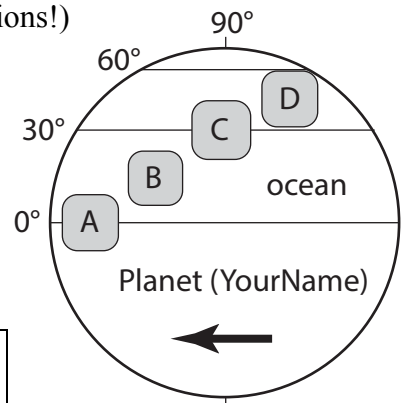
Name: \_\_\_\_\_

6. The weather map below shows isotachs (shaded) and streamlines on the 30 kPa isobaric surface. On that map, label with A, B, C, D four locations that would favor the greatest cyclogenesis, and then in the table below, explain why for each point.

(2 points) A
(2 points) B
(2 points) C
(2 points) D



7. A new planet has been discovered, and was named after you. (Congratulations!) This planet is the same size and mass as Earth, and rotates at the same speed, but in the opposite direction (see arrow on diagram). Similar to Earth, this planet is covered mostly by oceans, but has four continents A – D. Your mission is to anticipate the nature of the general circulation on your planet. For the following questions, focus on the Northern Hemisphere. The planet has the same atmosphere as Earth is affected by sunlight the same way as earth.



a) (5 points) Ignoring the continents for now, within what latitude band(s) on YourPlanet would you expect **west** winds in the average circulation **near the surface**? Why?

Name: \_\_\_\_\_

7. (continued)

b) (5 points) Ignoring the continents for now, within what latitude band(s) on YourPlanet would you expect **east** winds in the average circulation **near the tropopause**? Why?

c) (5 points) Ignoring the continents for now, at what latitude(s) would you expect average conditions that are usually **calm or light winds** in the general circulation **near the surface**? Why?

d) During late summer, circle the rotation direction for monsoon winds over the following continents:  
(1 point) Continent A: (clockwise , counterclockwise, or not-much-monsoon-rotation)  
(1 point) Continent B: (clockwise , counterclockwise, or not-much-monsoon-rotation)  
(1 point) Continent C: (clockwise , counterclockwise, or not-much-monsoon-rotation)

e) (2 points) Assuming no mountains on these continents, which continent(s) would have persistent heavy rain? Why?

f) (2 points) Which continent(s) would be mostly dry and desert-like? Why?

g) (2 points)

Hurricanes would mostly likely affect which one continent? \_\_\_\_\_

For this continent, most hurricanes would come from what direction? \_\_\_\_\_

8. Consider **extratropical** cyclones in winter on YourPlanet (see previous page).

a) (1 point) The continent(s) most affected by these extratropical cyclones is/are \_\_\_\_\_

b) (1 point) The cyclone's rotation direction is

[clockwise, counterclockwise, not-much rotation (circle one)].

c) (1 point) These extratropical cyclones will, on average, translate toward what direction?

d) (3 points) Cold air would usually be found on which side of the cyclone? [ west , east (circle one)]  
Why?

e) (5 points) For cyclogenesis, the trough axis of low pressure on this planet will generally tilt toward what direction with increasing altitude. [ toward the west , toward the east (circle one)] Why?