AOS 100/101
Spring 2018

HOMEWORK #6
(Due Fri. April 20)

Please provide concise, grammatically correct, neatly written answers to the following questions. All questions can be answered in, at most, a few sentences. Don't forget to write your name on the paper!!!

NAME:

1) A nearly continuous line of thunderstorms rings the globe near the equator. This feature is known as the Inter-Tropical Convergence Zone (ITCZ). The thunderstorms are fed by low-level inflow toward the equator from both hemispheres and they exhaust upper-level outflow toward the poles in both hemispheres as shown in Fig. 1a below. Explain why, in the face of the Earth's rotation, this circulation produces low-level winds from the east and upper-level winds from the west as shown in Fig. 1b.

(10 pts)

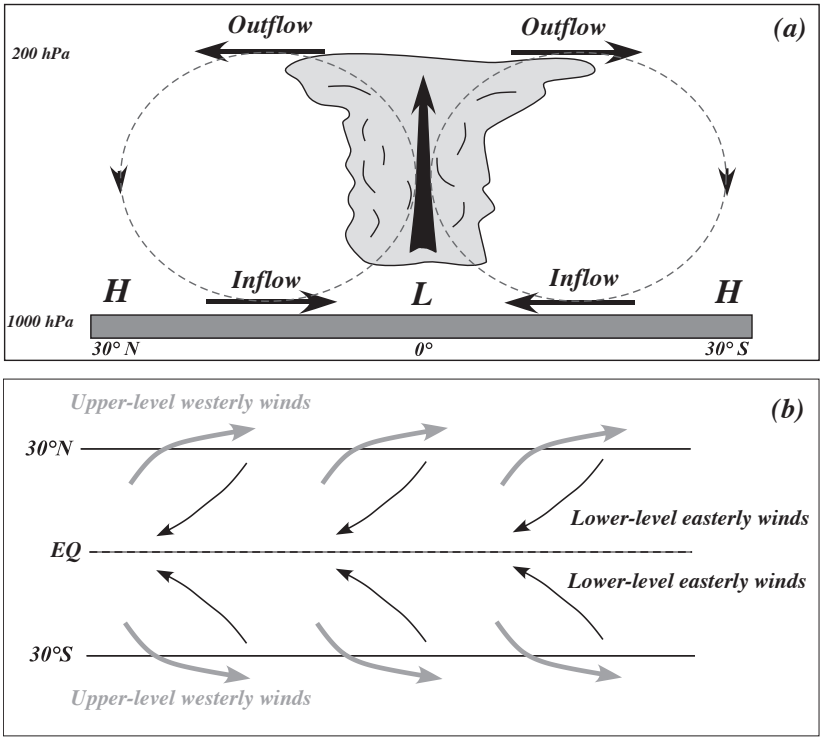

FIG. 1

2) The Coriolis force we have discussed in class is actually the product of the wind speed (V) and the Coriolis parameter, *f*, which is largest at the poles and zero at the Equator (i.e. COR = *f*V). Given this fact, explain why, for the same PGF, the 500 hPa geostrophic wind at New Orleans, LA is larger than at Minneapolis, MN. (10 pts)

3) You decide to take a walk on a windy, snowy night in Madison. Walking to the southwest you have the wind at your back. Is that actual wind stronger or weaker than the geostrophic wind? Explain. Is your path to the right or to the left of the geostrophic wind direction? Explain. (10 pts)

4) *Backing* is a term that means "to turn in a counterclockwise direction". On a certain day in Santiago, Chile the PGF remains constant in size and direction in the lowest 1 km of the atmosphere (i.e. from the ground to 1 km above the ground). Explain why the wind direction in the lowest 1 km of the atmosphere backs with increasing height on that day. (HINT: Consider the force balances at the surface and at 1 km)

(10 pts)