Review Questions for Exam 1 Oct 3, 2014 ATM 645/445

Definitions Part: (not open book) This part will be 25% of the test and should take you less than 15 minutes. These will be fairly straightforward questions.

1) Define the geostrophic balance
2) Identify terms given the various equations we have derived/discussed (e.g. equations of motion, thermodynamic equation…)
3) What is Dines Compensation and what assumptions are made to get to this conclusion?
4) Define inertial and non-inertial reference frames. How do they differ?
5) Total derivative and explain it's meaning in the Lagrangian frame and expand it in the Eularian frame in vector and component forms.
6) Potential Temperature, Virtual temperature, virtual potential temperature.
7) Adiabatic Lapse Rate
8) Buoyancy.
9) Conditions for stability in dry atmosphere
10) Brünt-Vaisala frequency is a function of what? Meaning of sign of N^2.
11) Basic vector manipulations, add, subtract, dot product and cross product. Differentiate a vector. Definition of del operator and the manipulations you can do with the del operator (e.g. divergence).
12) Draw and name different flow kinematics given the equations.
13) What does isothermal mean?
14) Effect of Coriolis Force on a parcel.
15) What is the point of doing scale analysis?

Thinking Parts: (Open notes and homework and any photocopies you want to have) This will be 75% of the value of the test. There will be 3-4 problems similar to homework or manipulations we have done in class. Most will be reasonably straightforward, but one will likely test a synthesis of what we have learned.

1) Given some scaling values and an equation, be able to do a scale analysis and determine which terms are most important.
2) Given a few equations, recombine to get something else.
3) What assumptions are made in deriving various equations
4) Give you one of the tasks that I gave as 'WOAH' derive assignments in class.