Topics you should be familiar with for AOS 311 Exam 1

1) Material from AOS310, specifically:
    a. Geostrophic, hydrostatic, and thermal wind balance
    b. Thickness
    c. Divergence, gradient, and curl
    d. Vorticity
    e. Governing equations:
        i. Momentum
        ii. Thermodynamic equation
        iii. Equation of state for dry air
        iv. Mass continuity equation
    f. Streamfunction and velocity potential
2) Boussinesq fluids
3) Barotropic and baroclinic fluids
4) f-plane and β-plane approximations
5) Circulation and circulation theorems
6) Vorticity equation
7) Potential vorticity (shallow water; QG; two-dimensional, non-divergent)
8) QG vorticity and thermodynamic equations
9) QG ω-equation and height tendency equation
10) Invertibility (requirements, definitions, and consequences)
11) Rossby wavesReynolds' averaging
12) **Generation of turbulence (buoyancy vs. shear)**
13) **Mixed layer problem (closure assumptions, BCs, characteristics of solution)**
14) **Bottom Ekman problem (closure assumptions, BCs, characteristics of solution, net transport and divergence of that transport)**
15) **Spin-down in neutral and stably stratified environments**
16) **Surface Ekman problem (closure assumptions, BCs, characteristics of solution, net transport and divergence of that transport)**

Material from the current lab WILL NOT be included in this exam.