1. **Approximating fluid motions** (5 points)
   
   (a) What is hydrostatic balance?
   
   (b) What is the anelastic approximation, and when is it applied in the Earth’s atmosphere?
   
   (c) What is the Boussinesq approximation and when is it valid?

2. **Vertical Boussinesq Navier-Stokes Equation** (8 points)
   
   (a) Starting with equation 1.3.7, apply the Boussinesq approximation, divide the pressure into its hydrostatic and nonhydrostatic parts, and derive the vertical Boussinesq Navier-Stokes Equation (equation 1.3.10).
   
   (b) Using the scaling suggested in the text, derive the scaled form of the vertical momentum equation (1.3.16).

3. **Buoyant parcels** (10 points)
   
   Emanuel problems 1.1-1.4.