MAST-602: Introduction to Physical Oceanography (fall 2008)
Andreas Muenchow

Study Guide Questions for Sept.-18, 2008 lecture on

Equations of Motion

Reading: Knauss (1997): p. 81-85 (acceleration), p. 87-89 (Coriolis), p. 96-99 (friction), p. 101-102 (Reynolds stress), and p. 104 (Equations of motion)

1. How would you measure a Lagrangian and an Eulerian velocity?
2. What is the difference in the pressure distribution between an explosion and an implosion?
3. What is the force balance in the vertical of a fluid at rest?
4. Which way does the pressure gradient force in the vertical direction point, up or down?
5. How large is the Coriolis force for a particle at rest?
6. For two hurricanes moving at the same constant velocity towards the coast of Delaware and Texas, which one experiences a larger Coriolis force?
7. As the Gulf Stream moves northward from Florida to New England, does its Coriolis force increase or decrease along its path?
8. If frictional stresses were only due to the molecular transfer of kinetic energy, how long would it take for a surface current of 0.5 m/s to extend 2-m below the surface and what would the speed be at that depth at that time?
9. Why are vertical eddy viscosities much smaller (by about a million) than horizontal eddy viscosities?
10. What are the 6 terms that constitute the momentum equation?