Phys 410

Spring 2013

Homework #5

Due Friday, 8 March, 2013

All problems are from Taylor, *Classical Mechanics*.

1) Problem 9.1 Buoyant force in an accelerating reference frame
2) Problem 9.2 Artificial gravity on a space station
3) Problem 9.7 Time derivative of vector in rotating frame
4) Problem 9.9 Coriolis force
5) Problem 9.14 Surface profile of water in a rotating bucket
6) Problem 9.19 Circular motion with different initial conditions
7) Problem 9.20 Spiral motion [*Hint: see Section 5.4- Critical Damping for the 2nd solution to the diff. eq.*]
8) Problem 9.33 Foucault pendulum initial condition
9) Problem 6.1 Geodesic on a sphere
10) Problem 6.4 Snell's law [*Hint: the time for light to traverse each path is the path length divided by the speed of light v = c/n*]

Extra Credit

1) Problem 6.24 An optical "cloaking device"