

Phys 410

Fall 2014

Homework #5

Due Thursday, 9 October, 2014

NOTE: EXAM #1 is October 16, 2014, Covering ~ chapters 1-6, 9 of Taylor

All problems are from Taylor, *Classical Mechanics*.

- 1) Problem 9.2 Artificial gravity on a space station
- 2) Problem 9.7 Time derivative of vector in rotating frame
- 3) Problem 9.9 Coriolis force
- 4) Problem 9.14 Surface profile of water in a rotating bucket
- 5) Problem 9.19 Circular motion with different initial conditions
- 6) Problem 9.20 Spiral motion [*Hint: see Section 5.4- Critical Damping for the 2nd solution to the diff. eq.*]
- 7) Problem 9.28 Coriolis effect and shell trajectories
- 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"