ADVANCED MECHANICS — PHY-4241/5227 HOMEWORK 2

(January 12, 2004) Due on 10 am (Grader mailbox), Tuesday, January 20, 2004

PROBLEM 4

Problem 7.7 of Thornton and Marion

PROBLEM 5

Approximate the equations of motions of the previous problem to small ocillations around the rest position and find the frequencies of the normal modes.

PROBLEM 6

Consider the spherical pedulum (a point mass m on the surface of a sphere of radius R under the influence of gravity $-g\hat{z}$).

1. Write down the Lagrange function using spherical coordinates.

2. Find the Euler-Lagrange equations.

3. Calculate the special solutions for $\theta = \text{constant}$.