Physics 200A **Mechanics I** **Fall 2015**

Problem Set V: Due Date TBA

FW=Fetter and Walecka

1.) FW 4.1 a.), b.), d.)

2.) FW 4.4

3.) FW 4.9 a.) You may state the three $\omega^2 = 0$ modes on the basis of symmetry.

4.) FW 4.10

5.) FW 4.13

6.) FW 4.16

7.) FW 7.1, a, b. You need only discuss d' Alembert solution in B.

8.) Consider a string of length L and mass-per-length μ which is, as usual, clamped at both ends. Assume the tension is T.

Express the Hamiltonian density in terms of the Fourier coefficients, thereby converting the problem to one of particle dynamics. (Hint: Expand the displacement in terms of the *spatial* eigenfunctions.) Derive the Hamiltonian EOMs.

9a.) Generalize the derivation of the nonlinear wave equation for a string to that for a 2D membrane (i.e. drum head), with clamped boundary. Show that you recover the wave equation in the linear limit.

b.) Derive the energy-momentum conservation equations for linear waves on this membrane.

1-2 Problems to be added.