362L Homework Set 3 **February 18, 2019**

["H & G" refers to our textbook. This assignment is due in a week; that is, it is due in class on Feb.25. Show a complete solution to each question, explaining things in your own words. Many of the questions are quite simple and straightforward. Where specific information about various individual particles is needed, as a check on your result or to begin the setup of the solution, consult reliable on-line sources.]

(1) What is the charge-conjugate ($\mathcal{C}$) reaction to $K^- + p \to \bar{K}^0 + n$? Can a $K^- + p$ system be an eigenstate of the charge conjugation operator? Give a similar discussion for the reaction $\bar{p} + p \to \pi^+ + \pi^-$.

(2) Which of the following particles or states are eigenstates of $\mathcal{C}$? For the ones which are eigenstates, what is the eigenvalue? $|\gamma\rangle,\ |\pi^0\rangle,\ |\pi^+\rangle,\ |\pi^-\rangle,\ |\pi^+\rangle - |\pi^-\rangle,\ |\nu_e\rangle,\ |\Sigma^0\rangle$.

(3) 9.5 in H & G.

(4) 9.11 in H & G.

(5) 9.19 in H & G.

(6) 9.29 in H & G.

(7) 9.37 in H & G.

(8) 9.43 in H & G.