Physics 472 – Spring 2008

Homework #10, due Friday, April 11
(Point values are in parentheses.)

1.   [3] Griffiths problem 9.8.

2.   [2] Griffiths problem 9.10.

3.   [9] Griffiths problem 9.11. Use the information on selection rules in Section 9.3.3 to help figure out which matrix elements are zero, and to find relationships between different matrix elements. If you take full advantage of the information there, you should only have to calculate 3 distinct matrix elements, one of which you already calculated in problem 9.1 of the previous problem set. I suggest you do the radial integrals and angular integrals separately, because you will need the latter again on the next problem.

4.   [6] Griffiths problem 9.14 parts (b) and (c). (You already did part (a) on the previous homework set.) Some of the angular integrals in this problem are the same as those you did for problem 9.11. Feel free to use Mathematica for the radial integral.

    When you finish problem 4, compare the answers you obtained for problems 3 and 4. The lifetime you obtained in problem 4 is 100 times longer than the one you obtained in problem 3. Why is that? Which factor in the calculation differs the most between the two situations?