Hints: Assignment 4

2. "Unimodular" means determinant is unity. You will find lots of useful information for this problem in §3.2, 3.3.

3. Note that an expression like $\mathbf{S}^{e^-} \cdot \mathbf{S}^{e^+}$ means

$$\mathbf{S}^{e^-} \cdot \mathbf{S}^{e^+} = S_x^{e^-} \otimes S_x^{e^+} + S_y^{e^-} \otimes S_y^{e^+} + S_z^{e^-} \otimes S_z^{e^+}.$$

8. You need to read §3.2, 3.3.

15ab. You will want to express this wave function in terms of spherical harmonics.

15c. You need to find an expression for the potential in terms of the energy and the wave function.

16. By the "semi-classical" interpretation Sakurai wants you to think about angular momentum expectation values as ordinary vectorial quantities.

24. Don't just state the answers; I need to see a computation/explanation of your results.