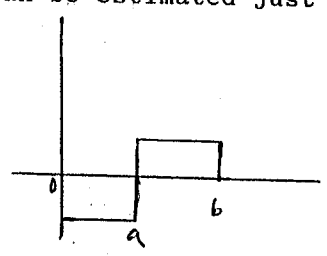


- 8% 1, We used to use double slit experiment to say electron has wave property. Explain. What do you say if we have only one electron.
- 10% 2, If an atom has two p-electrons. What could the total orbital angular momentum be? What could the total angular momentum be? Which state will be the ground state? Why?
- 12% 3, Why simple harmonic oscillator problem is important in physics? Find the energy eigen value of a one dimensional simple harmonic oscillator.
- 10% 4, If an electron in atom has orbital angular momentum l . Find its energy splitting in a magnetic field B.
- 10% 5, What is nuclear magnetic resonance. What is the use of it?
- 10% 6, How do you estimate the ground state energy of helium?
- 10% 7, In nuclear β -decay we can say that there must be a neutral spin particle exit except proton, neutron and electron. Why? Design an experiment that can measure the parity violation of β -decay.
- 10% 8, What is Fermi energy? Estimate it for a solid of dimension L.
- 8% 9, Why laser beam energy is much stronger than the usual light? In order to have monochromatic laser beam how do we choose the material?
- 12% 10, Find the Schrodinger equation solution for a potential in one dimension as shown in the figure. Find the transmission coefficient. Explain that α -decay can be estimated just the same way.



$$V = \begin{cases} \infty & x \leq 0 \\ -V_0 & 0 < x \leq a \\ +\frac{2}{3}V_0 & a < x \leq b \\ 0 & x > b \end{cases}$$