

淡江大學九十一年度碩士班招生考試試題

系別：物理系

科目：近代物理

准帶項目請打「○」否則打「×」	
計算機	字典
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本試題共 壹 頁

1. A γ ray creates an electron-positron pair. Show directly that, without the presence of a third body to take up some of the momentum, energy and momentum cannot both be conserved. 20%
2. (a) Explain what is the Heisenberg uncertainty principle. 10%
(b) A boy on top of a ladder of height H is dropping marbles of mass m to the floor and trying to hit a crack in the floor. To aim, he is using equipment of highest possible precision. Show that the marbles will miss the crack by an average distance of the order of $(h/2\pi m)^{1/2} (H/g)^{1/4}$, where g is the acceleration due to gravity. 20%
3. (a) What is the Bohr's atomic model? 10%
(b) Explain how he used this model to find out the energy levels of an electron inside an atom. 15%
4. For a free particle confined inside a one dimensional box:
(a) Write down the Schrodinger equation. 10%
(b) Find both the eigenvalues and eigenfunctions of that equation. 15%