

國立清華大學 104 學年度碩士班考試入學試題

系所班組別：生命科學院丙組

考試科目（代碼）：近代物理(0602)

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*請在【答案卷】作答

1. (10%) Einstein based his theory of special relativity on two basic assumptions, explain the contents of his hypotheses.
2. (15%) A particle with mass M decays at rest into a photon and another particle with mass m . Use the theory of relativity to calculate the total energy E (including rest energy) of the particle with mass m .
3. (15%) Use the Bohr model to derive the energy levels of a hydrogen atom.
4. (15%) A particle with mass m is confined in a one-dimensional box between $x=0$ and $x=L$. Derive the normalized wave functions from the Schrodinger equation and calculate the energy levels.
5. (10%) Describe the photoelectric effect and explain the meaning of the work function for the metal.
6. (35%) Explain (a) Josephson effect. (b) Meissner effect. (c) Chandrasekhar limit. (d) Cosmic background radiation. (e) Boltzmann factor. (f) Zeeman effect. (g) Franck-Hertz experiment.