

國立清華大學 103 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)

共__1__頁，第__1__頁 *請在【答案卷】作答

1. (10%) A clock moves along an x axis at a speed of $0.6c$ ($c=300000$ km/s is the speed of light) and reads $t=0$ as it passes the origin ($x=0$). What time does the clock read as it passes $x=180$ km?
2. (10%) Two rockets approach each other with the same speed v relative to the Earth. If their relative speed is $0.8 c$, what is the value of v/c ?
3. (10%) For a particle with mass m and potential energy $U(x)$ moving in one dimensional space, write down without proof (a) the time-dependent Schrodinger wave equation and (b) the time-independent Schrodinger wave equation.
4. (10%) Describe two important experiments which demonstrate the particle nature of light.
5. (10%) Describe two important experiments which demonstrate the wave nature of matter.
6. (10%) The radioactive decay of the isotope Carbon-14 has been an invaluable aid in determining the age of archeological specimens. Explain the principle of this method..
7. (40%) Explain (a) The Moseley's law. (b) Pauli exclusion principle and the periodic table. (c) The standard model of particles. (d) Bose-Einstein condensation. (e) Space quantization.