

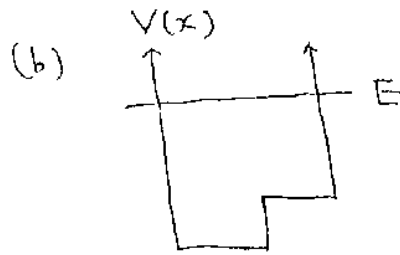
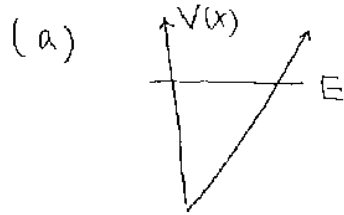
國立中央大學八十七學年度碩士班研究生入學試題卷

所別: 太空科學研究所 不分組 科目:

近代物理

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1. Sketch a possible solution to the Schrödinger equation with following potential energy:



2. Find the kinetic energy of an electron moving at a speed of:

(20%) (a) $v = 4.00 \times 10^{-4} c$, (b) $v = 0.4 c$. ($m_e = 0.511 \text{ MeV}/c^2$)

3. Find the shortest and the longest wavelengths of the Lyman series of singly ionized helium. ($hc = 1240 \text{ eV} \cdot \text{nm}$)

(20%) ($R_{\infty} = 1.097 \times 10^7 \text{ m}^{-1}$)

4. Explain:

(a) Moseley's law

(b) Pauli exclusion principle

(c) The radial probability density for the three lowest states of hydrogen

(d) Blackbody spectrum for $T = 3 \text{ K}$.

(40%)