※ 注意：請於試卷上「非選擇題作答區」標明大題及小題題號，並依序作答。

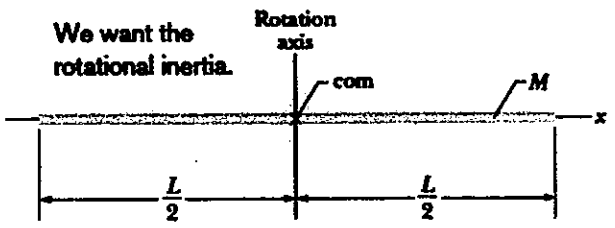
Question 1:

(a) The energy levels of a non-relativistic electron of mass m in a 1D trap of length L are given by $E_n = \left(\frac{h^2}{8mL^2}\right)n^2$, $n = 1, 2, 3, \ldots$, where h is the Planck constant. A transition happens where the electron jumps from the energy level $n = 2$ to $n = 1$. Find an expression for the wavelength of the photon emitted in this transition. [30%]

(b) The mean lifetime of a muon is 2.2μs (the lifetime in its own rest frame). If a muon velocity in the laboratory is $v = 0.9994c$, where c is the speed of light, find the muon mean lifetime as measured in the laboratory. [20%]

Question 2:

(a) In the figure below a stick of mass M and length L is shown. Show that its moment of inertia about its center of mass is given by $I = \frac{ML^2}{12}$.



[30%]

(b) Find the moment of inertia the stick not about its center of mass (com) but about one of its two edges. [20%]

試題隨卷繳回