TL 6-21 (nuclear model w/o neutrons)

Take atomic nucleus to be 1-D square well with $L = 10\,fm$.

a) Ground state energy of "nuclear electron"

$$E_e = \frac{n^2 h^2}{8mL^2} = 6.02e{-}10 \text{ Joules}$$

$$= \boxed{3.76 \text{ GeV}}$$

b) of nuclear proton?

$$E_p = \boxed{2.04 \text{ MeV}} \quad \text{or} \quad \boxed{3.28e{-}13 \text{ J}}$$

c) Total energy in ground state is $E_e + E_p =$ ~~E_p~~

The first excited state would probably be when $n=2$ for the proton. The difference would be

$$3 \cdot E_p = \boxed{6.12 \text{ MeV}}$$