

Quantum Physics: Nuclear Physics

⚠ This is a preview of the draft version of the quiz

Started: Nov 4 at 11:06am

Quiz Instructions

Question 1

1 pts

Which of the following statements is/are correct? (Choose all that apply)

- Electromagnetic force between protons is always greater than gravitational force between them.
- Nuclear force between protons is always greater than electromagnetic force between them.
- Nuclear force between protons is always less than gravitational force between them.
- Gravitational force between protons is always greater than electromagnetic force between them.

Question 2

1 pts

Which of the following gives the correct order of magnitude of the forces from strongest (left) to weakest (right) between two electrons at a given separation?

- Electromagnetic force, strong force, gravitational force

- Electromagnetic force, gravitational force, strong force
- Strong force, gravitational force, electromagnetic force
- Strong force, electromagnetic force, gravitational force

Question 3**1 pts**

In Ernest Rutherford's gold foil experiment, he found that most alpha particles passed straight through the foil and only a few were deflected. What can be inferred about the nuclear properties of an atom from this information?

- the nucleus of an atom is small compared to the size of the entire atom
- the nucleus is held together via the strong force
- the nucleus has a positive charge
- the nucleus is comprised of neutrons and protons

Question 4**1 pts**

U-235 is the isotope of uranium that is used in nuclear power reactors. How many protons does the U-235 isotope have?

- 92

235 327 143**Question 5****1 pts**

Which of the following is true of a beta particle?

- it is more penetrating than a gamma ray of the same energy
- it carries a charge equal and opposite to that of an alpha particle
- it can exhibit wave-like behaviors
- it is more massive than a proton

Question 6**1 pts**

mass of a proton = 1.0073 amu

mass of a neutron = 1.0087 amu

mass of an alpha particle = 4.0028 amu

1 amu = 931 MeV

What is the binding energy of an alpha particle?

- 38.2 MeV
- 33.1 MeV
- 27.2 MeV
- 22.8 MeV

Question 7

1 pts

mass of a proton = 1.0073 amu

mass of a neutron = 1.0087 amu

mass of an alpha particle = 4.0028 amu

1 amu = 931 MeV

The mass of a Chlorine-37 atom is 36.966 amu. Calculate the mass defect for a Chlorine-37 atom.

- 0.332 amu
- 0.111 amu
- 0.221 amu
- 0.433 amu

Question 8**1 pts**

mass of a proton = 1.0073 amu

mass of a neutron = 1.0087 amu

mass of an alpha particle = 4.0028 amu

1 amu = 931 MeV

What is the binding energy of the nucleus of a Chlorine-37 atom?

$5.30 \times 10^{-11} \text{ J}$

$7.32 \times 10^{-11} \text{ J}$

$4.96 \times 10^{-11} \text{ J}$

$9.86 \times 10^{-11} \text{ J}$

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