Name STURMAN KEY Date _____ Class _____

4.2 STRUCTURE OF THE NUCLEAR ATOM

21 poss
7

Section Review

Objectives

- Identify three types of subatomic particles
- Describe the structure of atoms according to the Rutherford model

Vocabulary

- electrons
- cathode ray
- protons
- neutrons
- nucleus

Part A Completion

Use this completion exercise to check your understanding of the concepts and terms that are introduced in this section. Each blank can be completed with a term, short phrase, or number.

Dalton theorized that atoms are indivisible, but the discovery of __1__ particles changed this theory. Scientists now know that atoms are made up of electrons, which have a __2__ charge; __3__, which have a positive charge; and __4__, which are neutral. The latter two particles are found in the __5__ of the atom. It was __6__ who discovered the nucleus of the atom. The nucleus, which has a __7__ charge, occupies a very small volume of the atom. In contrast, the negatively charged __8__ occupy most of the volume of the atom.

1. subatomic or e⁻
2. negative
3. protons
4. neutrons
5. nucleus
6. Rutherford
7. positive
8. electron

Part B True-False

Classify each of these statements as always true, AT; sometimes true, ST; or never true, NT.

★ NT 9. According to Dalton's atomic theory, atoms are composed of protons, electrons, and neutrons.

ST/AT 10. Atoms of elements are electrically neutral.

NT 11. The mass of an electron is equal to the mass of a neutron.

AT 12. The charge on all protons is the same.

Name _____ Date _____ Class _____

Part C Matching

Match each description in Column B to the correct term in Column A

Column A	Column B
C 13. electrons	a. stream of electrons produced at the negative electrode of a tube containing a gas at low pressure
A 14. cathode ray	b. the central core of an atom, which is composed of protons and neutrons
E 15. protons	c. negatively charged subatomic particles
D 16. neutrons	d. subatomic particles with no charge
B 17. nucleus	e. positively charged subatomic particles

Part D Questions and Problems

Answer the following questions in the space provided.

18. Which subatomic particles are found in the nucleus of an atom?

$p^+ + n^0$

19. Which subatomic particles are charged?

e^-; p^+

★ 20. Describe Rutherford's model of the atom, including the location of protons, neutrons, and electrons with respect to the nucleus. How does this model explain the deflections of a beam of alpha particles aimed at a sheet of gold foil?

The p^+ & n^0 are located in a small nucleus, which has most of the atom's mass. The rest of the atom is mostly spaced w/ e^-. The ⊗ beams deflected since they are + + p^+ are positive + like charges repel.

$\alpha^{++} = (He^{2+})$

2