Name _____ **Atomic Review #1**

___ 1) Four statements about the development of the atomic model are shown below.

A: Electrons have wavelike properties.
B: Atoms have small, negatively charged particles.
C: The center of an atom is a small, dense nucleus.
D: Atoms are hard, indivisible spheres.

Which order of statements represents the historical development of the atomic model?

A) $C \rightarrow D \rightarrow A \rightarrow B$ B) $C \rightarrow D \rightarrow B \rightarrow A$
C) $D \rightarrow B \rightarrow A \rightarrow C$ D) $D \rightarrow B \rightarrow C \rightarrow A$

___ 2) In the late 1800s, experiments using cathode ray tubes led to the discovery of the

A) electron B) neutron
C) positron D) proton

___ 3) Which subatomic particle is negatively charged?

A) electron B) neutron
C) positron D) proton

___ 4) Subatomic particles can usually pass undeflected through an atom because the volume of an atom is composed of

A) an uncharged nucleus
B) largely empty space
C) neutrons
D) protons

___ 5) As a result of the gold foil experiment, it was concluded that an atom

A) contains protons, neutrons, and electrons
B) contains a small, dense nucleus
C) has positrons and orbitals
D) is a hard, indivisible sphere

___ 6) Which subatomic particles are found in the nucleus of an atom of beryllium?

A) electrons and protons
B) electrons and positrons
C) neutrons and protons
D) neutrons and electrons

___ 7) What is the overall charge of an ion that has 12 protons, 10 electrons, and 14 neutrons?

A) 2– B) 2+ C) 4– D) 4+

___ 8) Which statement describes the charge of an electron and the charge of a proton?

A) An electron and a proton both have a charge of +1.
B) An electron and a proton both have a charge of -1.
C) An electron has a charge of +1, and a proton has a charge of -1.
D) An electron has a charge of -1, and a proton has a charge of +1.

___ 9) Which phrase describes the charge and mass of a neutron?

A) a charge of +1 and no mass
B) a charge of +1 and an approximate mass of 1 u
C) no charge and no mass
D) no charge and an approximate mass of 1 u

___ 10) An ion that consists of 7 protons, 6 neutrons, and 10 electrons has a net charge of

A) 4– B) 3– C) 3+ D) 4+

___ 11) Which statement concerning elements is true?

A) Different elements must have different numbers of isotopes.
B) Different elements must have different numbers of neutrons.
C) All atoms of a given element must have the same mass number.
D) All atoms of a given element must have the same atomic number.

___ 12) What is the mass number of an atom that has six protons, six electrons, and eight neutrons?

A) 6 B) 12 C) 14 D) 20

13) Which of the following particles has the *smallest* mass?

A) neutron B) electron
C) proton D) hydrogen atom

14) As the number of neutrons in the nucleus of an atom increases, the nuclear charge of the atom

A) decreases
B) increases
C) remains the same

15) Every chlorine atom has

A) 7 electrons
B) 17 neutrons
C) a mass number of 35
D) an atomic number of 17

16) What is the total number of neutrons in the nucleus of a neutral atom that has 19 electrons and a mass number of 39?

A) 19 B) 20 C) 39 D) 58

17) The stability of isotopes is related to the ratio of which particles in the atoms?

A) electrons and protons
B) electrons and positrons
C) neutrons and protons
D) neutrons and positrons

18) Which notations represent hydrogen isotopes?

A) ${}_{1}^{1}\mathrm{H}$ and ${}_{1}^{2}\mathrm{H}$ B) ${}_{1}^{1}\mathrm{H}$ and ${}_{2}^{4}\mathrm{H}$
C) ${}_{2}^{1}\mathrm{H}$ and ${}_{3}^{1}\mathrm{H}$ D) ${}_{1}^{2}\mathrm{H}$ and ${}_{2}^{7}\mathrm{H}$

19) The atomic mass of an element is the weighted average of the

A) number of protons in the isotopes of that element
B) number of neutrons in the isotopes of that element
C) atomic numbers of the naturally occurring isotopes of that element
D) atomic masses of the naturally occurring isotopes of that element

20) Element *X* has two isotopes. If 72.0% of the element has an isotopic mass of 84.9 atomic mass units, and 28.0% of the element has an isotopic mass of 87.0 atomic mass units, the average atomic mass of element *X* is numerically equal to

A) $(72.0 + 84.9) \times (28.0 + 87.0)$
B) $(72.0 - 84.9) \times (28.0 + 87.0)$
C) $\frac{(72.0 \times 84.9)}{100} + \frac{(28.0 \times 87.0)}{100}$
D) $(72.0 \times 84.9) + (28.0 \times 87.0)$