Chapter 5 Atomic Structure and the Periodic Table

Matching Questions

Chapter 5: Matching I

1) proton

2) nucleus

3) atom

4) electron

5) neutron

A) the smallest particle of an element that retains the properties of that element

B) a negatively charged subatomic particle

C) a positively charged subatomic particle

D) the central part of an atom, containing protons and neutrons

E) a subatomic particle with no charge

Chapter 5: Matching II

6) mass number

7) atomic mass unit

8) atomic number

9) atomic mass

10) isotope

A) the number of protons in the nucleus of an element

B) the total number of protons and neutrons in the nucleus of an atom

C) the weighted average of the masses of the isotopes of an element

D) atoms with the same number of protons, but different numbers of neutrons in the nucleus of an atom.

E) one-twelfth the mass of a carbon atom having six protons and six neutrons

Mutliple Choice and Bimodal Questions

1) What is the smallest particle of an element that retains the properties of that element?
   A) an atom
   B) an electron
   C) a proton
   D) a neutron
   E) a molecule

2) Who was the first person to suggest the idea of atoms, in the fourth century B. C.?
   A) Atomos
   B) Dalton
   C) Democritus
   D) Galileo
   E) Thomson

3) The comparison of the number of atoms in a copper coin the size of a penny with the number of people on earth is made to illustrate which of the following?
   A) that atoms are indivisible
   B) that atoms are very small
   C) that atoms are very large
   D) in a copper penny, there is one atom for every person on earth
   E) there are fewer atoms in a copper penny than there are people on earth

4) Dalton's atomic theory included which idea?
   A) All atoms of all elements are the same size.
   B) Atoms of different elements always combine in one–to–one ratios.
   C) Atoms of the same element are always identical.
   D) Individual atoms can be seen with a microscope.
   E) When an atom of an element changes into another element, a chemical reaction takes place.

5) Which of the following is NOT a part of Dalton's atomic theory?
   A) All elements are composed of atoms.
   B) Atoms are always in motion.
   C) Atoms of the same element are alike in mass and size.
   D) Atoms that combine do so in simple whole–number ratios.

6) What particles form the nucleus of an atom?
   A) protons and neutrons
   B) protons and electrons
   C) electrons only
   D) neutrons and electrons
   E) None of the above

7) Which of the following was originally a tenet of Dalton's atomic theory, but had to be revised about a century ago?

A) Atoms are tiny indivisible particles.

B) Atoms of the same element are identical.

C) Compounds are molecules made by uniting atoms.

D) Atoms of different elements can combine with one another in simple whole number ratios.

E) In a chemical reaction, atoms of one element are not changed into atoms of another element.

8) Which statement is true about the discovery of electrons?

A) Electrons were discovered by experimental chemists.

B) Electrons were discovered after the TV tube was invented.

C) Electrons were discovered in a vacuum tube.

D) Electrons were discovered when anode rays were identified in an anode ray tube.

E) Electrons were discovered when an electric current was passed through gases at low pressures.

9) Why did J. J. Thomson reason that electrons must be a part of the atoms of all elements?

A) Cathode rays are negatively-charged particles.

B) Cathode rays can be deflected by magnets.

C) An electron is 2000 times lighter than a hydrogen atom.

D) Cathode rays are always made of electrons, regardless of the gas used.

E) Cathode rays were always accompanied by anode rays.

10) Which hypothesis led to the discovery of the proton?

A) When a neutral hydrogen atom loses an electron, a positively-charged particle should remain.

B) A proton should be 1840 times heavier than an electron.

C) Cathode rays should be attracted to a positively-charged plate.

D) The nucleus of an atom should contain neutrons.

E) A neutral atom should have dozens of subatomic particles.

11) Which of the following is correct concerning subatomic particles?

A) The electron was discovered by Goldstein in 1886.

B) The neutron was discovered by Chadwick in 1932.

C) The proton was discovered by Thomson in 1880.

D) Cathode rays were found to be made of protons.

E) Canal rays were found to be made of protons, electrons, and neutrons.

12) Select the correct statement about subatomic particles.

A) Electrons are negatively charged and are the heaviest subatomic particle.

B) Protons are positively charged and the lightest subatomic particle.

C) Neutrons have no charge and are the lightest subatomic particle.

D) The mass of a neutron nearly equals the mass of a proton.

E) Electrons, protons, and neutrons all have the same mass.

13) Dalton theorized that atoms are indivisible and that all atoms of an element are identical. We now know that _____.

A) Dalton's theories are correct

B) Atoms of an element can have different numbers of protons

C) Atoms are divisible

D) All atoms of an element are not identical but they must all have the same mass

14) As a consequence of the discovery of the nucleus by Rutherford, which model of the atoms is believed to be true?

A) A model in which the protons, electrons, and neutrons are evenly distributed throughout the volume of the atom

B) A model in which the nucleus is made of protons, electrons, and neutrons

C) A model in which the nucleus is made of neutrons only

D) A model in which the nucleus is made of electrons and protons.

E) A model in which the region outside the nucleus is largely empty space in which the electrons are situated

15) The nucleus of an atom is _____.

A) positively charged and has a high density

B) positively charged and has a low density

C) negatively charged and has a high density

D) negatively charged and has a low density

16) Which of these statements is FALSE?

A) Protons have a positive charge.

B) Electrons are negatively charged and have a mass of 1 amu.

C) The nucleus of an atom is positively charged.

D) The neutron is found in the nucleus of an atom.

17) All atoms are _____.

A) positively charged, with the number of protons exceeding the number of electrons

B) negatively charged, with the number of electrons exceeding the number of protons

C) neutral, with the number of protons equaling the number of electrons

D) neutral, with the number of protons equaling the number of electrons, which is equal to the number of neutrons

E) neutral, with the number of protons equaling the number of neutrons, which is equal to half the number of electrons

18) In which of the following sets are the symbol of the element, the number of protons, and the number of electrons given correctly?

A) In, 49 protons, 49 electrons

B) Zn, 30 protons, 60 electrons

C) Cs, 55 protons, 132.9 electrons

D) F, 19 protons, 19 electrons

E) He, 4 protons, 4 electrons

19) The atomic number of an element is the total number of which particles in the nucleus?

A) neutrons

B) protons

C) electrons

D) protons and electrons

E) protons and electrons and neutrons

20) An element has an atomic number of 80. How many protons and electrons are in a neutral atom of the element?

A) 80 protons, 80 electrons

B) 40 protons, 40 electrons

C) 160 protons, 80 electrons

D) 80 protons, 0 electrons

E) 0 protons, 80 electrons

21) The mass number of an element is equal to _____.

A) the total number of electrons in the nucleus

B) the total number of protons and neutrons in the nucleus

C) less than twice the atomic number

D) a constant number for the lighter elements

22) How are the number of neutrons in the nucleus of an atom calculated?

A) add the number of electrons and protons together

B) subtract the number of electrons from the number of protons

C) subtract the number of protons from the mass number

D) add the mass number to the number of electrons

23) The sum of the protons and neutrons in an atom equals the _____.

A) atomic number B) nucleus number

C) atomic mass D) mass number

24) Using the periodic table, determine the number of neutrons in ^{16}O.

A) ^{16}O B) 8 C) 124 D) 26 E) 61

25) How many protons, electrons, and neutrons does an atom with an atomic number 50 and a mass number 120 contain?

A) 50 protons, 50 electrons, and 70 neutrons

B) 70 electrons, 50 protons, and 50 neutrons

C) 120 neutrons, 50 protons, and 70 electrons

D) 70 neutrons, 70 protons, and 50 electrons

26) How do the isotopes hydrogen-1 and hydrogen-2 differ?

A) Hydrogen-2 has one more electron than hydrogen-1.

B) Hydrogen-2 has one neutron; hydrogen-1 has none.

C) Hydrogen-2 has two protons; hydrogen-1 has one.

D) Hydrogen-1 has no protons; hydrogen-2 has one.

27) What does the number 84 in the name krypton-84 represent?

A) the atomic number

B) the mass number

C) the sum of the protons and electrons

D) None of these

28) What unit is used to measure average relative atomic mass?

A) amus B) grams C) angstroms D) nanograms

29) Different elements have different numbers of _____.

A) subatomic particles

B) protons

C) electrons

D) all of the above

30) All atoms of the same element have the same _____.

A) number of neutrons

B) number of protons

C) mass numbers

D) mass

31) Why do chemists use relative comparisons of masses of atoms?

A) The actual mass of an electron is very large compared to the actual mass of a proton.

B) The actual masses of protons and neutrons are very small.

C) The number of subatomic particles in atoms of different elements varies.

D) The actual masses of protons, electrons, and neutrons are not known.

32) Which of the following equals one atomic mass unit?

A) the mass of one electron

B) the mass of one helium atom

C) the mass of one carbon atom

D) one-twelfth the mass of one carbon atom

E) one gram

33) Isotopes of the same element have different _____.

A) numbers of neutrons

B) numbers of protons

C) numbers of electrons

D) atomic numbers

E) symbols

34) Isotopes of the same element have different _____.

A) positions on the periodic table

B) chemical behavior

C) atomic numbers

D) mass numbers

E) symbols

35) In which of the following is the number of neutrons correctly represented?

A) $^{19}_{9}F$ has 0 neutrons.

B) $^{75}_{33}As$ has 108 neutrons.

C) $^{24}_{12}Mg$ has 24 neutrons.

D) $^{197}_{79}Au$ has 79 neutrons.

E) $^{238}_{92}U$ has 146 neutrons.

36) Which of the following sets of symbols represents isotopes of the same element?

A) $^{91}_{42}J$ $^{92}_{42}J$ $^{93}_{40}J$

B) $^{50}_{19}L$ $^{50}_{20}L$ $^{50}_{21}L$

C) $^{80}_{38}M$ $^{81}_{38}M$ $^{83}_{38}M$

D) $^{132}_{55}Q$ $^{133}_{55}Q$ $^{133}_{54}Q$

E) $^{58}_{59}Z$ $^{60}_{30}Z$ $^{62}_{31}Z$

37) Which of these statements is NOT true?

A) Atoms of the same element can have different masses.

B) Atoms of isotopes of an element have different numbers of protons.

C) The nucleus of an atom has a positive charge.

D) Atoms are mostly empty space.

38) If E is the symbol for an element, which two of the following symbols represent isotopes of the same element?

1. $^{20}_{10}E$ 3. $^{21}_{9}E$

2. $^{20}_{11}E$ 4. $^{21}_{10}E$

A) 1 and 2 B) 3 and 4 C) 1 and 4 D) 2 and 3

39) The atomic mass of an element is equal to _____.

A) the total number of subatomic particles in its nucleus

B) the average of the number of protons, neutrons and electrons in its nucleus

C) the total mass of the isotopes of the element

D) the average of the mass number and the atomic number for the element

E) the weighted average of the masses of the isotopes of the element

40) Consider an element Z that has two naturally occurring isotopes with the following percent abundances: the isotope with a mass number of 20 is 25% abundant; the isotope with a mass number of 22 is 75% abundant. What is the average atomic mass for element Z?

A) 2.0 g B) 20.5 g C) 21.0 g D) 21.5 g E) 42.0 g

41) The atomic mass of an element _____.

A) depends upon the number of isotopes of that element

B) depends upon the mass of each isotope of that element

C) depends upon the relative abundance of each isotope of the element

D) all of the above

42) What are the Group A elements known as?

A) representative elements

B) transition elements

C) inner transition elements

D) periodic elements

E) metallic elements

43) Of the elements Fe, Hg, U, Te, and Y, which is a representative element?

A) Fe B) Hg C) U D) Te E) Y

44) Of the elements Pt, Sc, V, Li, and Kr, which is a nonmetal?

A) Pt B) Sc C) V D) Li E) Kr

45) What is each vertical column of elements in the periodic table called?

A) row B) list C) group or family D) transition

Chapter 5 Atomic Structure and the Periodic Table

Matching Questions

1) Answer: C
2) Answer: D
3) Answer: A
4) Answer: B
5) Answer: E
6) Answer: B
7) Answer: E
8) Answer: A
9) Answer: C
10) Answer: D

Mutliple Choice and Bimodal Questions

1) Answer: A
2) Answer: C
3) Answer: B
4) Answer: C
5) Answer: B
6) Answer: A
7) Answer: A
8) Answer: E
9) Answer: D
10) Answer: A
11) Answer: B
12) Answer: D
13) Answer: C
14) Answer: E
15) Answer: A
16) Answer: B
17) Answer: C
18) Answer: A
19) Answer: B
20) Answer: A
21) Answer: B
22) Answer: C
23) Answer: D
24) Answer: B
25) Answer: A
26) Answer: B
27) Answer: B
28) Answer: A
29) Answer: D

30) Answer: B
31) Answer: B
32) Answer: D
33) Answer: A
34) Answer: D
35) Answer: E
36) Answer: C
37) Answer: B
38) Answer: C
39) Answer: E
40) Answer: D
41) Answer: D