Name: _____ **Class:** _____ **Date:** _____ **ID: A**

Practice Test: Chapters 4 and 25

***You need your own calculator for the exam.**
*** I will not answer questions about the practice test during class. You must come in during tutorials to get your questions answered.**

Matching

a. Cathode Ray
b. Ion
c. Neutrons
d. Isotopes
e. Electrons

____ 1. An atom that has lost or gained an electron
____ 2. A beam of light composed of electrons
____ 3. Particles in the nucleus with no charge
____ 4. Particles inside an atom that have very little mass and take up most of the volume
____ 5. Atoms that have the same number of protons but a different number of neutrons.

a. Alpha particles
b. Periodic Law
c. Atomic Mass Unit
d. Ion
e. Atomic Mass

____ 6. An atom that has gained or lost electrons
____ 7. The apporximate mass of a proton or neutron
____ 8. The weighted average of all of an elements isotopes
____ 9. Helium nuclei
____ 10. When elements are arranged in order of increasing atomic number, there is a periodic pattern of their physical and chemical properties

Multiple Choice
Identify the choice that best completes the statement or answers the question.

____ 11. Which statement is true about the discovery of electrons?

a. Electrons were discovered when an electric current was passed through gases at low pressures.
b. Electrons were discovered in a tube filled with helium
c. Electrons were discovered after the TV tube was invented.
d. Electrons were discovered when anode rays were identified in an anode ray tube.

____ 12. Rutherford's experiment produced which of the following results:

a. All alpha rays passed through the gold foil.

b. Some alpha rays passed through the gold foil in a straight line while most bounced back from the direction that they came.

c. Most alpha rays passed through the gold foil in a straight line, some scattered as they passed through the foil and some bounced back from the direction that they came.

____ 13. Which radioactive emission will not alter the mass of an atom?

a. alpha
b. beta
c. gamma

____ 14. Radon-222 decays by alpha emission, what element is produced?

a. Ra-226
b. Po-218
c. Pb-218
d. Rn-226

____ 15. The nucleus of an atom is _____.

a. Negatively charged and has a low density.
b. Positively charged and has a high density.
c. Positively charged and has a low density.
d. Negatively charged and has a high density.

____ 16. Chlorine-32 undergoes beta decay. What will be one of the products?

a. Sulfur-32
b. Argon-32
c. Phosphorus-28
d. Chlorine-33

____ 17. All atoms are _____.

a. positively charged, because they have more protons than electrons
b. neutral, with the number of protons equaling the number of neutrons, which is equal to half the number of electrons
c. negatively charged
d. neutral, because they have the same number of protons and electrons.

____ 18. In which of the following is the number of neutrons correctly represented?

a. $^{24}_{12}$Mg has 24 neutrons
b. $^{19}_{9}$F has 0 neutrons
c. $^{238}_{92}$U has 146 neutrons
d. $^{75}_{33}$As has 108 neutrons
e. $^{197}_{79}$Au has 79 neutrons

____ 19. One atomic mass unit (amu) is exactly equal to ...

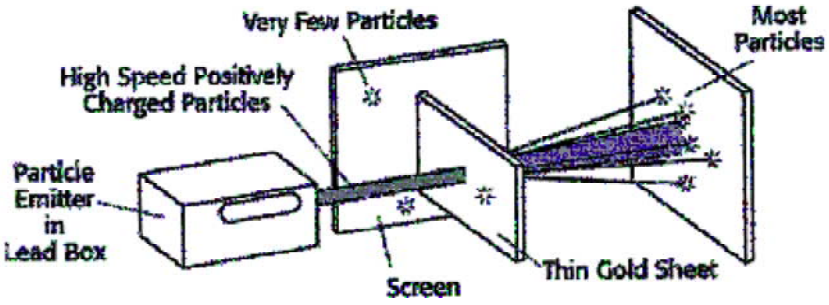
a. the mass of a helium nucleus
b. 1/12 the mass of a carbon-12 atom
c. one gram
d. the mass of an electron

____ 20. What kind of radiation is emitted when an unstable Uranium-238 isotope changes to a Thorium-234 isotope?
a. Alpha particle
b. Beta particle
c. Gamma ray
d. Positron

____ 21. A 2 cm thick piece of cardboard would be most effective in protecting against what type of radiation?
a. alpha
b. beta
c. gamma
d. x-rays

____ 22. Consider and element Z that has two naturally occurring isotopes with the following % abundances: the isotope with a mass # of 20 is 25.0% abundant; the isotope with a mass of 22 is 75.0% abundant. What is the average atomic mass for element Z?
a. 23 amu
b. 20 amu
c. 21 amu
d. 22 amu
e. 42 amu

____ 23. How many neutrons are in an atom of Sulfur-34
a. 34
b. 16
c. 18
d. 50

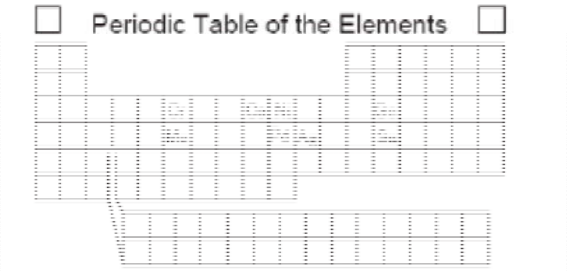


____ 24. The illustration above shows the gold-foil experiment conducted by Ernest Rutherford. According to the drawing, most of the positively charged particles that were "shot" at the foil went straight through the gold foil without changing course. After analyzing the results of this test, Rutherford concluded that

a. atoms are completely solid
b. atoms are made of positive and negative charges all mixed together
c. an atom had a solid, positively charged nucleus surrounded by electrons
d. gold atoms are more loosely packed than most other metal atoms

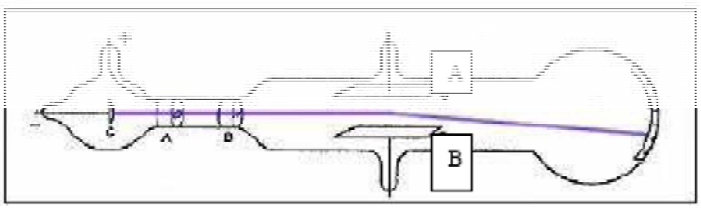
____ 25. The splitting of a nucleus into smaller nuclei is known as...
a. Fission
b. Fusion
c. Hydrolysis

____ 26. Matter is made up of atoms that have positive centers of neutrons and protons surrounded by a cloud of negatively charged electrons.This statement is a ...
a. theory
b. hypothesis
c. inference
d. observation



____ 27. Which of the following ordered pairs of elements shows an increase in atomic number but a decrease in atomic mass?

a. Ag to Pd
b. Co to Ni
c. Ge to Sn
d. Cr to Mo



____ 28. The above diagram shows a cathode ray being deflected by an electric field. Which plate is positively charged?

a. A
b. B
c. Neither one is charged

____ 29. Who was the man who lived from 460B.C.–370B.C. and was among the first to suggest the idea of atoms?

a. Atomos
b. Dalton
c. Democritus
d. Thomson

____ 30. The smallest particle of an element that retains the properties of that element is a(n) ____.

a. atom
b. electron
c. proton
d. neutron

____ 31. Which of the following is true 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.

____ 32. The particles that are found in the nucleus of an atom are ____.

a. neutrons and electrons
b. electrons only
c. protons and neutrons
d. protons and electrons

____ 33. 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

____ 34. An element has an atomic number of 76. The number of protons and electrons in a neutral atom of the element are ____.

a. 152 protons and 76 electrons
b. 76 protons and 0 electrons
c. 38 protons and 38 electrons
d. 76 protons and 76 electrons

____ 35. The sum of the protons and neutrons in an atom equals the ____.

a. atomic number
b. nucleus number
c. atomic mass
d. mass number

____ 36. 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. twice the number of protons

____ 37. Isotopes of the same element have different ____.
a. positions on the periodic table
b. chemical behavior
c. atomic numbers
d. mass numbers

____ 38. 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

____ 39. How many protons, electrons, and neutrons does an atom with atomic number 50 and mass number 125 contain?
a. 50 protons, 50 electrons, 75 neutrons
b. 75 electrons, 50 protons, 50 neutrons
c. 120 neutrons, 50 protons, 75 electrons
d. 70 neutrons, 75 protons, 50 electrons

____ 40. Which of the following 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.

____ 41. Which of the following isotopes has the same number of neutrons as phosphorus-31?
a. $^{32}_{15}\mathrm{P}$
b. $^{32}_{16}\mathrm{S}$
c. $^{29}_{14}\mathrm{Si}$
d. $^{28}_{14}\mathrm{Si}$

____ 42. An unstable nucleus ____.
a. increases its nuclear mass by fission
b. increases its half-life
c. emits energy when it decays
d. expels all of its protons

____ 43. The charge on a gamma ray is ____.
a. +2
b. +1
c. 0
d. –2

____ 44. What particle is emitted in alpha radiation?
a. electron
b. photon
c. helium nucleus
d. hydrogen nucleus

____ 45. A beta particle is a(n) ____.
a. photon
b. electron
c. helium nucleus
d. hydrogen nucleus

____ 46. The least penetrating form of radiation is ____.
a. beta radiation
b. gamma radiation
c. alpha radiation
d. X rays

____ 47. What is the change in atomic number when an atom emits a beta particle?
a. decreases by 2
b. decreases by 1
c. increases by 2
d. increases by 1

____ 48. Which symbol is used for an alpha particle?
a. $^{2}_{1}\mathrm{He}$
b. $^{2}_{2}\mathrm{He}$
c. $^{4}_{1}\mathrm{He}$
d. $^{4}_{2}\mathrm{He}$

____ 49. What particle decomposes to produce the electron of beta radiation?
a. proton
b. neutron
c. electron
d. positron

____ 50. What symbol is used for beta radiation?
a. $^{0}_{0}e$
b. $^{0}_{-1}e$
c. $^{-1}_{0}e$
d. $^{-1}_{-1}e$

____ 51. What particle is needed to complete this nuclear reaction?
$^{222}_{86}Rn \rightarrow {}^{218}_{84}Po + \_\_\_\_\_$
a. $^{4}_{2}He$
b. $^{0}_{-1}e$
c. $^{1}_{1}H$
d. $^{1}_{0}n$

____ 52. When radium-226 (atomic number 88) decays by emitting an alpha particle, it becomes ____.
a. polonium-222
b. polonium-224
c. radium-222
d. radon-222

____ 53. What particle does argon-39 (atomic number 18) emit when it decays to potassium-39 (atomic number 19)?
a. neutron
b. electron
c. proton
d. alpha particle

____ 54. What particle is needed to complete the following nuclear equation?
$^{56}_{25}Mn \rightarrow \_\_\_\_ + {}^{0}_{-1}e$
a. $^{56}_{27}Co$
b. $^{27}_{25}Mn$
c. $^{56}_{26}Fe$
d. $^{58}_{24}Cr$

____ 55. One difference between a mixture and a compound is that _____.
a. a compound is made up of more than one phase
b. a mixture must be uniform in composition
c. a mixture can only be separated into its components by chemical means
d. a compound can only be separated into its components by chemical means

____ 56. Which state of matter has a fixed volume?
a. Gas
b. Solid
c. Liquid
d. Both B and C

____ 57. All of the following changes to a metal are physical changes **EXCEPT**
a. Cutting
b. Polishing
c. Melting
d. Bending
e. Rusting

____ 58. A chemical change occurs when a piece of wood _____.
a. decays
b. is cut
c. is split
d. is painted

____ 59. Sublimation is …
a. a chemical change in which a liquid turns to a solid
b. a physical change in which a liquid changes to a gas
c. a chemical change in which a solid changes to a gas
d. a physical change in which a solid turns to a gas

____ 60. All of the following are physical properties of matter **EXCEPT** _____.
a. luster
b. mass
c. explosiveness
d. melting Point

____ 61. The separation of salt and sand can be classified as a:
a. Physical Change
b. Chemical Change

____ 62. Matter is defined as anything that _____.
a. has mass and takes up space
b. has a fixed volume and weight
c. can be weighed on a balance.
d. has a definite volume.

____ 63. Which of the following is a heterogeneous mixture?
a. milk
b. vinegar in water
c. oil and vinegar
d. air

____ 64. The left hand side of a reaction is called the:
a. Reactants
b. Products

____ 65. Which of the following **CANNOT** be classified as a substance?
a. Iron
b. Pepsi
c. Sodium
d. Sugar

____ 66. Which of the following is **NOT** a pure substance?
a. liquid helium
b. Mercury
c. Apple juice
d. Liquid Oxygen

____ 67. An example of an extensive property of matter is ____.
a. mass
b. pressure
c. temperature
d. hardness

____ 68. Which of the following is **NOT** a chemical change?
a. Food spoilage
b. explosion
c. corrosion
d. Evaporation

____ 69. Classify the following reaction.
$^{235}_{92}U + {}^{1}_{0}n \rightarrow {}^{236}_{92}U \rightarrow {}^{90}_{38}Sr + {}^{144}_{54}Xe + 2\,{}^{1}_{0}n$
a. fission reaction
b. fusion reaction

____ 70. Who discovered the neutron?
a. Thomson
b. Goldstein
c. Rutherford
d. Chadwick

____ 71. What type of rays were used to discover the proton?
a. canal rays
b. cathode ray

Practice Test: Chapters 4 and 25
Answer Section

MATCHING

1. ANS: B PTS: 1
2. ANS: A PTS: 1
3. ANS: C PTS: 1
4. ANS: E PTS: 1
5. ANS: D PTS: 1

6. ANS: D PTS: 1
7. ANS: C PTS: 1
8. ANS: E PTS: 1
9. ANS: A PTS: 1
10. ANS: B PTS: 1

MULTIPLE CHOICE

11. ANS: A PTS: 1
12. ANS: C PTS: 1
13. ANS: C PTS: 1
14. ANS: B PTS: 1
15. ANS: B PTS: 1
16. ANS: B PTS: 1
17. ANS: D PTS: 1
18. ANS: C PTS: 1
19. ANS: B PTS: 1
20. ANS: A PTS: 1
21. ANS: A PTS: 1
22. ANS: D PTS: 1
23. ANS: C PTS: 1
24. ANS: C PTS: 1
25. ANS: A PTS: 1
26. ANS: A PTS: 1
27. ANS: B PTS: 1
28. ANS: B PTS: 1
29. ANS: C PTS: 1 DIF: L2 REF: p. 101
    OBJ: 4.1.1
30. ANS: A PTS: 1 DIF: L1 REF: p. 101 | p. 102
    OBJ: 4.1.1 | 4.1.2
31. ANS: D PTS: 1 DIF: L2 REF: p. 104 | p. 105 | p. 106
    OBJ: 4.2.1 STA: Ch.1.a
32. ANS: C PTS: 1 DIF: L2 REF: p. 106 | p. 107
    OBJ: 4.2.1 | 4.2.2 STA: Ch.11.a

33. ANS: B PTS: 1 DIF: L1 REF: p. 110
OBJ: 4.3.1 STA: Ch.1.a
34. ANS: D PTS: 1 DIF: L1 REF: p. 110
OBJ: 4.3.1 STA: Ch.1.a
35. ANS: D PTS: 1 DIF: L1 REF: p. 111
OBJ: 4.3.1 STA: Ch.1.a
36. ANS: B PTS: 1 DIF: L1 REF: p. 111
OBJ: 4.3.1 STA: Ch.1.a | Ch.11.c
37. ANS: D PTS: 1 DIF: L1 REF: p. 112 | p. 113
OBJ: 4.3.1 STA: Ch.11.c
38. ANS: B PTS: 1 DIF: L2 REF: p. 111
OBJ: 4.3.1 STA: Ch.1.a
39. ANS: A PTS: 1 DIF: L2 REF: p. 111
OBJ: 4.3.1 STA: Ch.1.a
40. ANS: B PTS: 1 DIF: L2 REF: p. 110 | p. 112 | p. 113
OBJ: 4.3.1 STA: Ch.11.c
41. ANS: B PTS: 1 DIF: L3 REF: p. 111
OBJ: 4.3.2 STA: Ch.11.c
42. ANS: C PTS: 1 DIF: L3 REF: p. 800
OBJ: 25.1.1 STA: Ch.11.c | Ch.11.d
43. ANS: C PTS: 1 DIF: L1 REF: p. 800
OBJ: 25.1.2 STA: Ch.11.d
44. ANS: C PTS: 1 DIF: L1 REF: p. 800
OBJ: 25.1.2 STA: Ch.11.d
45. ANS: B PTS: 1 DIF: L1 REF: p. 801
OBJ: 25.1.2 STA: Ch.11.d
46. ANS: C PTS: 1 DIF: L1 REF: p. 802
OBJ: 25.1.2 STA: Ch.11.e
47. ANS: D PTS: 1 DIF: L2 REF: p. 801
OBJ: 25.1.2 STA: Ch.11.d
48. ANS: D PTS: 1 DIF: L2 REF: p. 800
OBJ: 25.1.2 STA: Ch.11.d
49. ANS: B PTS: 1 DIF: L2 REF: p. 801
OBJ: 25.1.2 STA: Ch.11.d
50. ANS: B PTS: 1 DIF: L2 REF: p. 801
OBJ: 25.1.2 STA: Ch.11.d
51. ANS: A PTS: 1 DIF: L2 REF: p. 801
OBJ: 25.2.1 STA: Ch.11.d
52. ANS: D PTS: 1 DIF: L2 REF: p. 800 | p. 804
OBJ: 25.1.2 | 25.2.1 STA: Ch.11.d
53. ANS: B PTS: 1 DIF: L2 REF: p. 801
OBJ: 25.2.1 STA: Ch.11.d
54. ANS: C PTS: 1 DIF: L3 REF: p. 803 | p. 804
OBJ: 25.2.1 STA: Ch.11.d
55. ANS: D PTS: 1
56. ANS: C PTS: 1
57. ANS: E PTS: 1
58. ANS: A PTS: 1

59. ANS: D PTS: 1
60. ANS: C PTS: 1
61. ANS: A PTS: 1
62. ANS: A PTS: 1
63. ANS: C PTS: 1 DIF: L1 REF: p. 45
    OBJ: 2.2.2
64. ANS: A PTS: 1
65. ANS: B PTS: 1
66. ANS: C PTS: 1
67. ANS: A PTS: 1 DIF: L1 REF: p. 39
    OBJ: 2.1.1
68. ANS: D PTS: 1
69. ANS: A PTS: 1
70. ANS: D PTS: 1
71. ANS: A PTS: 1