

**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 | d. Isotopes  |
| b. Ion         | e. Electrons |
| c. Neutrons    |              |

- \_\_\_\_ 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  | d. Ion         |
| b. Periodic Law     | e. Atomic Mass |
| c. Atomic Mass Unit |                |

- \_\_\_\_ 6. An atom that has gained or lost electrons  
\_\_\_\_ 7. The approximate mass of a proton or neutron  
\_\_\_\_ 8. The weighted average of all of an element's 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

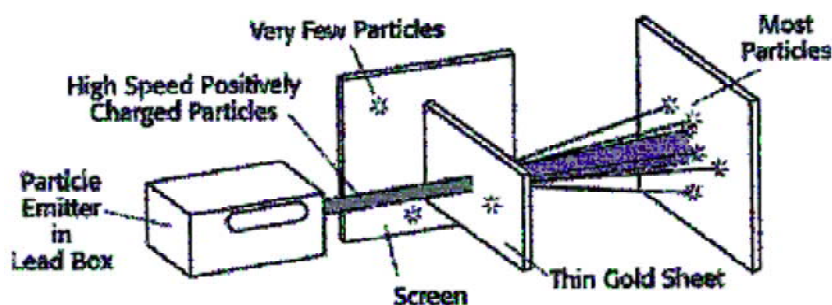
**Multiple Choice**

*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. | c. Electrons were discovered after the TV tube was invented.                       |
| b. Electrons were discovered in a tube filled with helium  | 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.  ${}^{24}_{12}\text{Mg}$  has 24 neutrons
  - b.  ${}^{19}_9\text{F}$  has 0 neutrons
  - c.  ${}^{238}_{92}\text{U}$  has 146 neutrons
  - d.  ${}^{75}_{33}\text{As}$  has 108 neutrons
  - e.  ${}^{197}_{79}\text{Au}$  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

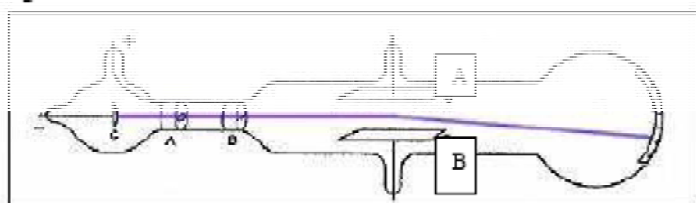
- \_\_\_\_\_ 20. What kind of radiation is emitted when an unstable Uranium-238 isotope changes to a Thorium-234 isotope?  
 a. Alpha particle  
 b. Beta particle  
 c. Gamma ray  
 d. Positron
- \_\_\_\_\_ 21. A 2 cm thick piece of cardboard would be most effective in protecting against what type of radiation?  
 a. alpha  
 b. beta  
 c. gamma  
 d. x-rays
- \_\_\_\_\_ 22. Consider an 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

Periodic Table of the Elements

- \_\_\_\_\_ 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 | c. Ge to Sn |
| b. Co to Ni | 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 | c. Neither one is charged |
| b. B |                           |
- \_\_\_\_\_ 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 | c. Democritus |
| b. Dalton | d. Thomson    |
- \_\_\_\_\_ 30. The smallest particle of an element that retains the properties of that element is a(n) \_\_\_\_.
- |             |            |
|-------------|------------|
| a. atom     | c. proton  |
| b. electron | d. neutron |
- \_\_\_\_\_ 31. Which of the following is true about subatomic particles?
- Electrons are negatively charged and are the heaviest subatomic particle.
  - Protons are positively charged and the lightest subatomic particle.
  - Neutrons have no charge and are the lightest subatomic particle.
  - 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 | c. protons and neutrons  |
| b. electrons only         | d. protons and electrons |
- \_\_\_\_\_ 33. The atomic number of an element is the total number of which particles in the nucleus?
- |             |                          |
|-------------|--------------------------|
| a. neutrons | c. electrons             |
| b. protons  | 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 | c. 38 protons and 38 electrons |
| b. 76 protons and 0 electrons   | d. 76 protons and 76 electrons |
- \_\_\_\_\_ 35. The sum of the protons and neutrons in an atom equals the \_\_\_\_.
- |                   |                |
|-------------------|----------------|
| a. atomic number  | c. atomic mass |
| b. nucleus number | d. mass number |

- \_\_\_\_\_ 36. What does the number 84 in the name krypton-84 represent?
- the atomic number
  - the mass number
  - the sum of the protons and electrons
  - twice the number of protons
- \_\_\_\_\_ 37. Isotopes of the same element have different \_\_\_\_\_.
- positions on the periodic table
  - chemical behavior
  - atomic numbers
  - mass numbers
- \_\_\_\_\_ 38. The mass number of an element is equal to \_\_\_\_\_.
- the total number of electrons in the nucleus
  - the total number of protons and neutrons in the nucleus
  - less than twice the atomic number
  - 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?
- 50 protons, 50 electrons, 75 neutrons
  - 75 electrons, 50 protons, 50 neutrons
  - 120 neutrons, 50 protons, 75 electrons
  - 70 neutrons, 75 protons, 50 electrons
- \_\_\_\_\_ 40. Which of the following statements is NOT true?
- Atoms of the same element can have different masses.
  - Atoms of isotopes of an element have different numbers of protons.
  - The nucleus of an atom has a positive charge.
  - Atoms are mostly empty space.
- \_\_\_\_\_ 41. Which of the following isotopes has the same number of neutrons as phosphorus-31?
- $^{32}_{15}\text{P}$
  - $^{32}_{16}\text{S}$
  - $^{29}_{14}\text{Si}$
  - $^{28}_{14}\text{Si}$
- \_\_\_\_\_ 42. An unstable nucleus \_\_\_\_\_.
- increases its nuclear mass by fission
  - increases its half-life
  - emits energy when it decays
  - expels all of its protons
- \_\_\_\_\_ 43. The charge on a gamma ray is \_\_\_\_\_.
- +2
  - +1
  - 0
  - 2
- \_\_\_\_\_ 44. What particle is emitted in alpha radiation?
- electron
  - photon
  - helium nucleus
  - hydrogen nucleus
- \_\_\_\_\_ 45. A beta particle is a(n) \_\_\_\_\_.
- photon
  - electron
  - helium nucleus
  - hydrogen nucleus
- \_\_\_\_\_ 46. The least penetrating form of radiation is \_\_\_\_\_.
- beta radiation
  - gamma radiation
  - alpha radiation
  - X rays
- \_\_\_\_\_ 47. What is the change in atomic number when an atom emits a beta particle?
- decreases by 2
  - decreases by 1
  - increases by 2
  - increases by 1
- \_\_\_\_\_ 48. Which symbol is used for an alpha particle?
- $^2_1\text{He}$
  - $^2_2\text{He}$
  - $^4_1\text{He}$
  - $^4_2\text{He}$

- \_\_\_\_\_ 49. What particle decomposes to produce the electron of beta radiation?
- proton
  - neutron
  - electron
  - positron
- \_\_\_\_\_ 50. What symbol is used for beta radiation?
- ${}^0_0\text{e}$
  - ${}^0_{-1}\text{e}$
  - ${}^{-1}_0\text{e}$
  - ${}^{-1}_{-1}\text{e}$
- \_\_\_\_\_ 51. What particle is needed to complete this nuclear reaction?
- $${}^{222}_{86}\text{Rn} \rightarrow {}^{218}_{84}\text{Po} + \text{_____}$$
- ${}^4_2\text{He}$
  - ${}^0_{-1}\text{e}$
  - ${}^1_1\text{H}$
  - ${}^1_0\text{n}$
- \_\_\_\_\_ 52. When radium-226 (atomic number 88) decays by emitting an alpha particle, it becomes \_\_\_\_\_.
- polonium-222
  - polonium-224
  - radium-222
  - radon-222
- \_\_\_\_\_ 53. What particle does argon-39 (atomic number 18) emit when it decays to potassium-39 (atomic number 19)?
- neutron
  - electron
  - proton
  - alpha particle
- \_\_\_\_\_ 54. What particle is needed to complete the following nuclear equation?
- $${}^{56}_{25}\text{Mn} \rightarrow \text{_____} + {}^0_{-1}\text{e}$$
- ${}^{56}_{27}\text{Co}$
  - ${}^{27}_{25}\text{Mn}$
  - ${}^{56}_{26}\text{Fe}$
  - ${}^{58}_{24}\text{Cr}$
- \_\_\_\_\_ 55. One difference between a mixture and a compound is that \_\_\_\_\_.
- a compound is made up of more than one phase
  - a mixture must be uniform in composition
  - a mixture can only be separated into its components by chemical means
  - a compound can only be separated into its components by chemical means
- \_\_\_\_\_ 56. Which state of matter has a fixed volume?
- Gas
  - Solid
  - Liquid
  - Both B and C
- \_\_\_\_\_ 57. All of the following changes to a metal are physical changes **EXCEPT**
- Cutting
  - Polishing
  - Melting
  - Bending
  - Rusting
- \_\_\_\_\_ 58. A chemical change occurs when a piece of wood \_\_\_\_\_.
- decays
  - is cut
  - is split
  - is painted
- \_\_\_\_\_ 59. Sublimation is ...
- a chemical change in which a liquid turns to a solid
  - a physical change in which a liquid changes to a gas
  - a chemical change in which a solid changes to a gas
  - 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.
- $${}_{92}^{235}\text{U} + {}_0^1\text{n} \rightarrow {}_{92}^{236}\text{U} \rightarrow {}_{38}^{90}\text{Sr} + {}_{54}^{144}\text{Xe} + 2{}_0^1\text{n}$$
- 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 OBJ: 4.3.1	PTS: 1 STA: Ch.1.a	DIF: L1	REF: p. 110
34.	ANS: D OBJ: 4.3.1	PTS: 1 STA: Ch.1.a	DIF: L1	REF: p. 110
35.	ANS: D OBJ: 4.3.1	PTS: 1 STA: Ch.1.a	DIF: L1	REF: p. 111
36.	ANS: B OBJ: 4.3.1	PTS: 1 STA: Ch.1.a   Ch.11.c	DIF: L1	REF: p. 111
37.	ANS: D OBJ: 4.3.1	PTS: 1 STA: Ch.11.c	DIF: L1	REF: p. 112   p. 113
38.	ANS: B OBJ: 4.3.1	PTS: 1 STA: Ch.1.a	DIF: L2	REF: p. 111
39.	ANS: A OBJ: 4.3.1	PTS: 1 STA: Ch.1.a	DIF: L2	REF: p. 111
40.	ANS: B OBJ: 4.3.1	PTS: 1 STA: Ch.11.c	DIF: L2	REF: p. 110   p. 112   p. 113
41.	ANS: B OBJ: 4.3.2	PTS: 1 STA: Ch.11.c	DIF: L3	REF: p. 111
42.	ANS: C OBJ: 25.1.1	PTS: 1 STA: Ch.11.c   Ch.11.d	DIF: L3	REF: p. 800
43.	ANS: C OBJ: 25.1.2	PTS: 1 STA: Ch.11.d	DIF: L1	REF: p. 800
44.	ANS: C OBJ: 25.1.2	PTS: 1 STA: Ch.11.d	DIF: L1	REF: p. 800
45.	ANS: B OBJ: 25.1.2	PTS: 1 STA: Ch.11.d	DIF: L1	REF: p. 801
46.	ANS: C OBJ: 25.1.2	PTS: 1 STA: Ch.11.e	DIF: L1	REF: p. 802
47.	ANS: D OBJ: 25.1.2	PTS: 1 STA: Ch.11.d	DIF: L2	REF: p. 801
48.	ANS: D OBJ: 25.1.2	PTS: 1 STA: Ch.11.d	DIF: L2	REF: p. 800
49.	ANS: B OBJ: 25.1.2	PTS: 1 STA: Ch.11.d	DIF: L2	REF: p. 801
50.	ANS: B OBJ: 25.1.2	PTS: 1 STA: Ch.11.d	DIF: L2	REF: p. 801
51.	ANS: A OBJ: 25.2.1	PTS: 1 STA: Ch.11.d	DIF: L2	REF: p. 801
52.	ANS: D OBJ: 25.1.2   25.2.1	PTS: 1 STA: Ch.11.d	DIF: L2	REF: p. 800   p. 804
53.	ANS: B OBJ: 25.2.1	PTS: 1 STA: Ch.11.d	DIF: L2	REF: p. 801
54.	ANS: C OBJ: 25.2.1	PTS: 1 STA: Ch.11.d	DIF: L3	REF: p. 803   p. 804
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