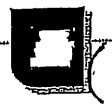
Mr. Seng

Name _____ Date _____ Class _____



Units 1 and 2 Common Assessment Review

(in Text; Use our Notes/WS/Quizzes/Per. Tables)

Chapter Test A

A. Matching

Match each description in Column B with the correct term in Column A. Write the letter of the correct description on the line.

	Column A	Column B
J	1. proton	a. the total number of protons and neutrons in the nucleus of an atom
G	2. atom	b. the weighted average mass of the atoms in a naturally occurring sample of an element
A	3. mass number	~~c. $\frac{1}{12}$ the mass of a carbon-12 atom~~
C	4. atomic mass unit	d. the number of protons in the nucleus of an element
F	5. electron	e. atoms with the same number of protons but different numbers of neutrons
E	6. isotopes	f. negatively charged subatomic particle
D	7. atomic number	g. the smallest particle of an element that retains its identity in a chemical reaction
B	8. atomic mass	h. a horizontal row of the periodic table
H	9. period	i. subatomic particle with no charge
I	10. neutron	j. positively charged subatomic particle

B. Multiple Choice

Choose the best answer and write its letter on the line.

IIIII 11. Which of the following is *not* a part of Dalton's atomic theory?
a. All elements are composed of atoms.
b. Atoms of the same element are alike.
c. Atoms are always in motion.
d. Atoms that combine do so in simple whole-number ratios.

D 12. The nucleus of an atom is
a. negatively charged and has a low density.
b. negatively charged and has a high density.
c. positively charged and has a low density.
d. positively charged and has a high density.

Name _____ Date _____ Class _____

IIII 13. Dalton theorized that atoms are indivisible and that all atoms of an element are identical. Scientists now know that
a. Dalton's theories are completely correct.
b. atoms of an element can have different numbers of protons.
c. atoms are all divisible.
d. all atoms of an element are not identical but they all have the same mass.

C 14. The number of neutrons in the nucleus of an atom can be calculated by
a. adding together the numbers of electrons and protons.
b. subtracting the number of protons from the number of electrons.
c. subtracting the number of protons from the mass number.
d. adding the mass number to the number of protons.

D 15. The sum of the protons and neutrons in an atom equals the
a. atomic number.
b. number of electrons.
c. atomic mass.
d. mass number.

A 16. All atoms of the same element have the same:
a. number of protons.
b. number of neutrons.
c. mass number.
d. mass.

B 17. Which of these statements is <u>false</u>?
a. Electrons have a negative charge.
b. Electrons 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.

A 18. An atom of an element with atomic number 48 and mass number 120 contains
a. 48 protons, 48 electrons, and 72 neutrons.
b. 72 protons, 48 electrons, and 48 neutrons.
c. 120 protons, 48 electrons, and 72 neutrons.
d. 72 protons, 72 electrons, and 48 neutrons.

B 19. How do the isotopes hydrogen-2 and hydrogen-3 differ?
a. Hydrogen-3 has one more electron than hydrogen-2.
b. Hydrogen-3 has two neutrons.
c. Hydrogen-2 has three protons.
d. Hydrogen-2 has no protons.

B 20. The number 80 in the name bromine-80 represents
a. the atomic number.
b. the mass number.
c. the sum of protons and electrons.
d. none of the above

C 21. Which of these statements is <u>not</u> true?
a. Atoms of the same elements can have different masses.
b. The nucleus of an atom has a positive charge.
c. Atoms of isotopes of an element have different numbers of protons.
d. Atoms are mostly empty space.

① COMMON ASSESSMENT
CP Chem Units 1-2 Review Name: _____
Mr. Seng Fall 2016
Ch. 3/5.1/5.2/19/11

Atomic Structure
→ $p^+/n/e^-$
→ Ions
→ Isotopes
- Periodic Table
→ Atomic #
→ Average Atomic Mass
→ Families
→ Oxidation states of typical ions
- Nuclear
→ Alpha/Beta/Gamma
→ Fission/Fusion
→ $E=mc^2$
→ Radioisotope uses
→ $t_{1/2}$-life
→ Decay Equations
- Quantum/Orbitals
Light/EM spectrum
→ f, λ, E relationships
→ Absorption/Emission Spectra
*Bohr Model
- Process of e^-s giving off light
→ Sub-level/Orbitals
→ Orb. Diagrams
→ Elec. Configs
→ Per. Table (ions, Val. e's/Families)
- Periodic Trends
→ AR/IR
→ IE/EA/EN
→ Know the trends from the Per. Table
→ Know why they change across and up on the Per. Table

Name _____ Date _____ Class _____

skip D 22. Relative atomic masses are measured in
a. nanograms. c. angstroms.
b. grams. d. amus.

C 23. If E is the symbol for an element, which two of the following symbols represent isotopes of the same element?
1. $^{24}_{12}E$ 2. $^{24}_{13}E$ 3. $^{25}_{11}E$ 4. $^{25}_{12}E$
a. 1 and 2 c. 1 and 4
b. 3 and 4 d. 2 and 3

C. Problems

Solve the following problem in the space provided. Show your work.

24. There are five naturally occurring isotopes of the element zinc. The relative abundance and mass of each are as follows.
$^{64}_{30}Zn$ = 48.89%, 63.929 amu
$^{66}_{30}Zn$ = 27.81%, 65.926 amu
$^{67}_{30}Zn$ = 4.11%, 66.927 amu
$^{68}_{30}Zn$ = 18.57%, 67.925 amu
$^{70}_{30}Zn$ = 0.62%, 69.925 amu
Calculate the average atomic mass of zinc.

24. The release of tremendous energy in fission and fusion is due to a loss of mass according to $E = m c^2$.

25. List 3 differences between fission and fusion.

a) fission is splitting of 1 atom → 2 diff. atoms (smaller)
fusion is joining/merging of 2 atoms → 1 larger atom

b) fission occurs in nuc. power plants & atomic bombs (WW II)
fusion " " the sun/stars + hydrogen bombs

c) fission releases less energy per mass; leaves radioactive waste behind
fusion releases more energy per mass; little to no waste

Name _____ Date _____ Class _____

A 22. In nuclear fission
a. certain atoms break into fragments when struck by neutrons.
b. a chain reaction cannot occur.
c. energy is absorbed.
d. all of the above

B 23. Nuclear fusion
a. occurs when large nuclei fuse together.
b. takes place in the sun.
c. generally produces hydrogen nuclei.
d. all of the above

A 24. What particle is needed to complete this equation?
$^{14}_{7}N + \_\_?\_\_ \rightarrow {}^{14}_{6}C + {}^{1}_{1}H$
a. $^{1}_{0}n$ c. $^{4}_{2}He$
b. $^{0}_{-1}e$ d. $^{0}_{+1}e$

skip D 25. Radioisotopes taken internally for medical reasons
a. must be eliminated from the body slowly.
b. should be fissionable isotopes.
c. should have stable nuclei.
d. should have a short half-life.

skip C 26. A device that is used primarily for the detection of beta radiation is
a. the film badge. c. the scintillation counter.
b. the Geiger counter. d. all of the above

C. Problems

Solve the following problems in the space provided. Show your work.

27. Complete the following nuclear reactions by filling in the blanks with the correct numbers.
a. $^{42}_{1}K \rightarrow {}^{0}_{-1}e + {}^{\_}_{20}Ca$

$^{42}_{19}K \rightarrow {}^{0}_{-1}e + {}^{42}_{20}Ca$

b. $^{\_}_{92}U \rightarrow {}^{4}_{2}He + {}^{231}_{\_}Th$

$^{235}_{92}U \rightarrow {}^{4}_{2}He + {}^{231}_{90}Th$

28. After 252 days, a 24-g sample of scandium-42 contains only 3.0 g of the isotope.
~~What is the half-life of scandium?~~

24g → 12g → 6g → 3g How many 1/2-lives have occurred? 3

How many days is one 1/2-life?

$\frac{252 \text{ days}}{3 \text{ half-lives}} =$ 84 days for 1 half-life

	Name	Symbol	Atomic Number	Mass Number	# of Protons	# of Neutrons	# of Electrons
1.	boron	B	5	11	5	6	5
2.	zinc	Zn	30	61	30	31	30
3.	potassium	K	19	42	19	23	19
4.	titanium	Ti	22	49	22	27	22
5.	antimony	Sb	51	122	51	71	51
6.	uranium(II)	U^{+2}	92	238	92	146	90
7.	silver(I)	Ag^{+1}	47	107	47	60	46
~~8.~~	~~fermium~~			~~257~~			
9.	cesium(I)	Cs^{+1}	55	134	55	79	54
10.	molybdenum	Mo^{+3}	42	97	42	55	39
~~11.~~				~~120~~	~~78~~		
12.	krypton	Kr	36	83	36	47	36
~~13.~~			~~86~~	~~222~~			
14.	nitride	N^{3-}	7	15	7	8	10
15.	chloride	Cl^{-1}	17	37	17	20	18

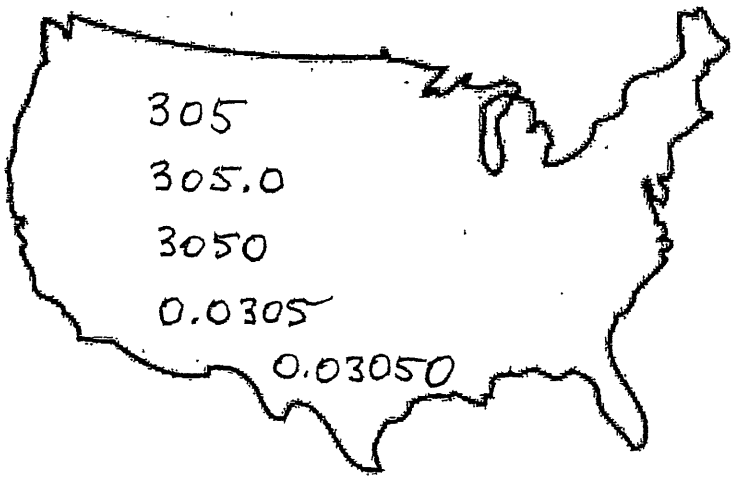
Convert into Scientific Notation:

A) 12994 = 1.2994E4 B) .0004405 = 4.405E-4 C) 3388.55 = 3.38855E3 D) .0033 = 3.3×10^{-3}

Convert to Regular Form:

A) 6.033×10^{5} = 603,300 B) 2.202×10^{2} = 220.2 C) 5.07×10^{-3} = 0.00507

Determine the correct number of significant figures: (Use Atlantic-Pacific trick)



A) 356.56 = 5 B) 0.00201 = 3 C) 23000 = 2 D) 34.000 = 5

★ Review Math w/ SFs ★

CALCULATIONS USING SIGNIFICANT FIGURES

Name Mine

When multiplying and dividing, limit and round to the least number of significant figures in any of the factors.

> **Example 1:** 23.0 cm x 432 cm x 19 cm = 188,784 cm^3
> The answer is expressed as 190,000 cm^3 since 19 cm has only two significant figures.

When adding and subtracting, limit and round your answer to the least number of decimal places in any of the numbers that make up your answer.

> **Example 2:** 123.25 mL + 46.0 mL + 86.257 mL = 255.507 mL
> The answer is expressed as 255.5 mL since 46.0 mL has only one decimal place.

Perform the following operations expressing the answer in the correct number of significant figures.

1. 1.35 m (3) x 2.467 m (4) = 3.33 (3)
2. 1,035 m^2 (4) ÷ 42 m (2) = 25 (2)
3. 12.01 mL + 35.2 mL + 6 mL = 53.21 → 53 round to ones place
4. 55.46 g − 28.9 g = 26.56 → 26.6 round to tenths place
5. .021 cm (2) x 3.2 cm (2) x 100.1 cm (4) = 6.7 (2)
6. 0.15 cm + 1.15 cm + 2.051 cm = 3.351 → 3.35 hundredths place
7. 150 L^3 (2) ÷ 4 L (1) = 37.5 → 40 (1)
8. 505 kg − 450.25 kg = 54.75 → 55 ones place
9. 1.252 mm (4) x 0.115 mm (3) x 0.012 mm (2) = 0.00172776 → 0.0017 (2)
10. 1.278 x 10^3 m^2 (4) ÷ 1.4267 x 10^2 m (5) = 8.9577... → 8.958 (4)

5

Mr. Seng Spr 2016 **Nuclear Chem** **Name** Mine

1. Beta particles are
   A. x-rays
   B. neutrons
E C. helium nuclei
   D. protons
   (E.) electrons

2. An unstable nucleus ____.
   A. increases its half-life
B (B.) emits energy when it decays
   C. expels all of its protons
   D. increases its nuclear mass by fission

3. The WEAKEST form of radiation is ____.
   A. beta radiation
D B. cannot determine
   C. gamma radiation
   (D.) alpha radiation

4. Which symbol is used for an alpha particle?
   A. $^{4}_{1}He$
C B. $^{2}_{1}He$
   (C.) $^{4}_{2}He$
   D. $^{2}_{2}He$

5. What symbol is used for beta radiation?
   A. $^{-1}_{0}e$
C B. $^{-1}_{-1}e$
   (C.) $^{0}_{-1}e$
   D. $^{0}_{0}e$

6. Complete this reaction: $^{222}_{86}Rn \rightarrow {}^{218}_{84}Po + $ _____
   A. $^{1}_{1}H$
C B. $^{1}_{0}n$
   (C.) $^{4}_{2}He$
   D. $^{0}_{-1}e$

7. To what element does polonium-208 (atomic number 84) decay when it emits an alpha particle?
   A. $^{214}_{86}Rn$
C B. $^{210}_{82}Pb$
   (C.) $^{204}_{82}Pb$
   D. $^{210}_{82}Po$

8. Nuclear fusion ____.
   A. is used in medicine
C B. occurs at low temperatures
   (C.) takes place in the sun
   D. is used in power plants

9. When small nuclei combine to form a larger nucleus, the reaction is
   A. chemical
B (B.) fusion
   C. fission
   D. ionization

10. Smoke detectors commonly use _____ decay from $_{95}Am$.
    A. neutron
C   B. gamma
    (C.) alpha
    D. beta

11. Radioisotopes are often used for ____.
    A. food additives
C   B. time travel
    (C.) medical testing
    D. fireworks

12. A beta particle has a mass number of ___, a charge of ___, and a mass equal to that of a(n) ___.
    A. 1, 0, neutron
C   B. 4, 2+, helium nucleus
    (C.) 0, 1-, electron
    D. 0, 1+, electron
    E. 1, 1+, proton

13. It is FALSE to say that gamma rays...
    (A.) are stopped by 1 mm of paper.
A   B. have no mass.
    C. are a common type of radiation emitted in decay processes.
    D. have a great penetrating power and severely damage both skin and internal organs.
    E. travel at the speed of light.

6

14. Complete the following : $^{92}_{37}\text{Rb} \rightarrow \_\_\_ + {}^{0}_{-1}\text{e}$

A
(A) $^{92}_{38}\text{Sr}$
B. $^{92}_{36}\text{Kr}$
C. $^{91}_{36}\text{K}$
D. $^{92}_{37}\text{Rb}$
E. $^{92}_{38}\text{U}$

15. Joining light nuclei to form heavier nuclei is _?_; splitting of heavy nuclei into lighter nuclei is _?_

A
(A) nuclear fusion; nuclear fission
B. combination; decomposition
C. induced radioactivity; natural radioactivity
D. nucleons; radioisotopes

16. Which one of the following represents fusion?

A
(A) $^{3}_{1}\text{H} + {}^{2}_{1}\text{H} \rightarrow {}^{4}_{2}\text{He} + {}^{1}_{0}\text{n}$
B. $^{211}_{84}\text{Po} \rightarrow {}^{211}_{84}\text{Po} + {}^{0}_{0}\gamma$
C. $^{233}_{90}\text{Th} \rightarrow {}^{233}_{91}\text{Pa} + {}^{0}_{-1}\text{e}$
D. $^{235}_{92}\text{U} \rightarrow {}^{146}_{57}\text{La} + {}^{87}_{35}\text{Ba} + 2\,{}^{1}_{0}\text{n}$

~~17.~~ During a fusion reaction, 5.00 ***GRAMS*** disappears. How much energy is released in Joules?

SKIP
B
A. 4.50E17
(B) 4.50E14
C. 5.56E-17
D. 5.56E-20

18. Cesium-131 has half-life of 30 yr. What percentage of the original sample would remain after 90 years?

D
A. 0
B. 50
C. 100
(D) 12.5
E. 25

Name _____ Date _____ Class _____

SKIP D 22. Relative atomic masses are measured in
a. nanograms. c. angstroms.
b. grams. d. amus.

C 23. If E is the symbol for an element, which two of the following symbols represent isotopes of the same element?
1. $^{24}_{12}E$ 2. $^{24}_{13}E$ 3. $^{25}_{11}E$ 4. $^{25}_{12}E$
a. 1 and 2 c. 1 and 4
b. 3 and 4 d. 2 and 3

C. Problems

Solve the following problem in the space provided. Show your work.

24. There are five naturally occurring isotopes of the element zinc. The relative abundance and mass of each are as follows.

$^{64}_{30}Zn$ = 48.89%, 63.929 amu

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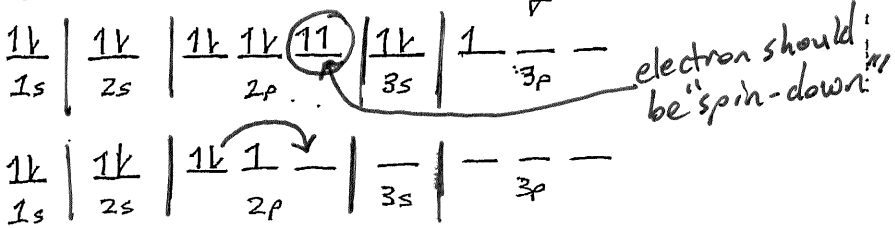
$^{67}_{30}Zn$ = 4.11%, 66.927 amu

$^{68}_{30}Zn$ = 18.57%, 67.925 amu

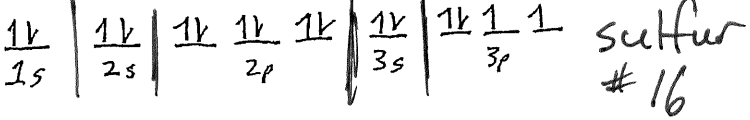
$^{70}_{30}Zn$ = 0.62%, 69.925 amu

Calculate the average atomic mass of zinc.

25) What rule is broken in the following orbital diagram?



26) Which element is represented in the orbital diagram?



sulfur #16

Name _____ Date _____ Class _____

ELECTRONS IN ATOMS

Vocabulary Review

Choose the term from the following list that best matches each description.

quantum
photons
~~hertz~~
Pauli exclusion principle
wavelength
Hund's rule
atomic emission spectrum
~~photoelectrons~~
Aufbau principle
~~quantum mechanical model~~

Skip 1. The lowest-energy arrangement of electrons in a subshell is obtained by putting electrons into separate orbitals of the subshell before pairing electrons.
(ex: 2p ↑↑↑) Hund's Rule

2. packets/quanta of electromagnetic energy
photons

3. the SI unit of frequency
hertz (not on test)

Skip 4. An atomic orbital can hold no more than two electrons (must have opp. spins)
Pauli Exclusion Principle

5) the amount of energy required to move an electron from its present energy level to the next higher one; or, the amount released when an electron drops to a lower l
quantum

6. the modern description of the location and energy of electrons in an atom
quantum mechanical model (not on test)

Skip 7. This principle states that electrons enter orbitals of lowest energy first.

8. the distance between two adjacent crests of an electromagnetic wave
(↔) wavelength

9. This is produced by passing the light emitted by an element through a prism.
(R O Y G B I V) Atomic Emission Spectrum

10. These are sometimes produced when light shines on metals.
photoelectrons (not on test)

Name _____ Date _____ Class _____

B 13. What is the maximum number of electrons allowed in the 2p sublevel?

a. 2 c. 10
b. 6 d. 14

B 14. What is the maximum number of electrons that can occupy one orbital?

a. 1 c. 8
b. 2 d. 18

B 15. The electron configuration for fluorine is

a. $1s^2 2s^2 2p^3$. c. $1s^2 2s^2 2p^6$.
b. $1s^2 2s^2 2p^5$. d. $1s^2 2s^2 2p^6 3s^2$.

B 16. The first three electrons that enter into *p* orbitals must ~~be~~ be in

a. ~~parallel spins~~. the same orbital c. low energy levels.
b. ~~opposite spins~~. separate orbitals d. opposite charges.

C 17. The atom whose electron configuration is $1s^2 2s^2 2p^6 3s^2 3p^1$ is

a. B. c. Al.
b. Na. d. Ga.

B 18. The ending configuration for element #20, Calcium, Ca, is

a. $3s^2$. c. $2s^1$.
b. $4s^2$. d. $4s^1$.

D 19. The element having the same *s* and *p* configurations for principal energy level 3 as the element F has for its principal energy level 2 is

a. Na. c. P.
b. Al. fluorine d. Cl.

B 20. The frequency and wavelength of all waves are

a. directly related. (change in same way) c. unrelated.
b. inversely related. (opposites) d. equal.

~~////~~ 21. The SI unit of cycles per second is called a

a. photon. c. hertz.
b. quantum. d. hund.

D 22. Among the following groups of atoms, which have the same outer (valence) ~~energy level~~ configurations?

a. H, He c. Mg, Al, Ca, Ga
b. Li, Be, N, Ne d. N, P, As, Bi

~~XXX~~ 23. The wavelength of light with a frequency of $2.50 \times 10^{13}\ s^{-1}$ is

a. 1.20×10^5 m. c. 1.20×10^{-5} m.
b. 8.33×10^5 m. d. 8.33×10^{-5} m.

B 24. When the ~~electron~~ electron in a hydrogen atom absorbs ~~excess~~ energy, it

a. is now in its ground state. (stays) c. has released a photon. (falls)
b. is now in its excited state. (jumps) d. none of the above

Name _____ Date _____ Class _____

C. Problems

Solve the following problems in the space provided. Show your work.

25. Write the electron configurations for the following atoms. (long and short)

a. Mg $1s^2 2s^2 2p^6 3s^2$
$[Ne]3s^2$

b. P $1s^2 2s^2 2p^6 3s^2 3p^3$ $[Ne]3s^2 3p^3$

c. Br $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^5$ $[Ar]4s^2 3d^{10} 4p^5$

d. Xe $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^6 5s^2 4d^{10} 5p^6$
$[Kr]5s^2 4d^{10} 5p^6$

26. Identify the elements described below.

a. Configuration = $1s^2 2s^2 2p^6 3s^2 3p^4$
Sulfur

b. Contains a full second energy level (2s and $2p^6$)
Neon

c. Contains the first *d* electron ($3d^1$)
Scandium

d. Contains seven electrons in its fourth energy level (4s and 4p combined)
Bromine

e. Contains only two electrons in its fifth energy level (5s)
Strontium

f. Contains three unpaired electrons in its third energy level (in 3p)
Phosphorus

g. Contains five electrons in its 3d orbitals
Manganese

h. Has its outermost electron in $7s^1$
Francium

SKIP ~~27~~) What is the frequency of radiation whose wavelength is 6.25×10^{-7} m?

SKIP ~~28~~) What is #27's Energy?

Name _____ Date _____ Class _____

THE PERIODIC TABLE

Vocabulary Review

Match the correct vocabulary term to each numbered statement. Write the letter of the correct term on the line.

	Column A	Column B
A	1. The highest occupied *s* and *p* sublevels are partially filled. (tall columns)	a. representative elements
N	2. The "d" block.	b. electronegativity
M	3. metals having only 2 electrons in the highest occupied energy level (2 valence e⁻)	c. atomic radius
C	4. size of an atom.	d. metals
K	5. decreases for cations and anions from left to right across a period	e. ionization energy
B	6. measures the ability of an atom to attract electrons when the atom is in a compound	f. cation
L	7. an atom or group of atoms that has a positive or negative charge	g. noble gases
G	8. elements in which the valence *s* and *p* sublevels are filled ($s^2 - p^6$)	h. alkali metals
O	9. nonmetals of Group 17	i. lanthanides/actinides
I	10. The f block	j. nonmetals
E	11. energy required to remove an electron from an atom	k. ionic radius
F	12. positively charged ion	l. ion
H	13. Group 1 elements	m. Group 2
D	14. good conductors of heat and electric current	n. transition metal
P	15. negatively charged ion	o. halogens
J	16. poor conductors of heat and electric current	p. anion

Name _____ Date _____ Class _____

THE PERIODIC TABLE

Chapter Test B

A. Matching

Match each term in Column B with the correct description in Column A. Write the letter of the correct term on the line.

	Column A	Column B
C	1. size of an atom	a. electronegativity
I	2. negatively charged ion	b. groups
B	3. the vertical columns of the periodic table	c. atomic radius
G	4. the nonmetallic elements of Group 17.	d. ionization energy
H	5. elements in which the highest occupied *s* and *p* sublevels are filled ($s^2 - p^6$)	e. periodic law
A	6. the tendency for the atoms of an element to attract electrons when the atoms are in a compound	f. alkali metals
J	7. positively charged ion	g. halogens
D	8. the energy required to remove an electron from an atom	h. noble gases
F	9. the Group 1 elements	i. anion
E	10. When elements are arranged in order of increasing atomic number, there is a periodic repetition of their physical and chemical properties.	j. cation

B. Multiple Choice

Choose the best answer and write its letter on the line.

B 11. The modern periodic table is arranged in order of increasing
a. atomic mass. c. atomic size.
b. atomic number. d. atomic radius.

D 12. The elements in the tall columns.
a. alkali metals. c. transition metals.
b. alkaline earth metals. (d.) representative elements.

Name _____ Date _____ Class _____

D 13. Which of the following is true concerning the noble gases?
a. Their highest occupied *s* and *p* sublevels are filled.
b. They belong to Group 18.
c. They are sometimes referred to as the inert gases.
(d) all of the above

A 14. What is the number of valence electrons in the nitrogen group?
(a) 5 c. 8
b. 3 d. 18

D 15. Among the groups of elements listed below, which have the same number of valence e⁻s?
a. Li, B, C, F c. K, Ca, Rb, Sr
b. Na, Mg, Al, S (d) N, P, As, Sb

C 16. An element that contains an electron in a *d* sublevel is
a. Mg. (c) Fe.
b. O. d. Ne.

D 17. The elements that contain electrons in an *f* sublevel near the highest occupied energy level are referred to as
a. alkali metals. c. transition metals.
b. alkaline earth metals. (d) inner transition metals (lanthanides/actinides)

C 18. The electron configuration of the element chlorine ends in
a. $3s^2$. (c) $3s^23p^5$.
b. $3p^6$. d. $3s^23p^7$.

D 19. The element with 8 electrons in its 3*d* sublevel is
a. O. c. Ar.
b. Ne. (d) Ni.

A 20. As you move down a group in the periodic table, atomic size generally
(a) increases. c. remains the same.
b. decreases. d. varies randomly.

D 21. The largest atom from among the following is
a. Li. c. Rb.
b. Na. (d) Fr.

D 22. The smallest atom from among the following is
a. Na. c. Si.
b. Mg. (d) Cl.

B 23. ~~As the number of electrons added to the same principal energy level increases,~~ Atomic size generally _____ across a period.
a. increases. c. remains the same.
(b) decreases. d. varies randomly.

A 24. Removing one electron from an atom results in the formation of an
(a) ion with a 1+ charge. c. ion with a 7+ charge.
b. ion with a 1− charge. d. ion with a 7− charge.

Name _____ Date _____ Class _____

32. Arrange the following elements as described below.
Li, C, K, F, Cs
a. In order of decreasing atomic size (largest to smallest)
Cs, K, Li, C, F
b. In order of increasing ionization energy
Cs, K, Li, C, F
c. In order of decreasing electronegativity
F, C, Li, K, Cs

33. Among the following pairs of atoms, identify the larger of the two, the one with the greater first ionization energy, and the one with the lower electronegativity.

Atom	Larger	Greater Ionization Energy	Lower Electronegativity
a. Li, K	K	Li	K
b. C, F	C	F	C
c. Mg, Ca	Ca	Mg	Ca
d. O, S	S	O	S

34. The outermost energy level configurations for the theoretical elements A–E are listed below. Use the symbols A through E to answer each of the questions that follow.
A = $3s^2$ B = $3s^1$ C = $2s^22p^6$ D = $2s^22p^5$ E = $2s^22p^3$
a. Which has the lowest first ionization energy? B
b. Which is a noble gas? C
c. Which has the highest electronegativity? D
d. Which has the highest second ionization energy? ////////
e. Which is the largest atom? B

STOP

D. Essay

Write a short essay for the following statement.

35. Explain why elements with high first ionization energies typically also have high electronegativity values.
They have greater nuclear pull on their valence e⁻s