Deep Run High School

CHEMISTRY I: 3(A), 5(A), 7(A)

Unit 5 Test

Due Date: **December 17, 2019**

Instructors: **Jennifer Krug, Mr. Wilson, Mrs. Tique**

ID: **2088**

Name: _____ Score: / 100

Instructions:

This test contains 35 questions from Unit 5 Ions and Chemical Bonding. The review questions on the test are from Unit 3 Atomic Structure. These questions focus on the nature of subatomic particles, isotopes, electron configurations, and Aufbau diagrams.

Question 1

Choose the correct name for: Li_2SO_4

- ☐ lithium II sulfoxate
- ☐ lithium sulfuroxide
- ☐ lithium sulfide
- ☐ lithium sulfate

Name: _____

Question 2

Choose the correct name for: $BaSO_4$

- ☐ barium sulfate
- ☐ barium sulfur oxide
- ☐ barium sulfoxide
- ☐ barium sulfade

Question 3

Choose the correct name for: $MgCO_3$

- ☐ magnesium carbon oxide
- ☐ magnesium carbonate
- ☐ magnesium III carbonate
- ☐ magnesium II carbide

Name: _____

Question 4

Choose the correct formula for: manganese II sulfate

- ☐ $MnSO_4$
- ☐ $MgSO_4$
- ☐ $Mn(SO_4)_2$
- ☐ Mn_2SO_4

Question 5

Choose the correct for formula for: gold III sulfate

- ☐ $Au_2(SO_4)_3$
- ☐ $Au_3(SO_2)_4$
- ☐ $Au_4(SO_3)_2$
- ☐ $Au_2(SO_3)_4$

Name: _____

Question 6

Choose the correct formula for: chromium III nitrate

- ☐ $Cr(NO_3)_3$
- ☐ $Cr_2(NO_3)_3$
- ☐ $Cr_2(NO_4)_3$
- ☐ $Cr(NO_4)_3$

Question 7

Choose the correct name for: $AuNO_3$

- ☐ gold I nitrate
- ☐ gold III nitrate
- ☐ gold I nitrogenate
- ☐ gold III nitrogenate

Name: _____

Question 8

Choose the correct name for: $Sn_3(PO_4)_4$

- ☐ tin II phosphate
- ☐ tin III phosphate
- ☐ tin IV phosphate
- ☐ tin I phosphate

Question 9

Choose the correct name for: $Pb_3(PO_4)_2$

- ☐ lead II phosphate
- ☐ lead III phosphate
- ☐ lead IV phosphate
- ☐ lead IIII phoshpate

Name: _____

Question 10

The outer orbital of an atom can

- ☐ gain electrons
- ☐ lose electrons
- ☐ gain or lose electrons
- ☐ gain or lose protons

Question 11

What rule determines the maximum number of valence electrons allowed in the outer orbital?

- ☐ Orbital rule
- ☐ Hund's rule
- ☐ Octet rule
- ☐ VSEPR Rule

Name: _____

Question 12

Choose the correct name for: $AlCl_3$

- ☐ aluminum chloride
- ☐ aluminum III chloride
- ☐ aluminum trichloride
- ☐ aluminum carbon triodide

Question 13

Choose the correct name for: MgO

- ☐ magnesium II oxide
- ☐ magnesium I oxide
- ☐ magnesium oxide
- ☐ magnesium oxate

Name: _____

Question 14

Choose the correct name for: ZnS

- ☐ zinc sulfide
- ☐ zinc I sulfide
- ☐ zinc II sulfide
- ☐ zinc sulfate

Question 15

Elements in Group 16 have an oxidation number of

- ☐ -16
- ☐ +6
- ☐ -2
- ☐ +2

Name: _____

Question 16

An element in the Halogen Group will have ___ valence electrons.

- ☐ 1
- ☐ 17
- ☐ 18
- ☐ 7

Question 17

How many valence electrons does an atom of carbon contain?

- ☐ 2
- ☐ 4
- ☐ 6
- ☐ 12

Name: _____

Question 18

Which of the following elements has an electron configuration of:

$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^2\ 3d^{10}\ 4p^6$

- ☐ Xe
- ☐ Br
- ☐ Kr
- ☐ Zn

Question 19

Which of the following elements has an electron configuration of:

$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^4$

- ☐ Br
- ☐ Cl
- ☐ P
- ☐ S

Name: _____

Question 20

The lines in the bright line spectrum of an atom are due to

- ☐ movement of electrons from inside to outside the nucleus
- ☐ movement of electrons from higher energy states to lower energy states
- ☐ movement of electrons from lower energy states to higher energy states
- ☐ movement of electrons from outside to inside the nucleus

Question 21

Which of the following statements are true of carbon-14?

I. Its chemical properties will be exactly like those of carbon-12.

II. Its mass will be different from that of an atom of carbon-12.

III. It will contain a different number of protons than an atom of carbon-12.

IV. It is more plentiful in nature than carbon-12

- ☐ III and IV only
- ☐ I, II, and III only
- ☐ I, II, and IV only
- ☐ II, III, and IV only
- ☐ I and II only

Name: _____

Question 22

Choose the correct formula for: copper I oxide

- ☐ Co_2O
- ☐ Cu_2O
- ☐ CuO_2
- ☐ CO_2

Question 23

Choose the correct formula for: cobalt II fluoride

- ☐ CoF_2
- ☐ CuF_2
- ☐ Co_2Fl
- ☐ CoF

Name: _____

Question 24

Choose the correct formula for: chromium III oxide

- ☐ Cr_3O
- ☐ Cr_3O_2
- ☐ Cr_2O_3
- ☐ CrO_3

Question 25

Which of the following correctly lists the number of protons, electrons, and neutrons in a $^{59}_{28}Ni$ atom?

- ☐ 28, 28, 28
- ☐ 28, 28, 59
- ☐ 28, 28, 31
- ☐ 59, 59, 31
- ☐ 59, 59, 28

Name: _____

Question 26

Choose the correct formula for: strontium nitrate

- ☐ SrN_3
- ☐ $SrNO_3$
- ☐ $Sr_2(NO_3)$
- ☐ $Sr(NO_3)_2$

Question 27

The formula for magnesium nitrate is

- ☐ $Mg(NO_3)_2$
- ☐ Mg_2NO_3
- ☐ $MgNO_3$
- ☐ $Mg_2(NO3)_3$

Name: _____

Question 28

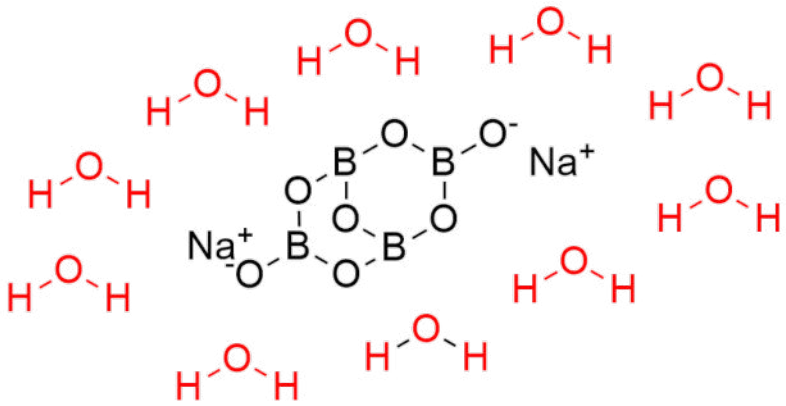
What is the chemical formula for aluminum sulfate?

- ☐ $AlSO_4$
- ☐ Al_2SO_4
- ☐ Al_3SO_4
- ☐ $Al_2(SO_4)_3$

Name: _____

Question 29

The total number of *oxygen atoms* represented in $Na_2B_4O_7 \cdot 10\ H_2O$ is



Borax
Sodum tetraborate decahydrate

- [ ] 7
- [ ] 10
- [ ] 17
- [ ] 70

Name: _____

Question 30

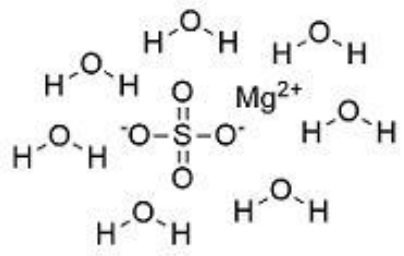
How many atoms are in the formula for potassium nitrate?

- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5

Name: _____

Question 31

How many *oxygen atoms* are represented in the formula for epsom salt - $MgSO_4 \cdot 7\ H_2O$?



Magnesium sulfate heptahydrate

- ☐ 4
- ☐ 7
- ☐ 28
- ☐ 11

Name: _____

Question 32

Which of the following is an example of an ionic bond?

- ☐ H_2O
- ☐ MgO
- ☐ CO_2
- ☐ SO_3

Question 33

All of the following are characteristic of ionic bonds *EXCEPT*

- ☐ Ionic compounds have strong intermolecular forces
- ☐ Ionic compounds exhibit high boiling points.
- ☐ Ionic compounds exhibit low melting points.
- ☐ Atoms have a large difference in electronegativity values.

Name: _____

Question 34

In order for ionic bonding to occur,

- ☐ metals must lose electrons and nonmetals must gain electrons
- ☐ metals must gain elctrons and nonmetals must lose protons
- ☐ metals must gain protons and nonmetals must gain electrons
- ☐ metals must lose protons and nonmetals must lose electrons

Question 35

An isotope of chlorine has a mass number of 37 and 20 neutrons. How many protons will it have? _____

Question 36

Which statement about the nucleus of an atom is INCORRECT?

- ☐ It is very dense.
- ☐ It is positively charged.
- ☐ It constitutes most of the volume of an atom.
- ☐ It is not involved in ordinary chemical reactions.
- ☐ It contains all of the protons and neutrons in the atom.

Name: _____

Question 37

Which is the largest subatomic particle?

- ☐ neutron
- ☐ proton
- ☐ electron
- ☐ ion

Question 38

Choose the correct name for: SnO

- ☐ tin oxide
- ☐ tin I oxide
- ☐ tin II oxide
- ☐ tin IV oxide

Name: _____

Question 39

Choose the correct name for: Fe_2O_3

- ☐ iron oxide
- ☐ iron II oxide
- ☐ iron III oxide
- ☐ iron hydoxide

Question 40

Choose the correct name for: AuN

- ☐ gold I nitride
- ☐ gold II nitride
- ☐ gold III nitride
- ☐ gold IV nitride

Name: _____

Question 41

Choose the correct formula for: magnesium fluoride

- ☐ MgF
- ☐ Mg_2F
- ☐ MgF_2
- ☐ Mgf_2

Question 42

Choose the correct formula for: magnesium nitride

- ☐ MgN_2
- ☐ Mg_2N_3
- ☐ Mg_3N
- ☐ Mg_3N_2

Name: _____

Question 43

Choose the correct formula for: zinc phosphide

- ☐ ZnP_3
- ☐ Zn_2P
- ☐ Zn_3P
- ☐ Zn_3P_2

Question 44

A student hypothesizes that bromine (Br) has different chemical properties from krypton (Kr). The periodic table supports this hypothesis by indicating that –

- ☐ bromine is a metal while krypton is a nonmetal
- ☐ the atomic mass of bromine is heavier than the atomic mass of krypton
- ☐ bromine and krypton are members of the same family
- ☐ bromine and krypton have different numbers of valence electrons

Name: _____

Question 45

Which of the following elements only has two valence electrons?

- ☐ Oxygen (O)
- ☐ Calcium (Ca)
- ☐ Lithium (Li)
- ☐ Carbon (C)

Question 46

Choose the orbitals below that do NOT exist.

I. 1p
II. 2p
III. 3f
IV. 4d
V. 7s

- ☐ I and V only
- ☐ I and III only
- ☐ I, III and IV only
- ☐ I, II, III, IV and V
- ☐ I, III and V only

Name: _____

Question 47

The isotope shown below has

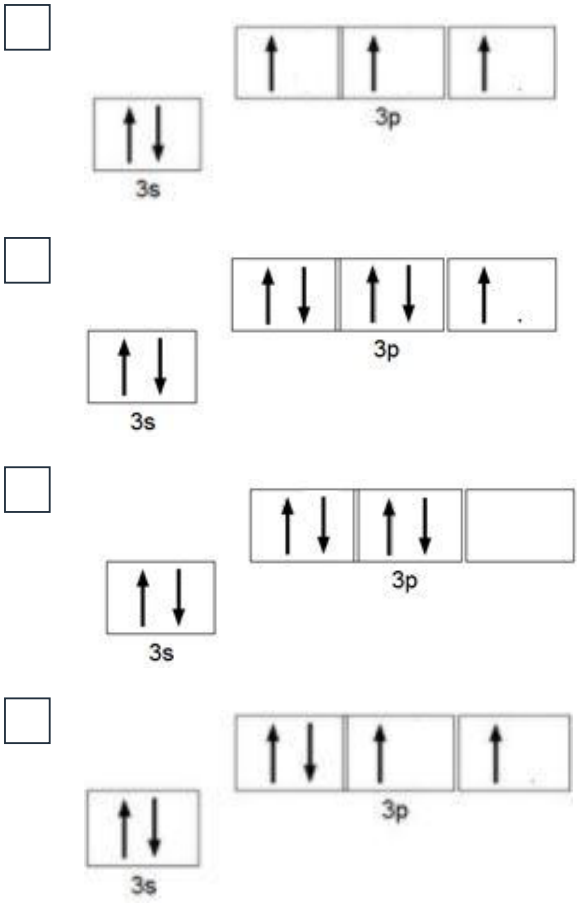
$$^{40}_{19}K^{+1}$$

- [ ] 19 protons, 21 neutrons, and 18 electrons
- [ ] 18 protons, 19 neutrons, and 20 electrons
- [ ] 19 protons, 40 neutrons, and 1 electrons
- [ ] 1 protons, 25 neutrons, and 19 electrons

Name: _____

Question 48

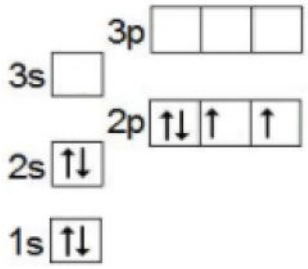
Which of the following Aufbau Diagram configurations breaks Hund's Rule?



Name: _____

Question 49

Which element has the following Aufbau electron configuration?



- ☐ fluorine
- ☐ nitrogen
- ☐ oxygen
- ☐ sulfur

Question 50

The element uranium-238 has in its nucleus

- ☐ 238 neutrons and 92 protons
- ☐ 92 neutrons and 92 protons
- ☐ 146 neutrons and 92 protons
- ☐ 92 neutrons and 146 protons

Answer Key

Possible Points: 50 Factor: x2.00 Test Value: 100

Instructions for grading: Grade each question and tally the score to obtain the total test points. If the factor does not equal 1, multiply the total points by the factor to obtain the student's final score.

Question 1

Choose the correct name for: Li_2SO_4

☑ lithium sulfate

1 possible pts.

Question 2

Choose the correct name for: $BaSO_4$

☑ barium sulfate

1 possible pts.

Question 3

Choose the correct name for: $MgCO_3$

☑ magnesium carbonate

1 possible pts.

Answer Key

Possible Points: 50 Factor: x2.00 Test Value: 100

Question 4

Choose the correct formula for: manganese II sulfate

☑ $MnSO_4$

1 possible pts.

Question 5

Choose the correct for formula for: gold III sulfate

☑ $Au_2(SO_4)_3$

1 possible pts.

Question 6

Choose the correct formula for: chromium III nitrate

☑ $Cr(NO_3)_3$

1 possible pts.

Answer Key

Possible Points: 50 Factor: x2.00 Test Value: 100

Question 7

Choose the correct name for: $AuNO_3$

☑ gold I nitrate

1 possible pts.

Question 8

Choose the correct name for: $Sn_3(PO_4)_4$

☑ tin IV phosphate

1 possible pts.

Question 9

Choose the correct name for: $Pb_3(PO_4)_2$

☑ lead II phosphate

1 possible pts.

Answer Key

Possible Points: 50 Factor: x2.00 Test Value: 100

Question 10

The outer orbital of an atom can

☑ gain or lose electrons

1 possible pts.

Question 11

What rule determines the maximum number of valence electrons allowed in the outer orbital?

☑ Octet rule

1 possible pts.

Question 12

Choose the correct name for: $AlCl_3$

☑ aluminum chloride

1 possible pts.

Answer Key

Possible Points: 50 Factor: x2.00 Test Value: 100

Question 13

Choose the correct name for: MgO

☑ magnesium oxide

1 possible pts.

Question 14

Choose the correct name for: ZnS

☑ zinc sulfide

1 possible pts.

Question 15

Elements in Group 16 have an oxidation number of

☑ -2

1 possible pts.

Answer Key

Possible Points: 50 Factor: x2.00 Test Value: 100

Question 16

An element in the Halogen Group will have ___ valence electrons.

☑ 7

1 possible pts.

Question 17

How many valence electrons does an atom of carbon contain?

☑ 4

1 possible pts.

Question 18

Which of the following elements has an electron configuration of:

$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^6\ 4s^2\ 3d^{10}\ 4p^6$

☑ Kr

1 possible pts.

Answer Key

Possible Points: 50 Factor: x2.00 Test Value: 100

Question 19

Which of the following elements has an electron configuration of:

$1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^4$

☑ S

1 possible pts.

Question 20

The lines in the bright line spectrum of an atom are due to

☑ movement of electrons from higher energy states to lower energy states

1 possible pts.

Answer Key

Possible Points: 50 Factor: x2.00 Test Value: 100

Question 21

Which of the following statements are true of carbon-14?

I. Its chemical properties will be exactly like those of carbon-12.

II. Its mass will be different from that of an atom of carbon-12.

III. It will contain a different number of protons than an atom of carbon-12.

IV. It is more plentiful in nature than carbon-12

☑ I and II only

1 possible pts.

Question 22

Choose the correct formula for: copper I oxide

☑ Cu_2O

1 possible pts.

Answer Key

Possible Points: 50 Factor: x2.00 Test Value: 100

Question 23

Choose the correct formula for: cobalt II fluoride

☑ CoF_2

1 possible pts.

Question 24

Choose the correct formula for: chromium III oxide

☑ Cr_2O_3

1 possible pts.

Question 25

Which of the following correctly lists the number of protons, electrons, and neutrons in a $^{59}_{28}Ni$ atom?

☑ 28, 28, 31

1 possible pts.

Answer Key

Possible Points: 50 Factor: x2.00 Test Value: 100

Question 26

Choose the correct formula for: strontium nitrate

☑ $Sr(NO_3)_2$

1 possible pts.

Question 27

The formula for magnesium nitrate is

☑ $Mg(NO_3)_2$

1 possible pts.

Question 28

What is the chemical formula for aluminum sulfate?

☑ $Al_2(SO_4)_3$

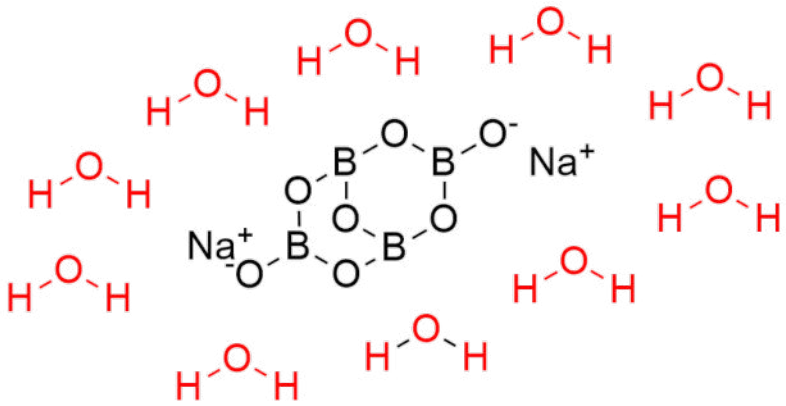
1 possible pts.

Answer Key

Possible Points: 50 Factor: x2.00 Test Value: 100

Question 29

The total number of *oxygen atoms* represented in $Na_2B_4O_7 \cdot 10\ H_2O$ is



Borax
Sodum tetraborate decahydrate

☑ 17

1 possible pts.

Question 30

How many atoms are in the formula for potassium nitrate?

☑ 5

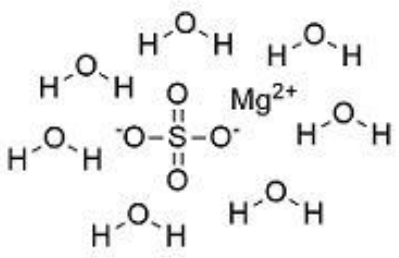
1 possible pts.

Answer Key

Possible Points: 50 Factor: x2.00 Test Value: 100

Question 31

How many *oxygen atoms* are represented in the formula for epsom salt - $MgSO_4 \cdot 7\ H_2O$?



Magnesium sulfate heptahydrate

☑ 11

1 possible pts.

Question 32

Which of the following is an example of an ionic bond?

☑ MgO

1 possible pts.

Answer Key

Possible Points: 50 Factor: x2.00 Test Value: 100

Question 33

All of the following are characteristic of ionic bonds *EXCEPT*

☑ Ionic compounds exhibit low melting points.

1 possible pts.

Question 34

In order for ionic bonding to occur,

☑ metals must lose electrons and nonmetals must gain electrons

1 possible pts.

Question 35

An isotope of chlorine has a mass number of 37 and 20 neutrons. How many protons will it have? 17

1 possible pts.

Answer Key

Possible Points: 50 Factor: x2.00 Test Value: 100

Question 36

Which statement about the nucleus of an atom is INCORRECT?

☑ It constitutes most of the volume of an atom.

1 possible pts.

Question 37

Which is the largest subatomic particle?

☑ neutron

1 possible pts.

Question 38

Choose the correct name for: SnO

☑ tin II oxide

1 possible pts.

Answer Key

Possible Points: 50 Factor: x2.00 Test Value: 100

Question 39

Choose the correct name for: Fe_2O_3

☑ iron III oxide

1 possible pts.

Question 40

Choose the correct name for: AuN

☑ gold III nitride

1 possible pts.

Question 41

Choose the correct formula for: magnesium fluoride

☑ MgF_2

1 possible pts.

Answer Key

Possible Points: 50 Factor: x2.00 Test Value: 100

Question 42

Choose the correct formula for: magnesium nitride

☑ Mg_3N_2

1 possible pts.

Question 43

Choose the correct formula for: zinc phosphide

☑ Zn_3P_2

1 possible pts.

Question 44

A student hypothesizes that bromine (Br) has different chemical properties from krypton (Kr). The periodic table supports this hypothesis by indicating that –

☑ bromine and krypton have different numbers of valence electrons

1 possible pts.

Answer Key

Possible Points: 50 Factor: x2.00 Test Value: 100

Question 45

Which of the following elements only has two valence electrons?

☑ Calcium (Ca)

1 possible pts.

Question 46

Choose the orbitals below that do NOT exist.

I. 1p
II. 2p
III. 3f
IV. 4d
V. 7s

☑ I and III only

1 possible pts.

Answer Key

Possible Points: 50 Factor: x2.00 Test Value: 100

Question 47

The isotope shown below has

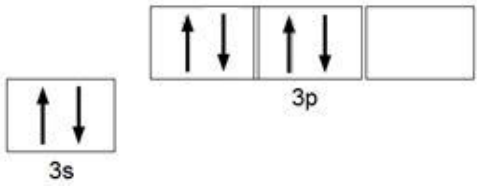
$$^{40}_{19}K^{+1}$$

☑ 19 protons, 21 neutrons, and 18 electrons

1 possible pts.

Question 48

Which of the following Aufbau Diagram configurations breaks Hund's Rule?

☑ 

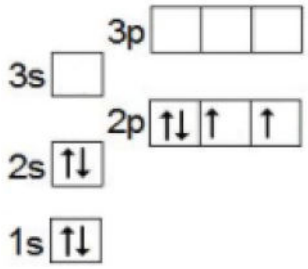
1 possible pts.

Answer Key

Possible Points: 50 Factor: x2.00 Test Value: 100

Question 49

Which element has the following Aufbau electron configuration?



☑ oxygen

1 possible pts.

Question 50

The element uranium-238 has in its nucleus

☑ 146 neutrons and 92 protons

1 possible pts.