

Deep Run High School

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

Unit 4 Test Review - Periodic Trends

Due Date: November 26, 2019

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

ID: 9008

Name: _____

Score: / 100

Instructions:

You have **two attempts** to get your highest score.

Question 1

A chemist is examining an unidentified element sample with oxidation states of +2, +3, and +6. The element has a shielding effect similar to that of potassium (K). Which statement about the unidentified element is *most* likely true?

- ☐ It is a transition metal from the same period as potassium.
- ☐ It has the same number of neutrons as potassium.
- ☐ It is one of the heaviest elements in potassium's group.
- ☐ It is a mix of three unstable isotopes of potassium.

Name: _____

Question 2

Which group of the periodic table has the least reactive elements?

- ☐ Halogens
- ☐ Alkali Metals
- ☐ Nobel Gases
- ☐ Transition Metals

Question 3

Which group of the periodic table has the highest electronegativity?

- ☐ Halogens
- ☐ Alkaline Earth Metals
- ☐ Nobel Gases
- ☐ Transition Metals

Name: _____

Question 4

All of the following are true of ionic radii *EXCEPT* -

- ☐ Metals get smaller when they become cations.
- ☐ Nobel gases form the largest ions.
- ☐ The shielding effect increases for ionic radii as you move down a group.
- ☐ Nonmetals get larger when they become anions.

Question 5

Which periodic trend is a measure of the tendency of an atom to attract a bonding pair of electrons?

- ☐ Ionization Energy
- ☐ Electronegativity
- ☐ Ionic Radii
- ☐ Shielding

Name: _____

Question 6

Which of the following are ranked according to increasing electronegativity?

☐ Cl, Br, I

☐ F, C, Li

☐ Mg, Ca, Sr

☐ Ar, Na, Cl

Question 7

Which of the following elements is the most reactive?

☐ Mg

☐ Rb

☐ K

☐ Ca

Name: _____

Question 8

All of the following trends increase as shielding increases *EXCEPT* –

- ☐ Metallic Properties
- ☐ Atomic Radii
- ☐ Ionization Energy
- ☐ Ionic Radii

Question 9

A student hypothesizes that nitrogen (N) has different chemical properties from oxygen (O). The periodic table supports this hypothesis by indicating that -

- ☐ one mole of oxygen is heavier than one mole of nitrogen
- ☐ nitrogen is a metal while oxygen is a nonmetal
- ☐ oxygen and nitrogen are members of the same family
- ☐ nitrogen and oxygen have different numbers of valence electrons

Name: _____

Question 10

Which sequence of elements is arranged in order of *increasing* ionization energy?

☐ O, S, Se

☐ K, Zn, Br

☐ Cl, S, P

☐ F, B, Li

Name: _____

Question 11

List the following elements in order of decreasing reactivity.

▲ Most Reactive

▼ Least Reactive

- ☐ Silicon (Si)
- ☐ Magnesium (Mg)
- ☐ Helium (He)
- ☐ Cesium (Cs)

Name: _____

Question 12

Which of the following types of matter can be classified as a **homogeneous mixture**?

- ☐ sugar
- ☐ air
- ☐ concrete
- ☐ sodium chloride

Question 13

Which of the following elements has the largest atomic radius?

- ☐ Aluminum (Al)
- ☐ Boron (B)
- ☐ Silicon (Si)
- ☐ Carbon (C)

Name: _____

Question 14

Which group of the periodic table has an electron configuration of $ns^2 np^5$?

- ☐ Metalloids
- ☐ Alkaline Earth Metals
- ☐ Actinides
- ☐ Halogens

Name: _____

Question 15

Sort the following elements in order of increasing atomic radius.

▲ Smallest Radius



▼ Largest Radius

- ☐ Phosphorus
- ☐ Magnesium
- ☐ Argon
- ☐ Aluminum

Name: _____

Question 16

Record the length of this caterpillar to the proper number of significant digits.



- ☐ 2.70 cm
- ☐ 2.52 cm
- ☐ 2.715 cm
- ☐ 2.7 cm

Name: _____

Question 17

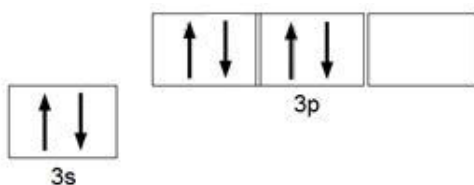
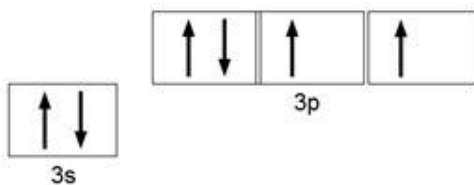
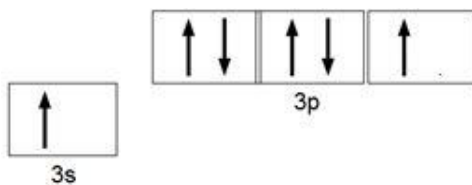
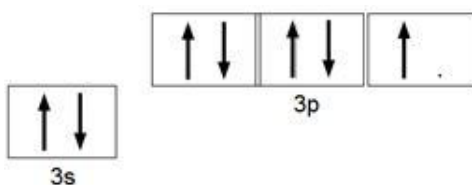
Which of the following properties decreases from left to right across a period?

- ☐ electronegativity
- ☐ Atomic Radius
- ☐ Shielding
- ☐ Ionization Energy

Name: _____

Question 18

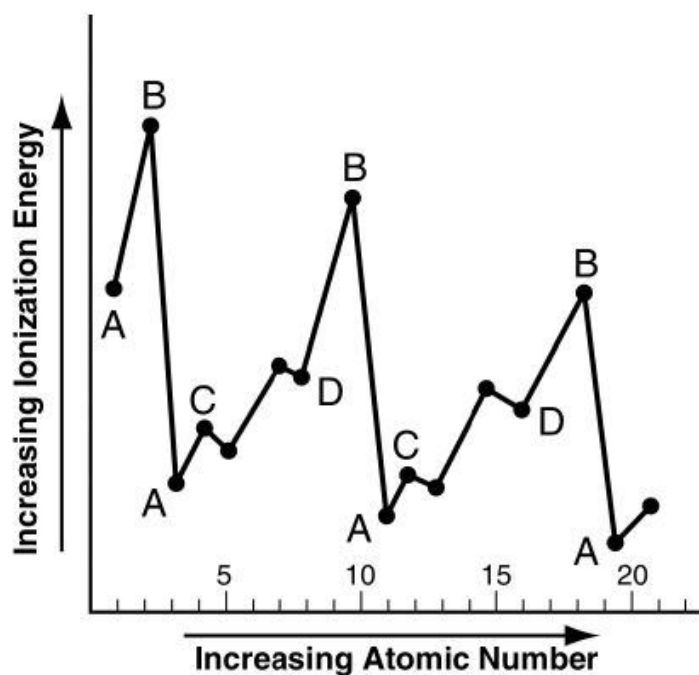
Which of the following correctly shows the third energy level of the Aufbau Diagram for Sulfur?

☐☐☐☐

Name: _____

Question 19

The chart above shows the relationship between the first ionization potential and the increase in atomic number. The letter on the chart that indicates the noble gases or the inert elements is -



- ☐ A
- ☐ B
- ☐ C
- ☐ D

Name: _____

Question 20

An electron in an atom's outer shell is shielded from the nucleus by

- ☐ electrons in the inner orbitals
- ☐ neutrons inside the nucleus
- ☐ electrons of other atoms
- ☐ protons inside the nucleus

Question 21

Which anion will have the largest radius?

- ☐ O⁻²
- ☐ S⁻²
- ☐ Se⁻²
- ☐ Te⁻²

Name: _____

Question 22

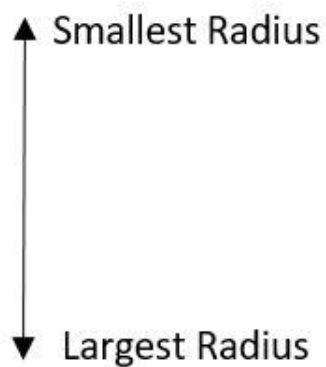
Which group of the periodic table has the most reactive metals?

- ☐ Metalloids
- ☐ Alkali Metals
- ☐ Halogens
- ☐ Transition Metals

Name: _____

Question 23

Sort the following elements in order of increasing atomic radius.



- ☐ Argon
- ☐ Magnesium
- ☐ Phosphorus
- ☐ Aluminum

Name: _____

Question 24

What causes the atomic radius to get smaller from left to right across a period?

- ☐ Shielding
- ☐ Gravity
- ☐ Nuclear Force
- ☐ Electron-electron repulsion

Question 25

Which of the following atoms exhibits the largest shielding effect?

- ☐ Copper (Cu)
- ☐ Nitrogen (N)
- ☐ Lead (Pb)
- ☐ Sodium (Na)

Name: _____

Question 26

Which grouping identifies chemical properties?

- ☐ Luster, hardness, texture
- ☐ Density, melting point, boiling point
- ☐ Malleability, ductility, conductivity
- ☐ Combustibility, flammability, reactivity

Question 27

Which chemist organized the modern periodic table, which is based on the atomic number of elements?

- ☐ Dmitri Mendeleev
- ☐ Ernest Rutherford
- ☐ Henry Moseley
- ☐ Neils Bohr

Name: _____

Question 28

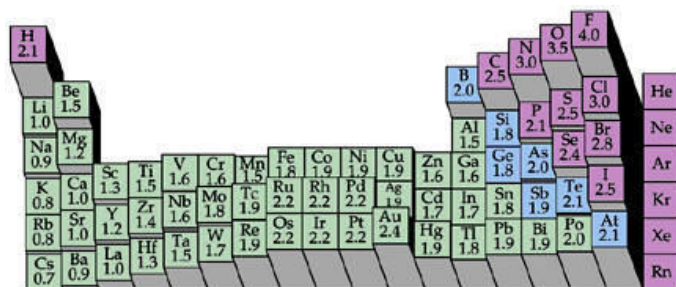
Which group has the highest ionization energy?

- ☐ Alkali Metals
- ☐ Metalloids
- ☐ Nobel Gases
- ☐ Halogens

Name: _____

Question 29

Why do the noble gases have the lowest electronegativity?



- ☐ Because they cannot conduct electricity.
- ☐ Because gases can't bond with other atoms.
- ☐ Because their valence orbitals are already full.
- ☐ Because their atomic radii are too large.

Name: _____

Question 30

Which property is a measure of a metals ability to be stretched and pulled into a wire?

- ☐ Malleability
- ☐ Ductility
- ☐ Reactivity
- ☐ Conductivity

Answer Key

Possible Points: 30 Factor: x3.33 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

A chemist is examining an unidentified element sample with oxidation states of +2, +3, and +6. The element has a shielding effect similar to that of potassium (K). Which statement about the unidentified element is *most* likely true?



It is a transition metal from the same period as potassium.

1 possible pts.

Question 2

Which group of the periodic table has the least reactive elements?



Nobel Gases

1 possible pts.

Answer Key

Possible Points: 30 Factor: x3.33 Test Value: 100

Question 3

Which group of the periodic table has the highest electronegativity?



Halogens

1 possible pts.

Question 4

All of the following are true of ionic radii *EXCEPT* -



Nobel gases form the largest ions.

1 possible pts.

Question 5

Which periodic trend is a measure of the tendency of an atom to attract a bonding pair of electrons?



Electronegativity

1 possible pts.

Answer Key

Possible Points: 30 Factor: x3.33 Test Value: 100

Question 6

Which of the following are ranked according to increasing electronegativity?



Ar, Na, Cl

1 possible pts.

Question 7

Which of the following elements is the most reactive?



Rb

1 possible pts.

Question 8

All of the following trends increase as shielding increases *EXCEPT* –



Ionization Energy

1 possible pts.

Answer Key

Possible Points: 30 Factor: x3.33 Test Value: 100

Question 9

A student hypothesizes that nitrogen (N) has different chemical properties from oxygen (O). The periodic table supports this hypothesis by indicating that -



nitrogen and oxygen have different numbers of valence electrons

1 possible pts.

Question 10

Which sequence of elements is arranged in order of *increasing* ionization energy?



K, Zn, Br

1 possible pts.

Answer Key

Possible Points: 30 Factor: x3.33 Test Value: 100

Question 11

List the following elements in order of decreasing reactivity.

▲ Most Reactive

▼ Least Reactive

- Silicon (Si)
- Magnesium (Mg)
- Helium (He)
- Cesium (Cs)

1 possible pts.

Answer Key

Possible Points: 30 Factor: x3.33 Test Value: 100

Question 12

Which of the following types of matter can be classified as a **homogeneous mixture**?



air

1 possible pts.

Question 13

Which of the following elements has the largest atomic radius?



Aluminum (Al)

1 possible pts.

Question 14

Which group of the periodic table has an electron configuration of **$ns^2 np^5$** ?



Halogens

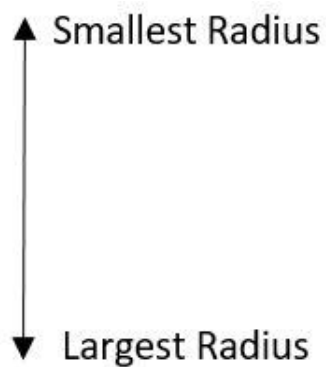
1 possible pts.

Answer Key

Possible Points: 30 Factor: x3.33 Test Value: 100

Question 15

Sort the following elements in order of increasing atomic radius.



- Phosphorus
- Magnesium
- Argon
- Aluminum

1 possible pts.

Answer Key

Possible Points: 30 Factor: x3.33 Test Value: 100

Question 16

Record the length of this caterpillar to the proper number of significant digits.



2.70 cm

1 possible pts.

Question 17

Which of the following properties decreases from left to right across a period?



Atomic Radius

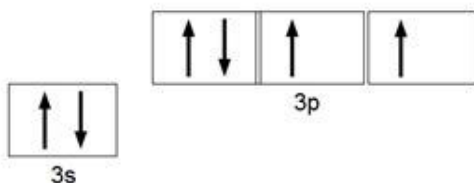
1 possible pts.

Answer Key

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Question 18

Which of the following correctly shows the third energy level of the Aufbau Diagram for Sulfur?



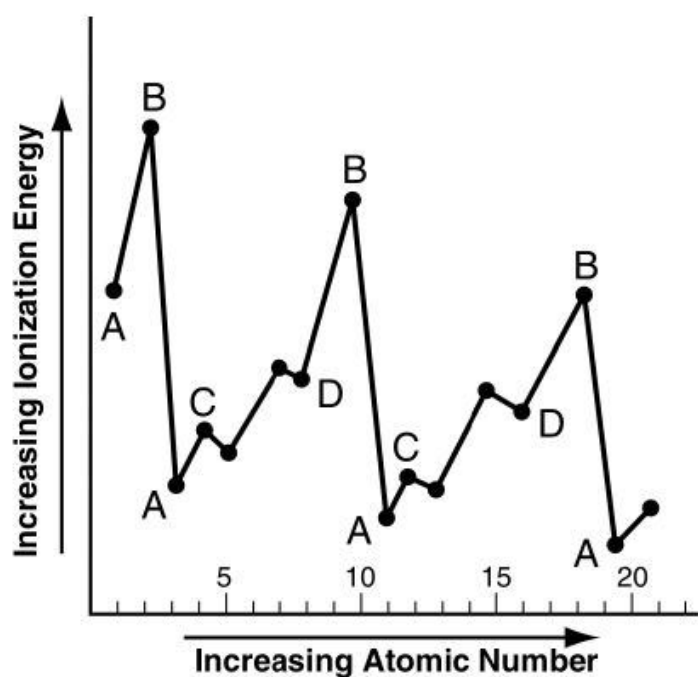
1 possible pts.

Answer Key

Possible Points: 30 Factor: x3.33 Test Value: 100

Question 19

The chart above shows the relationship between the first ionization potential and the increase in atomic number. The letter on the chart that indicates the noble gases or the inert elements is -



B

1 possible pts.

Answer Key

Possible Points: 30 Factor: x3.33 Test Value: 100

Question 20

An electron in an atom's outer shell is shielded from the nucleus by



electrons in the inner orbitals

1 possible pts.

Question 21

Which anion will have the largest radius?

 Te^{-2}

1 possible pts.

Question 22

Which group of the periodic table has the most reactive metals?



Alkali Metals

1 possible pts.

Answer Key

Possible Points: 30 Factor: x3.33 Test Value: 100

Question 23

Sort the following elements in order of increasing atomic radius.

▲ Smallest Radius

▼ Largest Radius

- Argon
- Magnesium
- Phosphorus
- Aluminum

1 possible pts.

Answer Key

Possible Points: 30 Factor: x3.33 Test Value: 100

Question 24

What causes the atomic radius to get smaller from left to right across a period?



Nuclear Force

1 possible pts.

Question 25

Which of the following atoms exhibits the largest shielding effect?



Lead (Pb)

1 possible pts.

Question 26

Which grouping identifies chemical properties?



Combustibility, flammability, reactivity

1 possible pts.

Answer Key

Possible Points: 30 Factor: x3.33 Test Value: 100

Question 27

Which chemist organized the modern periodic table, which is based on the atomic number of elements?



Henry Moseley

1 possible pts.

Question 28

Which group has the highest ionization energy?



Nobel Gases

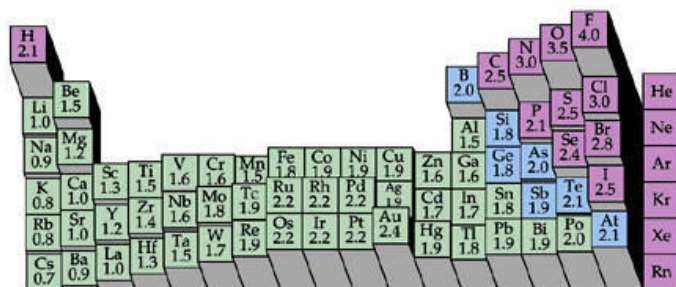
1 possible pts.

Answer Key

Possible Points: 30 Factor: x3.33 Test Value: 100

Question 29

Why do the noble gases have the lowest electronegativity?



Because their valence orbitals are already full.

1 possible pts.

Question 30

Which property is a measure of a metals ability to be stretched and pulled into a wire?



Ductility

1 possible pts.