

Deep Run High School

**CHEMISTRY I HON: 2(A)**

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## Unit 4 Test

**Due Date: November 25, 2019**

**Instructor: Jennifer Krug**

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**ID: 9012**

Name: \_\_\_\_\_

Score:

/ 100

## Question 1

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

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

## Question 2

**Which chemist organized the first periodic table based on average atomic mass?**

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

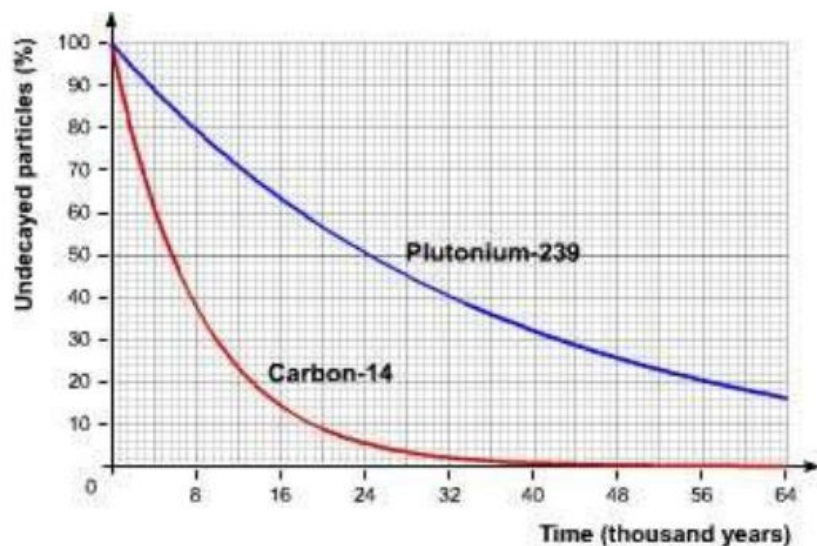
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## Question 3

Which isotope has the longest half life?



- ☐ both isotopes are the same
- ☐ cannot be determined
- ☐ plutonium-239
- ☐ carbon-14

## Question 4

The following results of a scientific study were found in a chemistry handbook. Based on this information, what is the independent variable in this experiment?

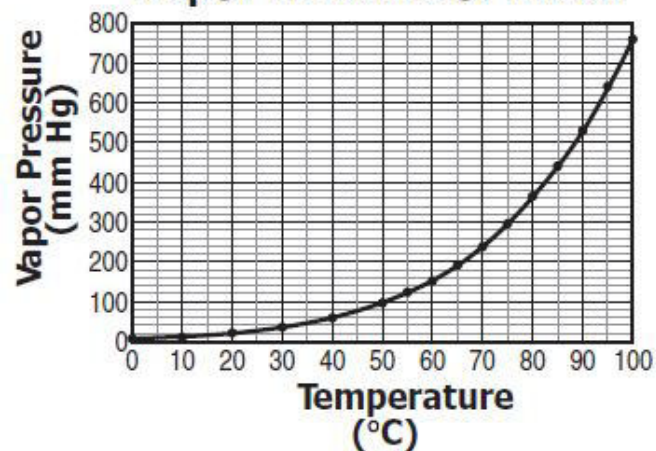
### Properties of Water

Molar Mass: 18.015 g/mole

Melting Point: 0.0°C

Boiling Point: 100.0°C

### Vapor Pressure of Water

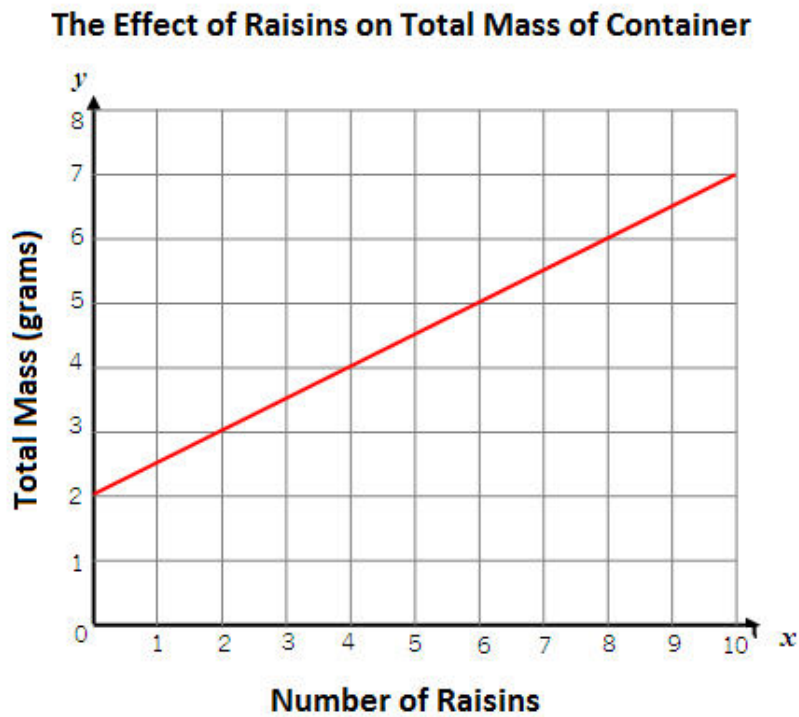


- ☐ Molar Mass
- ☐ Melting Point
- ☐ Vapor Pressure
- ☐ Temperature

Name: \_\_\_\_\_

## Question 5

According to the graph below, the independent and dependent variable are



- ☐ unrelated
- ☐ constant
- ☐ inversely proportional
- ☐ directly proportional

Name: \_\_\_\_\_

## Question 6

A refridgerator has a set point temperature of 38 °C. The actual temperature is tested every day for three days and recorded in the table below:

<u>Day #</u>	<u>Temperature (°C)</u>
1	37.9
2	38.1
3	38.0

Based on the results the data is

- ☐ both accurate and precise
- ☐ neither accurate nor precise
- ☐ accurate but not precise
- ☐ precise but not accurate

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## Question 7

The density of a metal was calculated three separate times and recorded below:

Trial # Concentration of HCl

1 5.23 g/ml

2 4.96 g/ml

3 6.99 g/ml

The actual expected density was 5.00 g/ml. The results were

☐

accurate but not precise

☐

neither accurate nor precise

☐

both accurate and precise

☐

precise but not accurate

## Question 8

Classify the following information: "An alloy is a mixture of two or more metals."

☐

Qualitative

☐

Quantitative

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Question 9

**Classify the following information: "High carbon steel contains 0.6% - 1.5% carbon."**

☐

QuaLitative

☐

QuaNtitative

Question 10

**Classify the following information: "The chemical formula for sulfuric acid is  $\text{H}_2\text{SO}_4$ ."**

☐

QuaLitative

☐

QuaNtitative

Question 11

**Classify the following information: "The reaction required 256 grams of sodium chloride."**

☐

QuaLitative

☐

QuaNtitative

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Name: \_\_\_\_\_

Question 12

**Classify the following information: "The temperature is thirty degrees Celsius."**

☐

QuaLitative

☐

QuaNtitative

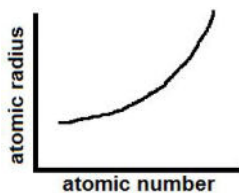
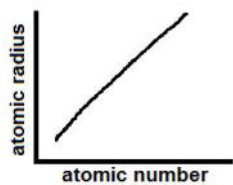
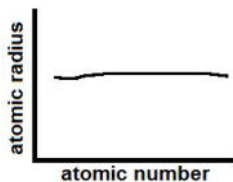
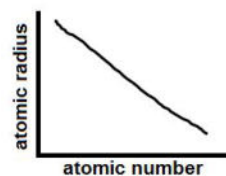
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Name: \_\_\_\_\_

## Question 13

Which graph represents the correct trend in atomic radius as you move down a column?

☐☐☐☐

Name: \_\_\_\_\_

Question 14

**What causes atomic radius to increase down a group?**

- ☐ elements become less metallic
- ☐ the number of valence electrons increases
- ☐ more energy orbitals are added
- ☐ electron repulsion decreases

Question 15

**Which of the following elements has the largest atomic radius?**

- ☐ Rubidium (Rb)
- ☐ Cesium (Cs)
- ☐ Potassium (K)
- ☐ Sodium (Na)

Name: \_\_\_\_\_

Question 16

**Compared to the size of a Chlorine (Cl) atom , a Sulfur (S) atom would have**

–

- ☐ one half the atomic radius
- ☐ double the atomic radius
- ☐ a smaller atomic radius
- ☐ a larger atomic radius

Question 17

**Which of the following causes the atomic radii to get smaller as you move left to right across the periodic table?**

- ☐ Shielding Effect
- ☐ Electromagnetic Force
- ☐ Electron-electron repulsion
- ☐ Radioactivity of the nucleus

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Name: \_\_\_\_\_

Question 18

**As you move down a group, shielding**

- ☐ remains constant because the number of protons equals the number of electrons.
- ☐ decreases because the electronegativity decreases.
- ☐ decreases because the atomic radius increases.
- ☐ increases because atoms contain more core orbitals.

Question 19

**Which metalloid has the weakest shielding effect?**

- ☐ Arsenic (As)
- ☐ Tellurium (Te)
- ☐ Silicon (Si)
- ☐ Boron (B)

Name: \_\_\_\_\_

Question 20

**Which of the following trends decreases as shielding increases?**

- ☐ Metallic Properties
- ☐ Electronegativity
- ☐ Ionic Radii
- ☐ Atomic Radii

Question 21

**Which of the following atoms exhibits the largest shielding effect?**

- ☐ Iron (Fe)
- ☐ Barium (Ba)
- ☐ Calcium (Ca)
- ☐ Oxygen (O)

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Name: \_\_\_\_\_

Question 22

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

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

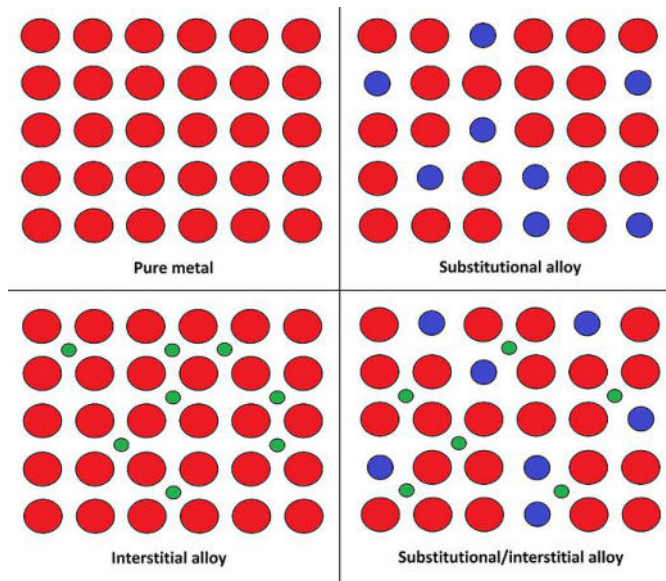
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Name: \_\_\_\_\_

## Question 23

An alloy composed of two different sized atoms is called



- ☐ an interstitial alloy
- ☐ a constitutional alloy
- ☐ a substitutional alloy
- ☐ a pure metal

Name: \_\_\_\_\_

Question 24

Which of the following elements is the most reactive?

☐

Mg

☐

K

☐

Ca

☐

Rb

Question 25

All of the following are properties of metals *EXCEPT* -

☐

malleable

☐

lustrous

☐

electrical conductivity

☐

low melting points

Name: \_\_\_\_\_

Question 26

**Which one of the following atoms has the strongest metallic properties?**

☐ Ca

☐ K

☐ Ti

☐ Fe

Question 27

**As elements in Group 14 are considered top to bottom, their Metallic Properties -**

☐ stay the same

☐ decrease

☐ increase

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## Question 28

**Multiple Response Question:****Which of the following values contains three significant figures?**

*\* Hint: Multiple Response Questions have more than one correct answer. A clue that more than one response is expected is the square check boxes versus the round dot boxes for single response questions.*

☐

23.0

☐

0.0350

☐

240

☐

1050

## Question 29

**Which of the following density measurements contains only 2 significant figures?**☐

2.500 g/ml

☐ $2.50 \times 10^{-2}$  g/ml☐

25.00 g/ml

☐

0.025 g/ml

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Name: \_\_\_\_\_

Question 30

**How many significant digits are in the measurement 0.0050300 g?**

☐ 5

☐ 8

☐ 3

☐ 7

Question 31

**Which combination of atoms will form a covalent bond?**

☐ H and O

☐ Fr and F

☐ Cu and Zn

☐ Na and Cl

Name: \_\_\_\_\_

Question 32

**Which combination of atoms will form an ionic bond?**

- ☐ Na and K
- ☐ Mg and Cl
- ☐ Cu and Zn
- ☐ C and O

Question 33

**How many valence electrons does a sulfur atom contain?**

- ☐ 4
- ☐ 6
- ☐ 32
- ☐ 16

Name: \_\_\_\_\_

Question 34

**Which group loses 1 valence electron to create a stable cation?**

- ☐ Halogens
- ☐ Noble Gases
- ☐ Alkaline Earth Metals
- ☐ Alkali Metals

Question 35

**Which subatomic particle is responsible for determining an elements chemical properties?**

- ☐ electrons
- ☐ ions
- ☐ neutrons
- ☐ protons

Name: \_\_\_\_\_

## Question 36

Which group of the periodic table has the highest electronegativity?

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

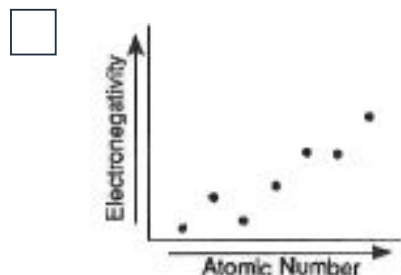
## Question 37

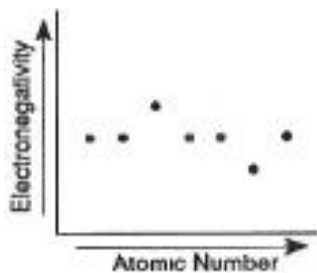
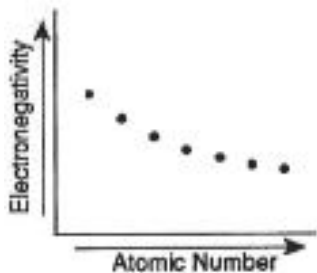
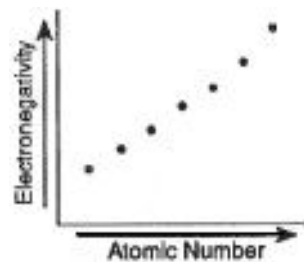
As you move down a group on the periodic table, the electronegativity tends to

- ☐ stays constant
- ☐ fluctuate
- ☐ increase
- ☐ decrease

## Question 38

Which diagram correctly shows the relationship between electronegativity and atomic number for the elements of Period 3?

☐

☐☐

Name: \_\_\_\_\_

Question 39

**As you go from left to right across the periodic table,**

- ☐ electronegativity increases and atomic radius decreases.
- ☐ electronegativity increases and atomic radius increases.
- ☐ electronegativity decreases and atomic radius increases.
- ☐ electronegativity decreases and atomic radius decreases.

Question 40

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

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

Name: \_\_\_\_\_

Question 41

When a lithium atom becomes an ion, it has \_\_\_\_\_ electrons than protons.

- ☐ 3 less
- ☐ 7 more
- ☐ 1 less
- ☐ 2 more

Question 42

An anion is formed when

- ☐ a metal loses an electron
- ☐ a metal gains a proton
- ☐ a non-metal loses a proton
- ☐ a non-metal gains an electron

Name: \_\_\_\_\_

Question 43

**A cation is formed when**

- ☐ a nonmetal gains neutrons
- ☐ a nonmetal gains electrons
- ☐ a metal loses electrons
- ☐ a metal gains protons

Question 44

**Which anion will have the largest radius?**

- ☐ O<sup>-2</sup>
- ☐ N<sup>-3</sup>
- ☐ S<sup>-2</sup>
- ☐ Cl<sup>-1</sup>

Name: \_\_\_\_\_

Question 45

**Which of the following is true of the Ionic Radii trend?**

- ☐ Metals get smaller when they become cations.
- ☐ Cations are always smaller than anions.
- ☐ Nonmetals get smaller when they become anions.
- ☐ Noble gases form the largest ions.

Question 46

**Which element in Group 2 has the greatest tendency to lose an electron?**

- ☐ Ca
- ☐ Sr
- ☐ Mg
- ☐ Be

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Name: \_\_\_\_\_

Question 47

**Which alkali metal has the highest first ionization energy?**

☐ Rb

☐ Cs

☐ K

☐ Na

Question 48

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

☐ O, S, Se

☐ Al, Mg, Na

☐ Cl, S, P

☐ Li, C, F

Name: \_\_\_\_\_

Question 49

**When moving from left to right across the periodic table, ionization energy...**

- ☐ increases due to increased electron-electron repulsion.
- ☐ none of the above.
- ☐ increases due to increased electromagnetic attraction.
- ☐ increases due to increased shielding.

Question 50

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

- ☐ Br, Cl, F
- ☐ Ar, Ne, He
- ☐ Be, Mg, Ca
- ☐ Na, Si, Cl

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

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



Henry Moseley

1 possible pts.

## Question 2

Which chemist organized the first periodic table based on average atomic mass?



Dmitri Mendeleev

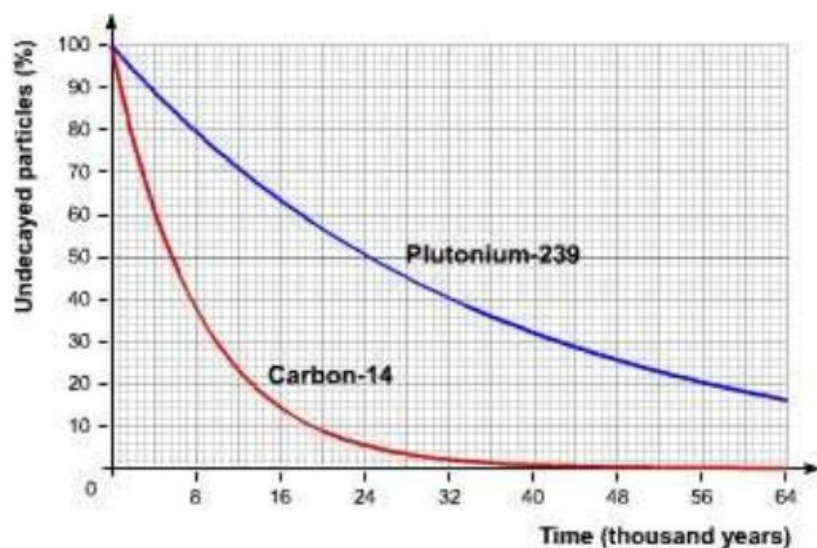
1 possible pts.

Answer Key

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

## Question 3

Which isotope has the longest half life?



plutonium-239

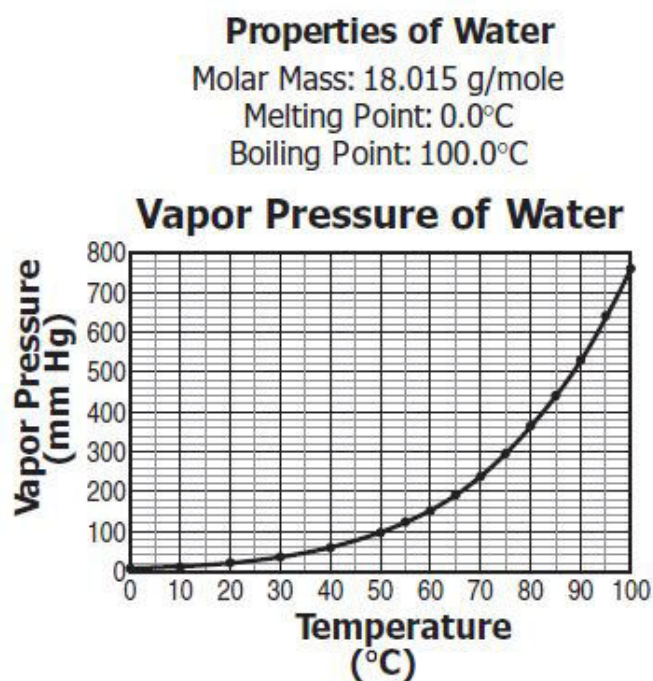
1 possible pts.

Answer Key

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

## Question 4

The following results of a scientific study were found in a chemistry handbook. Based on this information, what is the independent variable in this experiment?



Temperature

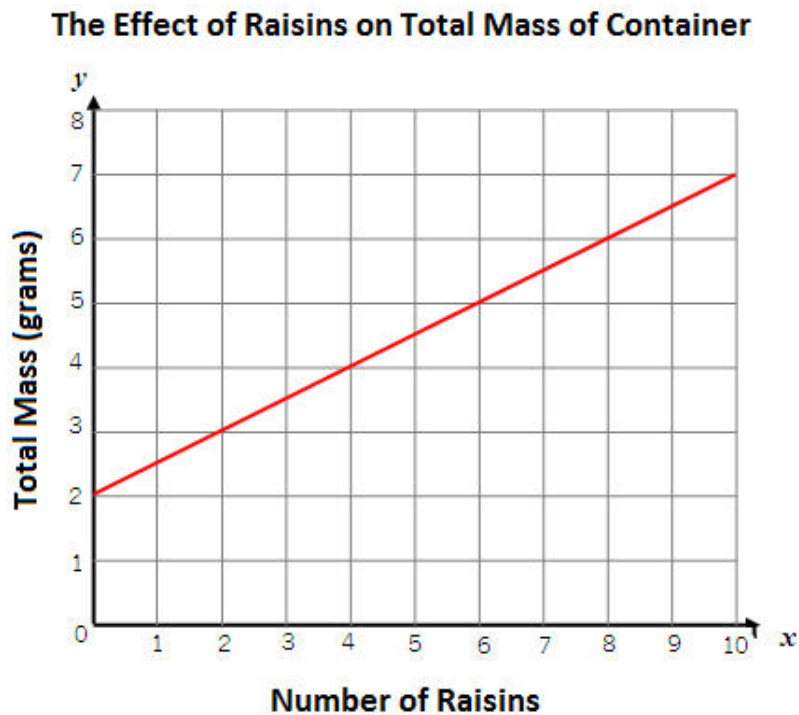
1 possible pts.

Answer Key

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

## Question 5

According to the graph below, the independent and dependent variable are



directly proportional

1 possible pts.

Answer Key

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

## Question 6

A refridgerator has a set point temperature of 38 °C. The actual temperature is tested every day for three days and recorded in the table below:

<u>Day #</u>	<u>Temperature (°C)</u>
1	37.9
2	38.1
3	38.0

Based on the results the data is



both accurate and precise

1 possible pts.

## Question 7

The density of a metal was calculated three separate times and recorded below:

Trial # Concentration of HCl

1	5.23 g/ml
2	4.96 g/ml
3	6.99 g/ml

The actual expected density was 5.00 g/ml. The results were



neither accurate nor precise

1 possible pts.

Answer Key

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

## Question 8

Classify the following information: "An alloy is a mixture of two or more metals."



QuaNtitative

1 possible pts.

## Question 9

Classify the following information: "High carbon steel contains 0.6% - 1.5% carbon."



QuaNtitative

1 possible pts.

## Question 10

Classify the following information: "The chemical formula for sulfuric acid is H<sub>2</sub>SO<sub>4</sub>."



QuaLitative

1 possible pts.

Answer Key

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

## Question 11

Classify the following information: "The reaction required 256 grams of sodium chloride."



QuaNtitative

1 possible pts.

## Question 12

Classify the following information: "The temperature is thirty degrees Celsius."



QuaNtitative

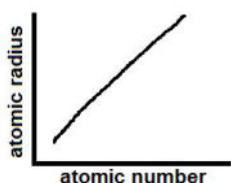
1 possible pts.

Answer Key

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

## Question 13

Which graph represents the correct trend in atomic radius as you move down a column?



1 possible pts.

## Question 14

What causes atomic radius to increase down a group?



more energy orbitals are added

1 possible pts.

Answer Key

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

Question 15

Which of the following elements has the largest atomic radius?



Cesium (Cs)

1 possible pts.

Question 16

Compared to the size of a Chlorine (Cl) atom , a Sulfur (S) atom would have

-



a larger atomic radius

1 possible pts.

Question 17

Which of the following causes the atomic radii to get smaller as you move left to right across the periodic table?



Electromagnetic Force

1 possible pts.

Answer Key

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

Question 18

**As you move down a group, shielding**

increases because atoms contain more core orbitals.

1 possible pts.

Question 19

**Which metalloid has the weakest shielding effect?**

Boron (B)

1 possible pts.

Question 20

**Which of the following trends decreases as shielding increases?**

Electronegativity

1 possible pts.

Answer Key

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

Question 21

Which of the following atoms exhibits the largest shielding effect?



Barium (Ba)

1 possible pts.

Question 22

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



Ionization Energy

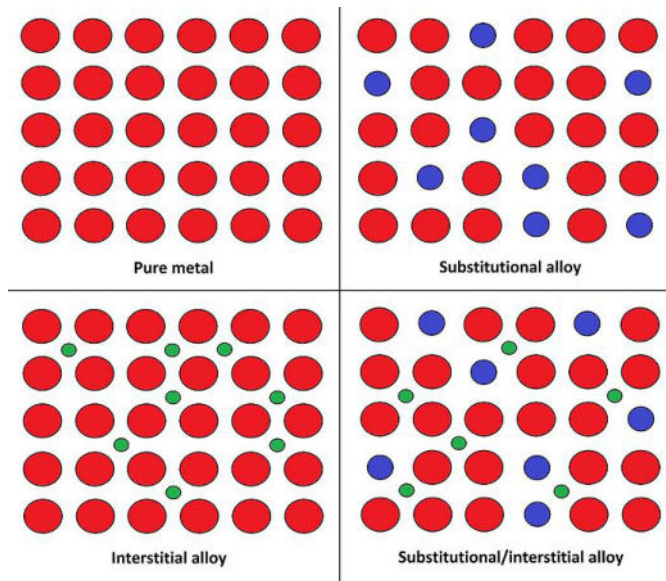
1 possible pts.

## Answer Key

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

## Question 23

An alloy composed of two different sized atoms is called



an interstitial alloy



a pure metal

1 possible pts.

Answer Key

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

Question 24

Which of the following elements is the most reactive?



Rb

1 possible pts.

Question 25

All of the following are properties of metals *EXCEPT* -



low melting points

1 possible pts.

Question 26

Which one of the following atoms has the strongest metallic properties?



K

1 possible pts.

Answer Key

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

## Question 27

As elements in Group 14 are considered top to bottom, their Metallic Properties -



increase

1 possible pts.

## Question 28

**Multiple Response Question:**

Which of the following values contains three significant figures?

*\* Hint: Multiple Response Questions have more than one correct answer. A clue that more than one response is expected is the square check boxes versus the round dot boxes for single response questions.*



23.0



0.0350



1050

1 possible pts. / partial credit

Answer Key

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

## Question 29

Which of the following density measurements contains only 2 significant figures?



0.025 g/ml

1 possible pts.

## Question 30

How many significant digits are in the measurement 0.0050300 g?



5

1 possible pts.

## Question 31

Which combination of atoms will form a covalent bond?



H and O

1 possible pts.

Answer Key

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

Question 32

**Which combination of atoms will form an ionic bond?**

Mg and Cl

1 possible pts.

Question 33

**How many valence electrons does a sulfur atom contain?**

6

1 possible pts.

Question 34

**Which group loses 1 valence electron to create a stable cation?**

Alkali Metals

1 possible pts.

Answer Key

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

## Question 35

Which subatomic particle is responsible for determining an elements chemical properties?



electrons

1 possible pts.

## Question 36

Which group of the periodic table has the highest electronegativity?



Halogens

1 possible pts.

## Question 37

As you move down a group on the periodic table, the electronegativity tends to



decrease

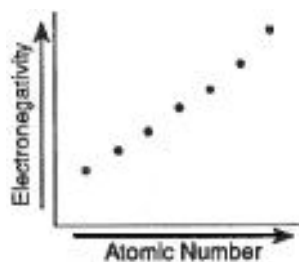
1 possible pts.

Answer Key

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

## Question 38

Which diagram correctly shows the relationship between electronegativity and atomic number for the elements of Period 3?



1 possible pts.

## Question 39

As you go from left to right across the periodic table,



electronegativity increases and atomic radius decreases.

1 possible pts.

Answer Key

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

Question 40

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



Electronegativity

1 possible pts.

Question 41

When a lithium atom becomes an ion, it has \_\_\_\_\_ electrons than protons.



1 less

1 possible pts.

Question 42

An anion is formed when



a non-metal gains an electron

1 possible pts.

Answer Key

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

Question 43

**A cation is formed when**

a metal loses electrons

1 possible pts.

Question 44

**Which anion will have the largest radius?** $S^{-2}$ 

1 possible pts.

Question 45

**Which of the following is true of the Ionic Radii trend?**

Metals get smaller when they become cations.

1 possible pts.

Answer Key

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

Question 46

Which element in Group 2 has the greatest tendency to lose an electron?



Sr

1 possible pts.

Question 47

Which alkali metal has the highest first ionization energy?



Na

1 possible pts.

Question 48

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



Li, C, F

1 possible pts.

Answer Key

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

Question 49

**When moving from left to right across the periodic table, ionization energy...**



increases due to increased electromagnetic attraction.

1 possible pts.

Question 50

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



Be, Mg, Ca

1 possible pts.