**LANGATA HIGH SCHOOL**

**FORM TWO CHEMISTRY APRIL HOLIDAY ASSIGNMENT**

1. Study the information in the table below and answer the questions that follow:

|  |  |  |
| --- | --- | --- |
| **Element** | **Atomic radius (nm)** | **Ionic radius (nm)** |
| **W** | 0.114 | 0.195 |
| **X** | 0.072 | 0.136 |
| **Y** | 0.133 | 0.216 |
| **Z** | 0.099 | 0.181 |

1. Would these form part of a metallic or a non-metallic group? Explain.

1. Suggest an element in the table above likely to be the most reactive. Explain

2 State the reason for using Argon in electric light bulbs.

3. Study the information in the table below and answer the questions that follow. The letters

do not represent the actual symbols of the elements.

|  |  |  |
| --- | --- | --- |
| Element | Electronic configuration | Boiling point |
| X  Y  Z | 2.7  2.8.7  2.8.8.7 | -188oC  -35oC  59oC |

1. What is the general name given to the group in which the elements **X,** Y and **Z** belong?

1. Select **two** elements which are colored gases.

1. Explain why **Z** has the highest boiling point.

(d) Write an equation for the reaction of element **Z** with iron metal

1. Element **Y** was dissolved in water and a piece of blue litmus paper was put into the resulting

solution. State and explain the observation that was made on the litmus paper

4. The table below shows elements **A, B, C, E, F**, and **G**. Elements in group **X** have a valency of 2 while elements in group **Y** have a valiancy of 1. Use the table to answer the questions that follow: -

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **GROUP X** | | | | **GROUP Y** | |
| **Element** | **A** | **B** | **C** | **E** | **F** | **G** |
| **Atomic radius (nm)** | 14.0 | 19.5 | 19.7 | 5.2 | 7.9 | 11.3 |
| **Ionic radius (nm)** | 7.6 | 10.5 | 12.4 | 12.6 | 16.1 | 19.6 |

1. Atomic radius increases from **A** to **C** and from **E** to **G.** Explain

1. Explain the difference in the atomic and ionic radii of group **X** elements.

(iii) Elements **C** and **G** belong to the same period. Explain why the atomic radius of **C** is

greater than that of **G**

1. Give the formula of the compound formed when **B** and **F** react .

1. What type of bonding is formed in the compound above? Explain

(vi) Starting with the least reactive, arrange the elements in group **Y** in the order of reactivity.

Explain:

5. The information in the table below relates to elements in the same group of the periodic table. Study it and answer the question that follows.

|  |  |
| --- | --- |
| **Element** | **Atomic size (nm)** |
| **P** | 0.19 |
| **Q** | 0.23 |
| **R** | 0.15 |

Which element has the highest ionization energy? Explain

6. a) What is an isotope?

b) An element **Q** consists of 3 isotopes of mass 28, 29, 30 and percentage abundance of 92.2%, 4.7%, 3.1% respectively. Determine the relative atomic mass of the element?

7. Study the information in the table below and answer the questions that follow.

(The letters do not represent the actual symbols of the elements)

|  |  |  |
| --- | --- | --- |
| **Element** | **Electronic configuration** | **Ionization energy Kj/mol)** |
| **P** | 2.2 | 1800 |
| **Q** | 2.8.2 | 1450 |
| **R** | 2.8.8.2 | 1150 |

1. What is the general name given to the group in which elements **P, Q** and **R** belong?

1. Explain why **P** has the highest ionization energy.

1. Write a balanced chemical equation for the reaction between element **Q** and water

8.The table below shows part of periodic table for some elements represented by Q, R, T, V, W, X, Y and Z. The letters do not represent the actual symbols of the elements. Study it and answer the questions that follows.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| T1 |  |  |  |  |  |  |  | T1 | 2 |
| Q3 | 4 |  |  | 5 | W6 | 7 | 8 | V9 | 10 |
| R11 | 12 |  |  | 13 | 14 | 15 | 16 | X17 | Y18 |
| 19 | 20 |  |  |  |  |  |  |  |  |

a) i) Explain why element T has been placed in two positions in the

periodic table.

ii) What is the name of the chemical family to which Q and R belong?

iii) Elements Y is generally unreactive. Explain

b) i) Explain the difference in atomic radius of atoms of elements X and

Y.

ii) V is more reactive than W Explain

c) i) Draw cross (x) and dots (.) diagram to show bonding between

“W” and “T” to form compound WT4.

ii) Explain why WT4 have low melting point and does not dissolve in water .

d) Element X consist of two isotopes whose mass numbers are 35 and 37 exist in the ratio of 3:1 respectively.

i) Draw the atomic structure of the isotope whose mass number is 35 and atomic structure of the isotope whose mass number is 35 and atomic number 17.

ii) Determine the relative atomic mass of element X

9 The table below gives elements represented by letters T, U, V, w, x, Y their atomic numbers.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Elements | T | U | V | W | X | Y |
| Atomic numbers | 12 | 13 | 14 | 15 | 16 | 17 |
| Electronic arrangement |  |  |  |  |  |  |

Use the information in the table to answer the questions below

a) Complete the above table giving the electron arrangement of each of the element

b) In which period of the periodic table do these elements belong? Give a reason.

c) How does the atomic radius of V compare with that of X. Explain?

d) Give the formula of the compound that could be termed between “U” and “W”

e) What type of bonding will be present in a compound formed between T and Y? Explain

f) Arrange the species T2+ T+  and T in increasing order of size

g) Which are the ions X+2 and X-2 is most suitable? Explain

h) Give the fomula of

i) An acidic oxide formed when one of the elements in the table is heated in air

ii) A basic oxide formed when one of the elements in the table is heated in the air.

10. Study the table below and answer the questions that follows:-

|  |  |  |  |
| --- | --- | --- | --- |
| Elements | Atomic numbers | Relative atomic mass | Melting point 0C |
| Aluminium | 13 | 27.0 | 1020 |
| Calcium | 20 | 40.0 | 850 |
| Carbon | - | 12.0 | 3730 |
| Hydrogen | - | 1.0 | -249 |
| Magnesium | 12 | 24.3 | 650 |
| Neon | 10 | - | -249 |
| Phosphorus | 15 | 31.0 | 442 white  590 red |
| Sodium | - | 23 | 97.8 |

a) Complete the table by filling in the missing atomic numbers and atomic masses

b) Write the electron arrangement for the following ions

i) Ca2+

ii) P-3

c) What is the melting point of hydrogen in degrees Kelvin

d) Which of the two allotropes of phosphorous has a higher density? Explain

e) The mass numbers of the three isotopes of magnesium are 24, 25 and 26. What is the mass number of the most abundant isotope of Magnesium? Explain

f) Give the formula to the compound formed between aluminium and carbon.