NAME: ……………………………………………………………..… ADM …………….

**JUJA GIRLS HIGH SCHOOL**

**END TERM II EXAMINATIONS 2018**

**FORM TWO**

***Kenya Certificate of Secondary Education (KCSE)***

***233/1***

***Paper 1***

***Chemistry (Theory)***

***July /August 2018***

***2 Hours***

**Instructions**

* *Answer* ***all*** *the questions in the spaces provided.*
* ***All*** *working* ***must*** *be clearly shown where applicable.*
* *Silent non programmable electronic calculators may be used.*

**For Examiner’s Use Only**

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| --- | --- | --- |
| **Questions** | **Maximum Score** | **Student’s Score** |
| 1-22 | 80 |  |

1. A certain complex sugar called raffinose was suspected to contain some simple sugars. A sample of raffinose was treated with dilute hydrochloric acid. The resulting solution W was then analyzed to find out the sugars present using chromatography.

 Glucose Galactose Fructose W

* + - * 1. Which simple sugar is absent in raffinose? (1mk)

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* + - * 1. Which sugar has the highest density? Explain. (2mks)

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* + - * 1. The sugar called maltose is known to be present in raffimose. Circle on the diagram the pigment that would be due to maltose. (1mk)
1. Name the sub-atomic particles described below:
	* + - 1. Does not exist in the nucleus of an atom (1mk)

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* + - * 1. Is considered when assigning atomic numbers of elements (1mk)

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* + - * 1. Does not contribute to the mass of an atom (1mk)

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* + - * 1. Is electrically neutral (1mk)

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1. The table below shows the ions of calcium and oxygen and the number of sub- atomic particles they contain. Complete the table. (2mks)

|  |  |
| --- | --- |
| Ca 2+ | O 2- |
| Number of protons |  | 8 |
| Number of neutrons | 20 |  |
| Number of electrons |  |  |
| Mass number | 40 | 16 |

1. Suggest ***three*** ways through which elements strive to attain the stable noble gas electronic arrangement. (3mks)

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1. Fix elements P, Q, R, S, T and U in their correct places in the periodic table below.( The letters do not represent the actual symbols of the elements). (6mks)
* P: is transition element
* Q: is an element whose atom can be represented as $$
* R: is an element with an isotope used in determining the age of fossils
* S: an element the forms a cation with a single charge and belongs to period 3
* T: an element with valency 3, gains electrons to form its ion and belongs to period 3
* U:an element with 17 protons.

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1. Define the following terms:
	* + - 1. Electron affinity (1mk)

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* + - * 1. Ionization energy (1mk)

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1. (a) What is the chemical name for ***rust***? (1mk)

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 (b) State ***two*** conditions necessary for rusting to take place. (2mks)

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 (c) Suggest why it is possible for an iron article to rust until it is completely `eaten away’ yet rust form a coating on the surface of the article. (1mk)

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 (d) State ***two*** factors that accelerate rusting (2mks)

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1. Atmospheric air contains 21% of oxygen by volume. Calculate the amount of air that contains 14cm3 of oxygen. (2mks)

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1. A sample of potassium consist of $0.01\% of;93.1\% of $
	* + - 1. What property do potassium exhibit? (1mk)

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* + - * 1. Calculate the relative atomic mass of this sample of potassium. (3mks)

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1. Balance the following chemical equations. (4mks)
	* + - 1. $ TiCl\_{4(g)}+ Na\_{(l)}$ $Ti\_{(s)}+ NaCl\_{(l)}$
				2. $C\_{2}H\_{6(g)}+ O\_{2(g)}$ $CO\_{2(g)}+ H\_{2}O\_{(l)}$
				3. $Fe\_{(s)}+ H\_{2}O\_{(g)}$ $Fe\_{3}O\_{4(s)}+ H\_{2(g)}$
				4. $FeCl\_{2\left(s\right)}+ Cl\_{2(g)}$ $FeCl\_{3(s)}$
2. The table below shows some compounds and their chemical formulae. Complete the table. (4mks)

|  |  |
| --- | --- |
| **Compound**  | **Chemical formula** |
| Sodium carbonate |  |
|  | $$(NH\_{4})O\_{4}$$ |
| Nitric (V) acid |  |
|  | $$Cu\_{2}O$$ |

1. The grid below shows part of the periodic table. Use it to answer the questions that follows. (The letters are not the actual symbols of the elements.)

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  |  |  |  |  |  | S | U | V |
| P | R |  |  |  |  | T |  | W |
| Q |  |  |  |  |  |  |  |  |

* + - * 1. Which is the element with the largest atom? Give a reason. (2mks)

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* + - * 1. Identify the element which is the most reactive metal. (1mk)

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* + - * 1. Give the electron arrangement of element T. (1mk)

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* + - * 1. Explain why the atom of W is heavier than that of element V. (1mk)

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* + - * 1. Given that the mass of W is 40, write down the composition of its nucleus. (2mks)

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1. An element T has an atomic number of 13.
	* + - 1. State the group and the period to which it belongs. (2mks)

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* + - * 1. What will be the formula of its sulphate? (1mk)

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1. The table below shows the pH values of different solutions.

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| **Solution**  | **pH** |
| A | 1 |
| B | 4 |
| C | 13.5 |
| D | 8 |

 Which solution is likely to be:

* + - * 1. A weak base (1mk)

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* + - * 1. A strong acid (1mk)

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* + - * 1. Sodium hydroxide solution (1mk)

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* + - * 1. Ethanoic acid (1mk)

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* + - * 1. What would happen to the pH of solution B if some distilled water is added? Give a reason for your answer. (2mks)

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* + - * 1. What would be the pH value of distilled water? (1mk)

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1. An element U has atomic number of 12 and a relative atomic mass of 24.3. it consists of three isotopes of mass number 24,25 and 26. What is the mass number of the most stable isotope? Give a reason for your answer. (2mks)

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1. Write down the meaning of:
	* + - 1. A salt (1mk)

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* + - * 1. Water of crystallization (1mk)

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1. Zinc sulphate is an example of a soluble salt prepared by the action of dilute sulphuric (VI) acid on zinc powder.
	* + - 1. State the observation made as the reaction proceeds. (1mk)

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* + - * 1. Give a reason why it was necessary to use zinc powder in excess amounts. (1mk)

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* + - * 1. Write down the chemical equation for the reaction that takes place. (1mk)

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* + - * 1. Name ***one*** other salt prepared by the action of dilute acids on metals. (1mk)

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* + - * 1. Suggest the reason why the following salts cannot be prepared by the action of dilute acids on the corresponding metals although they are soluble salts.
1. Lead (II) nitrate (1mk)

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1. Sodium chloride (1mk)

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1. Using dots(.) and crosses (x) to represent valence electrons, draw the structure of the following molecules:
	* + - 1. Ethane $(C\_{2}H\_{6})$ (2mks)

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* + - * 1. Sulphur (IV) oxide $(SO\_{2})$ (2mks)

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1. State ***two*** types of chemical structures that are usually exhibited by compounds with covalent bonds. (2mks)

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1. Give reasons for the following:
	* + - 1. Ionic compounds conduct electricity when in molten state or aqueous state but not in solid form. (1mk)

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* + - * 1. Dimethyl ether boils at -24oC while ethanol boils at 78.4oC yet both have the same relative molecular mass of 46. (1mk)

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* + - * 1. Carbon (IV) oxide exists as a gas at room temperature while silicon (IV) oxide exists as a solid at the same conditions yet both carbon and silicon are group IV elements. (1mk)

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* + - * 1. Both graphite and diamond are allotropes of carbon. Graphite conducts electricity while diamond does not. (1mk)

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1. Define ***allotropy***  (1mk)

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1. What is the other name for the ionic bond? (1mk)

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All the best