**NAME.................................................................ADM NO.........CLASS.......**

**TERM TWO END-TERM EXAM 2014**

**CHEMISTRY FORM 2**

**TIME: 1½HRS**

1. Elements A, B and C have atomic numbers 17, 19 and 20 respectfully.

i) What are the valencies of A and B.

A............................................................................................................ (1 mk)

B........................................................................................................... (1mk)

ii) To which groups of the periodic table do elements A, B and C belong?

A............................................................................................................ (1 mk)

B.............................................................................................................(1 mk)

C.............................................................................................................(1 mk)

iii) In which periods do elements A and C belong?

A............................................................................................................(1 mk)

B......................................................................................................... (1 mk)

iv) Which of the three elements is a non-meta? (1 mk)

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v) Write down the formula or the compounds formed when;

B reacts with A..............................................................................(1 mk)

C reacts with oxygen....................................................................(1 mk)

vi) The mass numbers of A and B are 35 and 39 respectively. How many:

Neutrons does A have?..................................................................... (1 mk)

Protons does B have? ...................................................................... (1 mk)

2. Pieces of metal W were placed in solutions containing cations of metals W, X, Y and Z. The experiment was repeated using four pieces of each metal w, x, y, and z. The results are shown below where sign ( ) and (x) indicates a reaction and no reaction respectively.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Metal | Ions of W | Ions of X | Ions of Y | Ions of Z |
| W | x | X | x | X |
| X |  | X |  |  |
| Y |  | X | X | X |
| Z |  | X | X | x |

Arrange metals W, X, Y and Z in order of reactivity starting with the most reactive.(2 mks)

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3. Steam is passed over heated magnesium as shown in the diagram below.

a) State two observations that will be made in the tube as the heating is carried out.(2 mks)

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b) What substance was:

Burning at P? ............................................................................ (1 mk)

Produced at P? ........................................................................ (1 mk)

c) Write an equation for the reaction in the tube. (1 mk)

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d) The magnesium weighed 1.2g before heating and the solid left in the tube after heating weighed 2.0g.

i) Explain the increase in mass. (1 mk)

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ii) Calculate the percentage composition of magnesium in the product. (2 mks)

4. Elements R, S and T have the following ionization energies (KJmol-1)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 1st | 2nd | 3rd | 4th |
| R  S  T | 738  495  800 | 1,450  4,563  2,427 | 7,730  6,912  3,658 | 10,550  9,540  25,024 |

From this information which element is in;

Group I?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (1 mk)

Group II? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (1 mk)

Group III? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (1 mk)

5. a) Using dot (●) and cross (x) to represent electrons draw diagrams to show the bonding between:

Hydrogen and sulphur. (2 mks)

Magnesium and nitrogen (H = 1, S = 16, Mg = 12, N = 7) (2 mks)

b) State the type of bonding and structure in the compounds formed in a (i) and (ii) above.

Bond \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (1 mk)

Structure \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (1 mk)

6. The grid below represents part of the periodic table. Study it and answer the questions that follow. The letters are not the actual symbol of the elements.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | |  | | | | |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
|  |  |  |  |  |  | R | S |
| Q |  |  |  |  |  |  |  |  | U |
| T |  |  |  |  |  |  |  |  | Z |
| V |  |  |  |  |  |  |  |  |  |

a. i) Which element will require the least amount of energy to remove its outermost electron? (1 mk)

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ii) Select the element that has the greatest tendency to form covalent compounds. Explain. (2 mks

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iii) What is the general name given to the family of elements to which Q, T and V belong (1 mk)

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iv) An element has atomic number 15. Indicate its position on the grid. (1 mk)

b) Explain the following

i) The atomic radius of S is smaller than that of Z. (1 mk)

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ii) Element T is less reactive than element V. (1 mk)

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7. Complete and balance the following equations.

i) K(s) + H2O(l)

(2 mks)

ii) CuO(s) + Al(s)  (2 mks)

8. Hydrogen gas can be prepared by reacting a dilute acid with a metal.

a) Give one metal and an acid that can be used to prepare hydrogen. (1mk)

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b)Explain why potassium metal cannot be used in the preparation of hydrogen gas. (1 mk)

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c) Give two properties of hydrogen that make it possible to be collected over water. (2 mks)

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9. Elements G and H were burnt in air and the products dissolved in water. The PH of the solution of G was 4 while that of H was 8. Which of the two elements is a metal? Explain. (2 mks)

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10. a) What are isotopes? (1mk)

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b) Element E has two isotopes,

37 17 E and 35 17 E. Its relative atomic mass = 35.5. Determine the relative abundance of the isotopes. (3 mks)

11. A piece of chromatography paper was spotted with coloured inks obtained from six different ink bottles. The diagram below shows the spots after the chromatogram was developed.

a) On the diagram label;

i) The solvent front. (1 mk)

ii) The starting point (origin) (1 mk)

b) Which two pens contained the same pigment? (2 mks)

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c) Which pens contained only one pigment? (1 mk)

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d) According to the chromatography, which pigments are present in the ink of pen number 6? (2mk)

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12.The table below shows properties of some element and compounds. Study it and answer the questions that follow

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Substance | Melting point 0C | Boiling point 0C | Electrical conductivity | | | Action of oxygen |
| Solid | Liquid | |
| M | 776 | 1500 | poor | | Good | No reaction |
| N | -157 | -152 | Poor | | Poor | No reactions |
| O | 98 | 890 | Good | | Good | Burns |
| P | 44 | 280 | Poor | | Poor | Catches fire even at room temperature |
| Q | -38 | 357 | good | | good | Slowly combines on reacting |
| R | -116 | 34.5 |  | | | Burns to give two products |

1. What substance are likely to be a metal (2mks)
2. Which is the reactive non metal (1mk)
3. Name a compound which is a liquid at room temperature (1mk)
4. Select a substance with ionic lattice (1mk)

13. Define the following terms (6mks)

i) Deliquescence

ii) Efflorescence

iii)hygroscopy

14. Lead carbonate was added to warm dilute nitric acid when the carbonate reacted with the warm acid more carbonate was added until excess. The mixture was filtered and some sodium chloride solution was added to the filtrate

a) What observation are made when lead carbonate is added to the warm nitric acid (1mk)

b) What happens when sodium chloride is added to the filtrate (2mks)

c) Write an equation for the reaction between

i) The carbonate and the acid (2mks)

ii) The filtrate and sodium chloride (2mks)

iii) Write an ionic equation for the (ii) above (1mk)

15. Study the scheme below and answer the questions that follow.

Yellow residue when cold

Solid X white

Brown + oxygen gas

Name: solid X …………………………………………….. (3mks)

Yellow residue…………………………………………

Brown gas……………………………………

b) Write equation for the decomposition of solid X (2mks)

c) How is oxygen tested in the lab (2mks)

16. State whether solution with the following PH values are acidic, base or neutral

A= PH = 3, B=PH =6, C=PH =2, D=PH=12, E=PH=7, F=PH =8

Which of the following PH values listed above is of

1. A strong acid …………………………………………………………… (1mks)
2. A weak base……………………………………………………………… (1mk)
3. A strong base ………………………………………………………… (1mk)
4. A weak acid ……………………………………………………….. (1mk)

17.Using dots (.) and crosses (x) show the bonding in (4mks)

1. NH4+
2. Nacl