

CHEMISTRY PAPER 2

KAGONDO SECONDARY SCHOOL

KCSE REVISION 2017

233/2

1. The grid below shows part of the periodic table. Study and answer the questions that follow (letters do not represent the actual symbol)

| | | | | | | | |
|---|---|--|--|---|---|---|---|
| E | | | | | | | |
| | | | | | | S | |
| | P | | | U | V | | M |
| X | Y | | | | | | |
| | | | | | | | N |

i) Select an element which forms an ion with a charge of -3 (1mk)

ii) Name the type of structure that the chloride of y would have. Explain (2mks)

iii) How does the reactivity of M compare with that of N. Explain (2mks)

iv) 1.3g of P completely burns in chlorine and consumes 1.2 litres of the gas.

I) Write an equation for the reaction between element P and chlorine (1mk)

II) Determine the relative atomic mass of P (3mks)

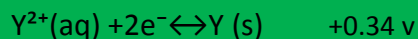
b) State and explain how you would expect the following to compare

i) Atomic radii of E and X (2mks)

ii) pH value of aqueous oxides Y and V

2 a) Use standard electrode potential for the element V, W, X, Y and Z given below to answer the questions that follow

| | |
|--|-----------|
| | E (volts) |
| $V^{2+}(aq) + 2e^{-} \leftrightarrow V(s)$ | -2.90 v |
| $W^{2+}(aq) + 2e^{-} \leftrightarrow W(s)$ | -2.38 v |
| $X^{+}(aq) + e^{-} \leftrightarrow X(s)$ | 0.00 v |



i) Which element is likely to be hydrogen? Give a reason for your answer (2mks)

ii) What is the E° value of the strongest reducing agent (1mk)

iii) On a grid, draw a well labeled diagram of the electrochemical cell that would be obtained when cells of W and Y are combined (3mks)

iv) Calculate the E° value of the electrochemical cell constructed in (iii) above (2mks)

c) During the electrolysis of aqueous copper (II) sulphate using copper electrodes, current of 0.2 amperes was passed through the cell for 3 hours

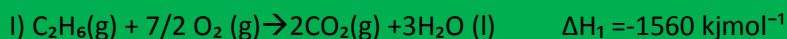
i) Write an ionic equation for the reaction that took place at the anode (1mk)

ii) Determine the change in mass of the anode which occurred as a result of the electrolysis process. (Cu=63.5, 1Farady =96500 coulombs) (3mks)

3 When ethyne is ignited, it burns with a sooty flame. Explain (1mk)

4 a) What is meant by molar heat of combustion (1m k)

b) Use the thermo chemical equations below to answer the questions that follow



i) Name two types of heat changes represented by ΔH_3 (2mks)

ii) Draw an energy level diagram for the reaction represented by equation I (2mks)

iii) Calculate the standard heat of formation of ethane (2mks)

iv) When a sample of ethane was burnt, the heat produced raised the temperature of 500g of water by 21.5 kg (specific heat capacity of water = $4.2 \text{ Jg}^{-1} \text{ K}^{-1}$)

Calculate the;

I) Heat change for the reaction (2mks)

II) Mass of ethane for the reaction (2mks)

5 a)The table below shows solubility in frame of sodium nitrate in 100g of water for various temperature in °c

| Temperature°c | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|---------------------|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|
| Solubility (g/100g) | 73 | 80 | 88 | 96 | 104 | 114 | 124 | 148 | 148 | 162 | 180 |

i)Draw a graph of solubility of sodium nitrate against temperature (3mks)

ii)From the graph, determine the solubility of sodium nitrate at 70°c (1mk)

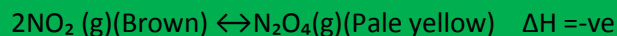
ii)From the graph determine the amount of sodium nitrate that would crystallize out if the solution is cooled from 65° to 20° (2mks)

b)Define the term fractional crystallization of salts (1mk)

6 a)What is chemical equilibrium (1mk)

b)Apart from concentration, list any two factors that affect equilibrium position in a chemical reaction (2mks)

c)At 20°c, NO₂ and N₂O₄ gases exist in equilibrium as shown in the equation below



State and explain what would be observed if

i)A syringe containing the mixture at 20°c is immersed in ice-cold water (1 ½ mks)

ii)The volume of the gaseous mixture in the syringe is reduced (1 ½ mks)

7 a) Give the name of any ore which iron is extracted (1mk)

b) i) what is meant by half life (1mk)

ii) If 87.5% of a radioactive isotope decays in 66 years. What is its half life (2mks)