Name:	Class:	Adm.No
School:	Index No.	
Sign :		

233/2 CHEMISTRY Paper 2 JUNE/JULY 2017 Time: 2 hours

MOI HIGH SCHOOL - KABARAK

Kenya Certificate to Secondary Education

CHEMISTRY PAPER 2

TIME: 2 HOURS

INSTRUCTIONS TO CANDIDATES

- Write your name, admission number, date and school in the spaces provided.
- Answer **all** the questions in the spaces provided.
- All working must be clearly shown where necessary.
- Scientific calculators may be used.

For examiners use only

Question number	Marks	Candidates score
1 (15)01	10	
2	12	
3100	12	
x04	13	
5	12	
6	10	
7	12	
Total	80	

This paper consists of **16** printed pages. Candidates are advised to check and to make sure all pages are as indicated and no question is missing.

1. The table below gives several samples of mixtures. Study the table and answer the questions that follow

Mixture 1	Mixture 2	Mixture 3	Mixture 4
components	components	components	components
Magnesium	Water	Silver Chloride	Iron (III) Chloride
Sulphate			
Water	Magnesium Sulphate	Lead Chloride	1ron (III) Oxide
Silver Chloride	Magnesium Nitrate	water	-
	C		

a). state **one** way in which the composition of a mixture differs from that of a compound (1mk) b) Describe how Mixture 1 and Mixture 2 can be separated into its components i. Mixture 1 (2mks) ii. Mixture 2 (2mks) c). State the main property that makes components of **Mixture 3** separable (1mk)d). Draw a well labeled diagram of a simple laboratory set up which can be used to separate the components of Mixture 4 (2mks)

e). the chart below gives a summary of steps which can be used to separate the components of mixture 3. Study it and answer the questions that follow



b) The volume of gas produced reduces when the gas is passed through an aqueous solution of

Potassium hydroxide

i.	Explain why the volume reduces	(1mk)
ii.	What will be the total volume of carbon (II) Oxide produced if 0.6n dioic acid is used in the reaction (all volumes measured at s.t volume = 22.4 dm ³)	noles of Ethan t.p, molar gas (2mks)
	set Papers.	
iii). S	tate two reasons as to why Carbon (II) Oxide is not easy to detect	(1mk)
c). Using dots between	s (•) and crosses (x) to represent electrons, show how bonding occurs Carbon and Oxygen in Carbon (II) Oxide	(1mk)
d). i). Carbon	(II) Oxide can be converted into Carbon (IV) Oxide, state one observ	vation made
when	Carbon (II) Oxide is being converted to Carbon (IV) Oxide	(1mk)
ii). W	hat is the role of carbon (IV) Oxide in the Solvay process	(1mk)
iii). B	esides Carbon (IV) Oxide, name another gaseous substance that is use	ed in the
Solva	y process	(1mk)

Na ₂ CO ₃ .NaHCO ₃ .2H ₂ O	
i). write down a balanced equation to show how	v Sodium Carbonate is obtained from trona (1mk)
ii). State why trona is classified as a double sal	t (1mk)
3. a). A compound D of molar mass 88 was found t	o have the following composition by mass.
Carbon = 54.54 %, Hydrogen = 9.09 % and the	est was Oxygen. Find the molecular formula
of the compound.	(3mks)
	w.trookesof
. wh	
b). Draw the structural formula of compound D	(1mk)
c). Describe how compound D can be used to distin	guish between Calcium Carbonate and
Calcium Sulphate	(1mk)
······································	
d). i). Name and give the molecular formula of the	next member of the homologous series to
which compound D belongs	(2mks)

e). Sodium Carbonate is extracted from Trona which is a double salt with the formula

e). compound **D** reacted with another compound with the formula NH_2CONH_2 .

i). Name two by-products of the reaction	(2mks)
ii). Draw the structural formula of the organic compound formed	(1mk)

f). About 5 cm³ of compound **D** was added into a boiling tube containing a mixture of distilled water and pentane. The mixture was shaken and then allowed to stand for about 2 hours. The figure below represents the set up at the end of the 2 hours.



The P^{H} of the liquid obtained from region **B** at the end of the experiment was found to be 7.0. Explain this observation (2mks)

THE REAL

4. Zinc metal can be extracted from its ores by reduction using carbon or through electrolytic process.

a). Apart from Zinc blende, name another ore from which Zinc metal is extracted (1mk)

.....

b). In the electrolytic process, an electric current is passed through a series of cells containing aqueous solution of pure Zinc Sulphate. The figure below represents one of the cells used in the electrolytic process



iv). State **one** environmental effect which can be associated with the extraction of Zinc from its ores (1mk) c). The equation given below represents a redox reaction involving elements X and Y. $\longrightarrow Y_{(s)+} X^{2+}_{(aq)}$ $Y^{2+}_{(aq)} + X_{(s)}$ i). with a reason, identify the reduced species (1mk) ii). Write down the cell representation for the cell that will formed between the two elements X and Y (1mk) iii). Draw an electrochemical cell involving the half cell of element \mathbf{X} and the half cell of Hydrogen (2mks) d). The reaction between Chlorine and aqueous Potassium Iodide can be resented as shown by the equation below *Q* + $2KI_{(aq)}$ \longrightarrow $2KCl_{(aq)}$ + $I_{2(s)}$ Cl2 i). Explain why formation of Iodine is described as an Oxidation process (1mk)

5. The figure below represents trends of some properties of period three elements. Study it answer the questions that follow.



c). write down the electronic configuration of phosphorous and sulphur in the following compounds

i). H ₃ PO ₄	(P=15)	(1 mk)
ii).Na ₂ S ₂ O ₃	(S=16)	(1mk)

. .

d). i). One of the elements given in the figure above is stored under water. Identify	y the element
and give a reason as to why it is stored under water	(1mk)
ii). State one use of aluminium that can be associated with its malleabili	ty (1mk)
e). Explain the observation that would be made if the chloride of Phosphorous is e	xposed
to moist air	(2mks)
and the second se	
f). distinguish between the terms electro negativity and electron affinity as used in	chemistry
NHOEKC	(2mk)
. wh	
6. A radioactive isotope of Uranium $^{238}_{39}U$ Undergoes decay by emitting a beta p	particle.
a). write down a balanced nuclear equation to show this decay process	(1mk)
b). i). The half life of Uranium -238 is 4.5×10^9 years.	
What is meant by the term half -life	(1mk)

ii). A sample of Uranium with 720 radioactive atoms decayed for 22.5 x 10^9 years. On the grid provided, plot a graph of number of radioactive atoms of uranium -238 against time in years

(3mks)



d). Explain the source of electrons in a radioactive process	(1mk)
e). state one application of half life	(1mk)

7. In a class experiment to study the rate of reaction between Sodium Sulphite and dilute Hydrochloric acid, 1.26g of Sodium Sulphite was reacted with excess 2M Hydrochloric acid. The volume of Sulphur (IV) Oxide evolved was plotted against time as shown in the graph below.



a). Name one piece of apparatus that can be used to measure accurate volume of gas collected. (1mk). b). What volume of 1.5M Hydrochloric acid would be needed to produce 4.76 litre of Sulphur (IV) Oxide (all volumes measured at r.t.p, molar gas volume = 24.0dm³) (2mks) c). Use the graph to determine i). The rate of production of gas at 120 seconds (2mks) ii). the rate of production of gas between 30 seconds and 140 seconds (2mks)..... <u>S</u>..... d). On the same axes, sketch the graph obtained if the experiment was repeated using 15 cm³ of 1.5M Hydrochloric acid. isior (1mk)

e). The reaction between Nitrogen and Hydrogen can be represented as shown in the energy cycle given below

