

NAME: ADM NO:

SCHOOL: DATE :

CANDIDATE'S SIGNATURE:.....

233
CHEMISTRY
THEORY
TIME: 2 HOURS

2016 FORM 2

CHEMISTRY
TIME: 2 HOURS

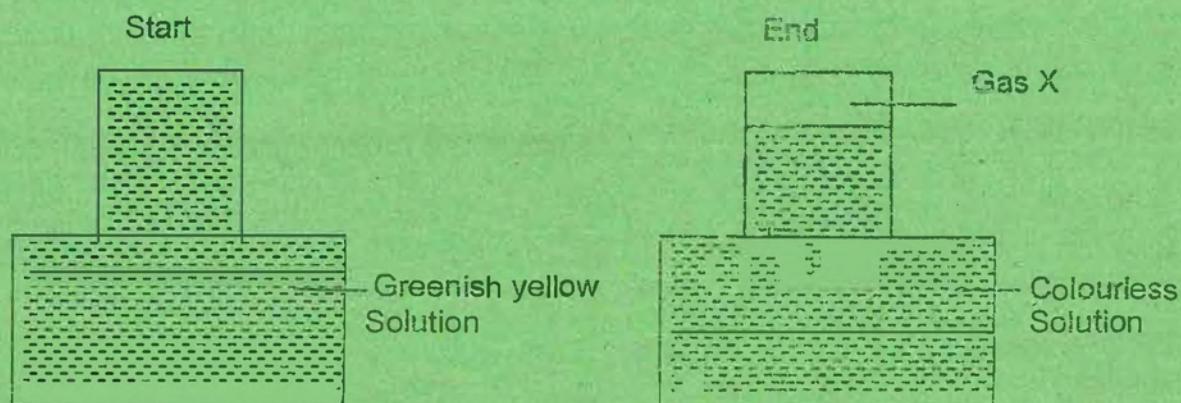
INSTRUCTIONS TO CANDIDATES

- Write your **Name**, **Index Number** and **School** in the spaces provided above.
- **Sign** and write the **date** of examination in the spaces provided.
- Answer **all** the questions in the spaces provided after each question.
- Mathematical tables and silent electronic calculators may be used.
- ALL working **MUST** be clearly shown where necessary.
- All questions should be answered in **English**.

FOR EXAMINER'S USE ONLY

QUESTIONS	MAX SCORE	CANDIDATE'S SCORE
1 – 15	100	

1. The diagram below shows the effect of sunlight on chlorine water.



- (a) Name the components of the yellow solution.

(1mk)

- (b) Write the equation for the reaction responsible for the change of colour of the solution from yellow to colourless.

(2mks)

2. The results of the experiments with R,S,T,K are summarized in the table below.

Metal	Action of heat on the Nitrate
R	R oxide, Nitrogen IV oxide and oxygen
S	S Nitrite and oxygen
T	T, Nitrogen IV oxide and oxygen
K	Brown hot Koxide and carbon IV oxide.

- (a) Identify metal ion present in K.

(1mk)

- (b) Arrange the metals R,S,T in order of reactivity starting with the most reactive.

(3mks)

- (c) Suggest the possible identity of each of the metal salts R, S, T.

(3mks)

R:.....

S:.....

T:.....

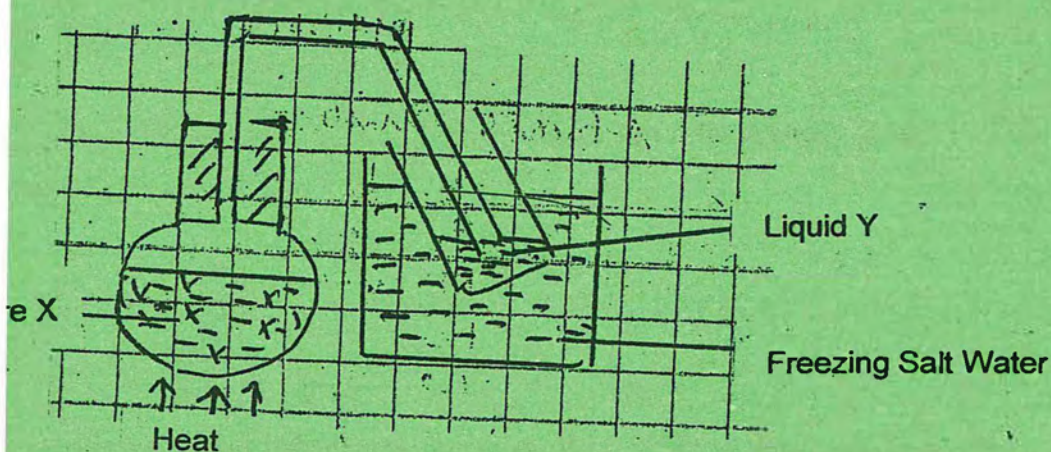
Using dot(●) and crosses(x) draw structures to show the bonding in:

(i) H_2O_2 (3mks)

(ii) H_2O (3mks)

(iii) Mg_3N_2 (3mks)

Study the set up below and answer questions.



(a) What is the general name given to liquid y? (1mk)

(b) Name the process of separation above. (1mk)

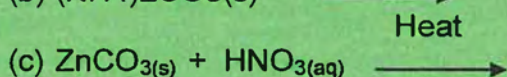
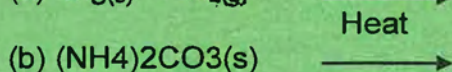
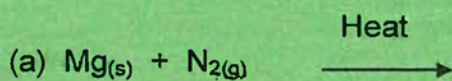
(c) Name two processes that must occur before the liquid y is obtained. (2mks)

(d) What are the advantages of using freezing salty water instead of pure water? (2mks)

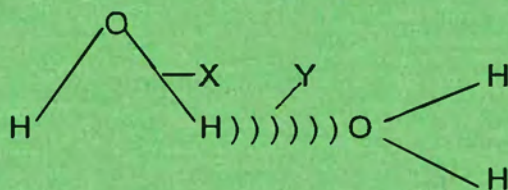
(e) Give an advantage of fractional distillation to the above method.

(2mks)

5. Complete the equations and balance them.



6. Water molecules can be represented as shown.



(a) Name the bonds represented by:

(2mks)

X:.....

Y:.....

(b) In Terms of structure and bonding, explain why the melting point of sodium chloride is 801°C and silicon IV chloride is -68°C .

(2mks)

The table below shows properties of elements G to R. Letters do not represent actual symbols of elements.

Element	Atomic Number
G	13
I	9
J	17
L	12
M	14
N	1
P	11
Q	18
R	19

(a) Which elements belong to the same period? (1mk)

(b) Which two elements belong to group I? (1mk)

(c) Give an element with an ion charge of:

(i) +3:

(ii) -1:

(d) Which element can be grouped in either group I or VII. Explain. (2mks)

(e) Write a formula of the compound formed between G and J. (2mks)

(f) Give the function of element Q. (1mk)

8. Calculate the oxidation number of Nitrogen in:

(i) $\text{NH}_3(\text{g})$ (2mks)

(ii) $\text{HNO}_3(\text{g})$ (2mks)

9. The following table gives some of the physical properties of Magnesium and Calcium.

Element	Mpt(Melting point)	Boiling Point	1 st Ionization energy	2 nd Ionization energy
Mg	650	1110	736	1450
Ca	850	1140	590	1150

(a) State the trend in:

(i) Melting and Boiling points (2mks)

(ii) Ionization energy down the group. (2mks)

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(b) Give reasons for your answer in (a) above. (4mks)

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(c) Explain why the 2nd ionization energy is greater than the 1st ionization energy. (2mks)

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Write the chemical formulae of the following compounds and give their states at room temperature.

(i) 8 molecules of oxygen gas. (1mk)

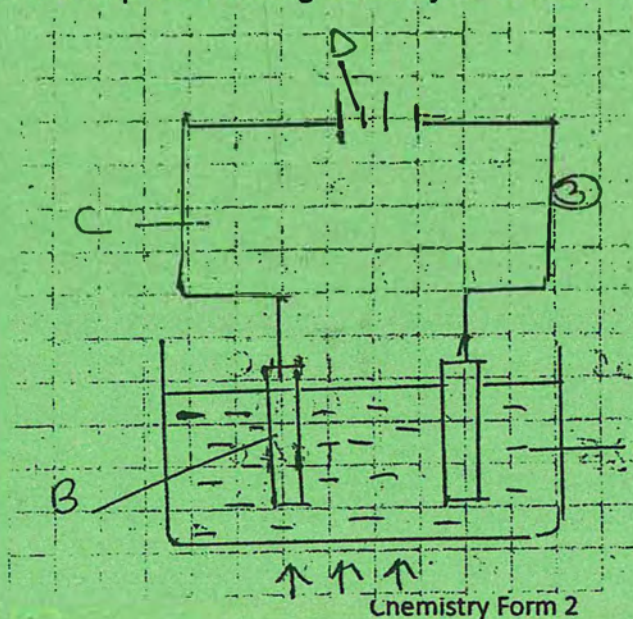
(ii) Concentrated Nitric V acid. (1mk)

(iii) Calcium hydrogen carbonate. (1mk)

(iv) Distilled water. (1mk)

(v) Dilute sulphuric VI acid. (1mk)

Below is a set up used during electrolysis of molten sodium chloride.



Molten Sodium Chloride

(a) Show the direction of the flow of electrons and current on the on the diagrams. (2mks)

(b) Identify the ions present in the electrolyte. (2mks)

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.....

(c) Label parts D, C, B. (3mks)

D:.....

C:.....

B:.....

(d) Write equation occurring at:

(i) Anode:.....

(ii) Cathode:.....

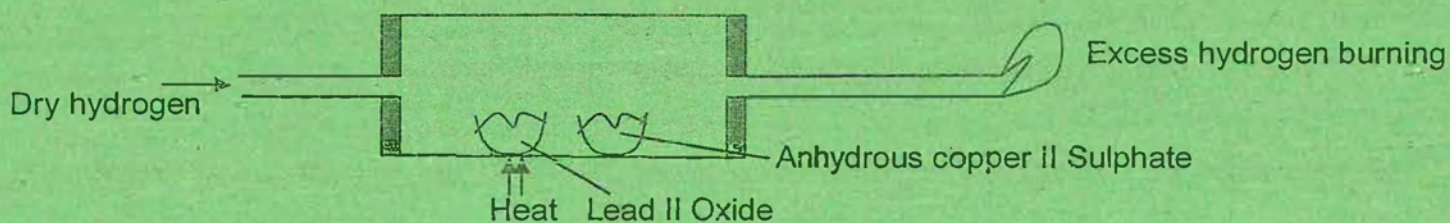
12. A student was given barium carbonate, Nitric V and (dil) solid sodium sulphate, water and other available laboratory apparatus. Describe how the student would prepare barium sulphate. (5mks)

13. (a) Potassium has Isotopes K-39, K-41 which exists naturally in the ratio of 13:1 respectively. Calculate the relative atomic mass of potassium. (2mks)

(a) Give the difference between an isotope and allotrope. (2mks)

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14. I. The diagram below shows apparatus used to investigate effects of dry Hydrogen gas on hot Lead II oxide.



(a) State the observation made in the combustion tube at the end of the experiment. (2mks)

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(b) Write an equation for the reaction between Hydrogen gas and Lead II Oxide. (2mks)

(c) State the safety measures to be taken while carrying out this experiment. (2mks)

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II. Hydrogen has been suggested as an alternative source of fuel to petrol.

(a) What would be the advantage of using hydrogen instead of petrol? (1mk)

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(b) Where else is Hydrogen used as a fuel? (1mk)

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(c) State other uses of hydrogen other than used as a fuel. (2mks)

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15. Carbon II oxide is a reducing agent that is widely used in extraction of some metals.

(a) Draw a set up that can be used to investigate the effect of Carbon II oxide on Iron III oxide. (3mks)

(b) State the precautions that must be taken when conducting this experiment. (2mks)

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(c) Write an equation for the reaction between Iron III oxide and Carbon II oxide. (2mks)

(d) Name a chemical substance for the reaction between Iron III oxide and carbon II oxide. (2mks)

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(e) Give a test that can be used to distinguish between Carbon II oxide and Carbon IV oxide (2mks)

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