NAME.....
ADM. NO.....

Class & Class no..... Sign.....

NYABURURU GIRLS' NATIONAL SCHOOL
Our Lady of lourdes

Form 2

Chemistry Contest

Term 2 2016

TIME: 2 Hours

INSTRUCTIONS TO CANDIDATES

- Write your name, admission number, class and class number in the spaces provided above.
- Answer all the questions in the spaces provided
- All working must be clearly shown where necessary.

FOR EXAMINER'S USE ONLY

QUESTIONS	MAXIMUM SCORE	CANDIDATE'S SCORE
1 - 25	90	

This paper has10printed pages. Ensure that no pages are missing.

1. The electronic configuration of X^{2+} and Y^- are 2.8 and 2.8 respectively.

i. Write the electronic configuration of the atoms of X and Y. (2mks)

.....

.....

ii. Write the formula of the oxide of X. (1mks)

.....

iii. Compare the atomic radius of Y and Y^-. Explain (2 mks)

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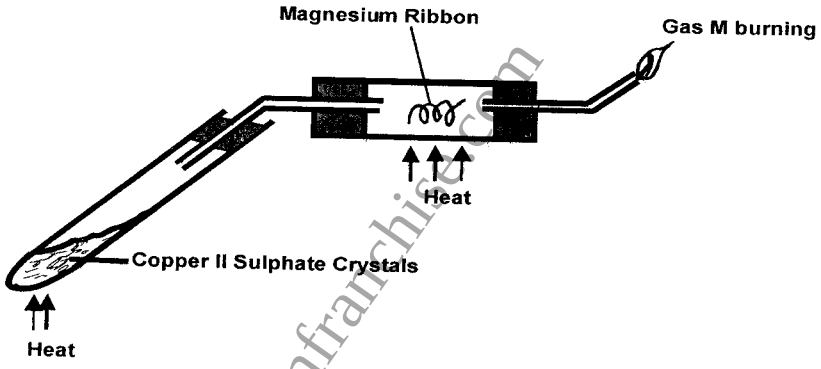
.....

2.Study the setup below and answer the questions that follow.



a) Identify gas M. (1mks)

.....

b.) Write an equation of the reaction that takes place in the combustion tube. (1 mks)

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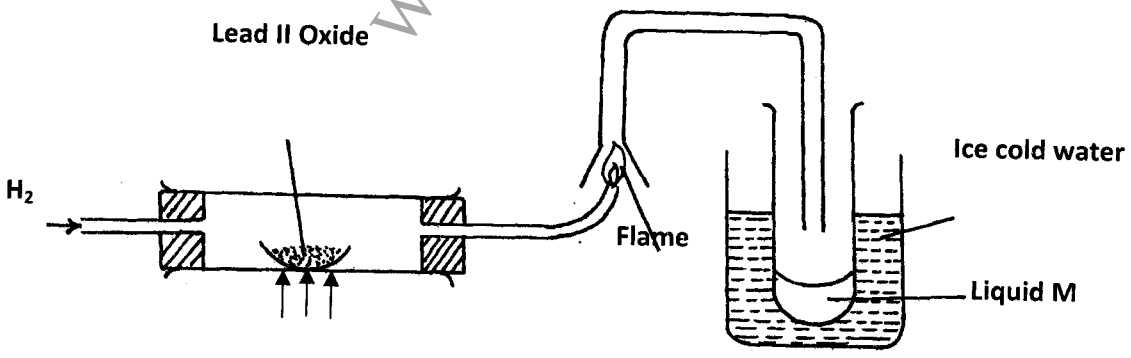
3. Study the diagram below and answer the questions which follow.



(i) State **two** observations made when hydrogen gas is passed over hot lead (II) oxide. (2mks)

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(ii) Write the equation for the reaction which occurs in the combustion tube. (1mks)

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(iii) What property of hydrogen is shown in the experiment above? (1 mk)

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(iv) Identify liquid **M**. (1 mk)

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(vii) Apart from hydrogen peroxide, state **two** other reagents that can be used to prepare oxygen gas. (2mks)

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(viii) Write an equation to show how hydrogen gas is formed from the reagents chosen in (vii) above. (1mks)

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4. The table shows some properties and electron arrangements of common ions of elements represented by letters Q to X. Study the information provided then answer the questions that follow.

Element	Formula of ion	Ionic electron arrangement	Atomic Radius	Ionic Radius
Q	Q^-	2.8	0.072	0.136
R	R^+	2.8.8	0.231	0.133
S	S^{3+}	2.8	0.143	0.050
T	T^{2+}	2.8.8	0.133	0.074
U	U^{2+}	2.8	0.160	0.064
V	V^+	2.8	0.186	0.095
W	W^{3-}	2.8.8	0.110	0.190
X	X^-	2.8.8	0.099	0.181

(i) Give the atomic numbers of elements T and Q (2marks)

T.....

Q.....

(ii) Select two non-metals that belong to the same period (2marks)

.....

(iii) Which two elements would react violently with water to produce hydrogen? (2mks)

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.....

c.) (i) Why is the atomic radius of R larger than its ionic radius? (2mks)

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.....

(ii) Element S is suitable for making cooking pans. Explain (2 mks)

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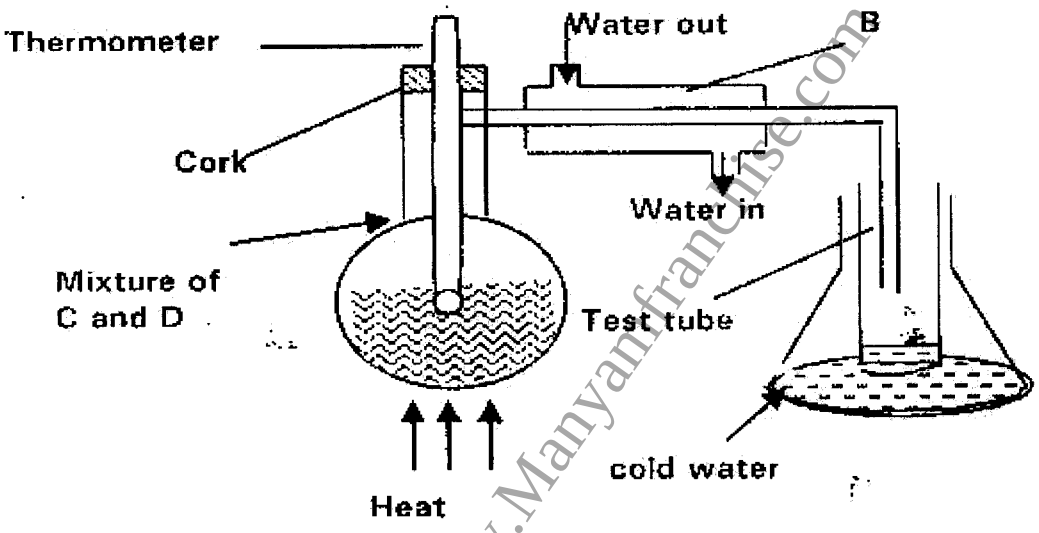
5. The set up below represents apparatus that may be used to separate a mixture of two miscible liquids "C" and "D" whose boiling points are 80^0C and 100^0C respectively.



i) Name B. (2mks)

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ii) What is the purpose of the thermometer? (2mks)

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i) Which liquid is collected in the test tube? (2mks)

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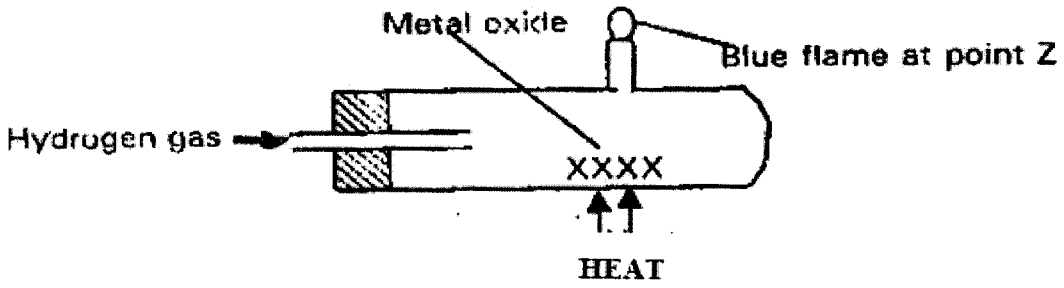
6.Use the information shown in the diagram below to answer the questions that follows.



i) Explain why it is important to pass the hydrogen gas for some time before lighting it at point Z (2mks)

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.....

ii) Write an equation for the reaction that takes place when hydrogen burns at point Z. (1mks)

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7. When trying to put off an oil fire, water is not used. Explain. (2mks)

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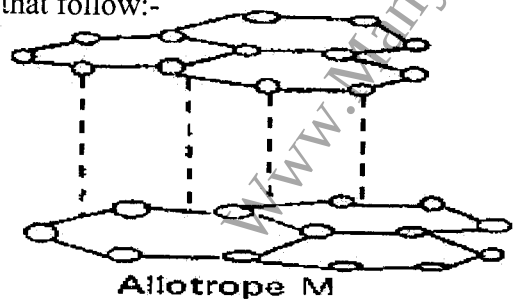
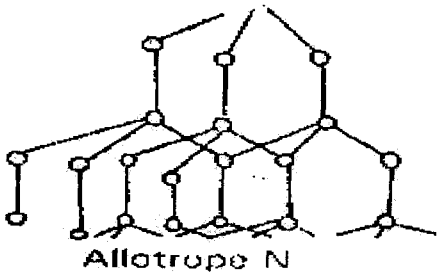
The following diagrams show the structures of two allotropes of carbon. Study them and answer the questions that follow:-





i) Name the allotrope

M..... (1mk)

N..... (1mk)

ii) Give one use of N (1mk)

.....

iii) Which allotrope conducts electricity? Explain. (2mks)

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8.In terms of structure and bonding explain why:

a.) Iodine has a higher melting point than chlorine. .(2mks)

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b.) Graphite is used as a lubricant. (2mks)

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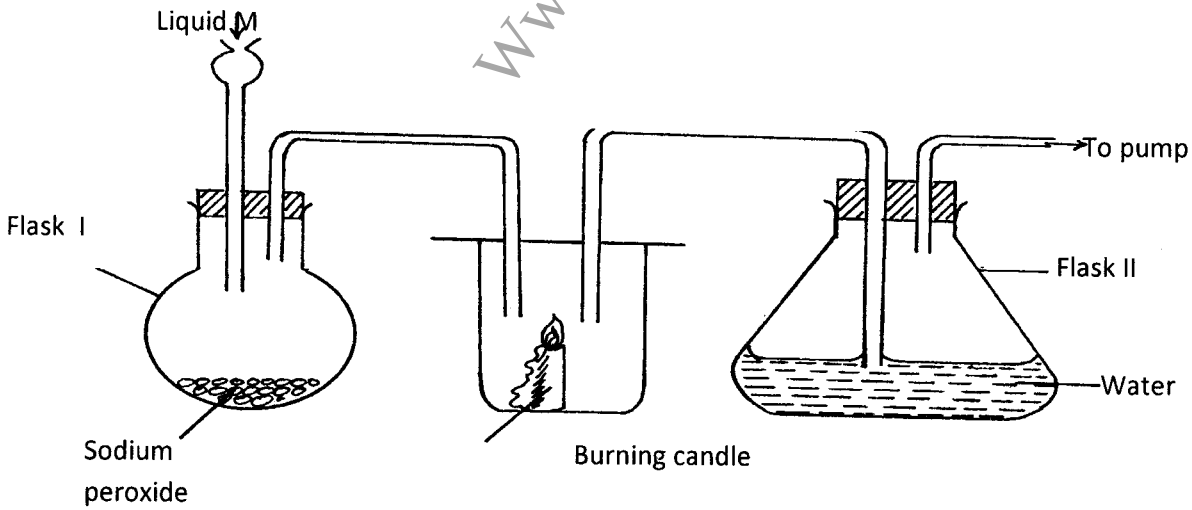
9.Using dots (.) and crosses(x) to represent electrons. Draw a diagram to show bonding in carbon (II) oxide.

(C= 6, O = 8) (2mks)

10.The diagram below shows a set up of apparatus used to prepare oxygen gas and pass it over burning candle. The experiment was allowed to run for several minutes.



(i) Identify liquid M. (1mk)

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(ii) The pH of the solution in flask II was found to be less than 7. Explain. (2mks)

……

……

iii) Write an equation for the reaction that forms oxygen gas in the set up. (1mks)

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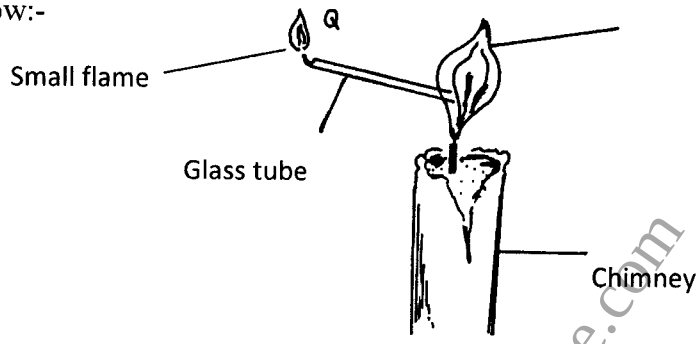
11. A glass tube was inserted into a flame formed when the air hole of the Bunsen burner was fully open as illustrated below:-



i) When a burning splint was brought near point Q, a small flame lit at this end of glass tube. Explain. (2mks)

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……

12. Both sodium and aluminium are metals in period 3, yet sodium has much lower melting point than aluminium. Explain (2mks)

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13. Explain why electrical conductivity of metals decreases with increase in temperature (2mks)

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14. In terms of the numbers of subatomic particles, state one difference and two similarities between two isotopes of the same element. (3mks)

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15.Define the term allotropy and give one example of an element that exhibits allotropy. (2mks)

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16.Paper chromatography of a plant extract gave the following results.

SOLVENT	NO. OF SPOTS
X	4
Y	1
W	2

Which Solvent is the most suitable for purifying the extract? Explain. (2mks)

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17.Describe an experiment to show that water is an oxide of hydrogen. (2mks)

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18.Define rust and give its chemical formula (1mks)

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19.Explain why nitric acid is not suitable in the laboratory preparation of dry hydrogen gas (2mks)

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20.The following particles have same electronic configuration K^+, S^{-2}, Ar.

i) Define the term electron affinity (1mk)

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ii) Arrange the particles in order of their increasing sizes (1mk

.....

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21. Hydrated magnesium sulphate is prepared as follows;

A spatula of magnesium carbonate is added to $50cm^3$ of dilute sulphuric acid. More magnesium carbonate is added in little amounts till no more reacts. The unreacted solid if filtered off. The filtrate if

evaporated to about half its original volume and allowed to cool. Crystals that form are removed and dried between filter papers.

a) i. Write a balanced chemical equation for the reaction between magnesium carbonate and dilute sulphuric acid (1mks)

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ii. Why should magnesium carbonate be added till no more reacts (1mks)

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iii. Why is the reaction mixture filtered (1mk)

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iv. Why is the filtrate evaporated to about half its volume (1mk)

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v. The crystals are dried between filter papers and not by heating. Explain (1mk)

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.....

b) Name two other compounds of magnesium which can be reacted with sulphuric acid to form sulphates (2mks)

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22. Study the table below

Element	Ionization energies	
	1st	2nd
B	857	1510
D	617	1201
C	600	996

a.) Define the term ionization energy. (1 mk)

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b)To which family does the element represented above belong? Give a reason. (2 mks)

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.....

b.) Explain the difference in ionization energies of B. (2mks)

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23 a.) Nitrogen, oxygen and argon are obtained from liquid air by fractional distillation. State the physical property that makes this possible. (1 mk)

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b.) Arrange the gases in a) above in order of how they distil, starting with the first. (1 mk)

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c.) State one industrial use of argon. (1 mk)

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24. In terms of structure and bonding explain why the boiling point of water (H_2O) is a liquid at room temperature while hydrogen sulphide (H_2S) is a gas (2mks)

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25.The nitrates of metals A, B and C were heated over a Bunsen burner flame. The table below shows the products of decomposition. Study the information in the table and answer questions that follow. A, B, C are not the actual symbols of the metals.

Metal nitrate	Products
A	Metal nitrite and oxygen gas
B	Metal, nitrogen (IV) oxide and oxygen
C	Metal oxide , nitrogen (IV) oxide and oxygen gas

Which of the metal is the most reactive? Explain. (1mk)

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(i) Name a metal that would possibly be B (1mk)

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(ii) Write an equation for the thermal decomposition of the nitrate of metal C (1mks).

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