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

FORM 3 CHEMISTRY
TIME: 2 HOURS
MARCH/APRIL 2019

INSTRUCTIONS TO CANDIDATES

- *Write your name and index number in the spaces provided.*
- *All questions should be answered in English.*
- *K.N.E.C mathematical tables and non-programmable electronics calculators may be used.*

FOR EXAMINERS USE ONLY

Question	Marks	Candidates Score
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		

Question	Marks	Candidates Score
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
	TOTAL	100

SECTION A

1. Give two reasons why non-luminous flame is used for heating in school laboratory. (2marks)

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2. Distinguish between isotopes and allotropes. (2marks)

Isotopes	Allotropes
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3. Use dot (.) and crosses (X) to show the bonding in

(i) NH_4^+ (1mark)

(ii) H_20 (1mark)

4. Give two reasons why a luminium is used to protect iron from rusting. (2marks)

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5. State Charse law (1mark)

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6. i) State why aluminium is a better conductor of electricity than magnesium. (1mark)

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(ii) State one use of aluminium related to the property mentioned in 6(i) (1mark)

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7. Starting with lead metal describe how you would prepare lead (ii) sulphate .(3marks)

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8. Study the information in the table and answer questions that follow. The letters given are not the real symbols of the elements.

Ions	Electronic arrangement	Ionic radius (nm)
A^+	2.8	0.95
B^+	2.8.8	0.133
C^+	2.8	0.065

Explain why the ionic radius of: -

(a) B^+ is greater than that of A^+. (1 mark)

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(b) C^{2+} is smaller than that of A^+.. (2marks)

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Graphite is one allotrope of carbon, draw the structure of graphite and label a covalent bond and Verdawael forces (2marks)

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10. Distinguish the mode of electrical conductivity between magnesium metal and molten magnesium Chloride.. (2marks)

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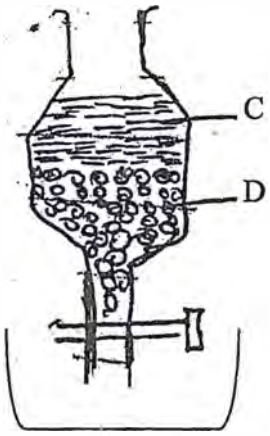
11. The diagram below shows a set-up used by a student to separate two liquids C and D.



(a) Name the apparatus drawn. (1mark)

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(b) State two properties of C and D that make it possible for them to be separated using the method shown above. (2marks)

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12. The melting point of sodium Chloride is 715°C while that of phosphorous III chloride is -91°C. In terms of structure and bonding explain the difference. (3marks)

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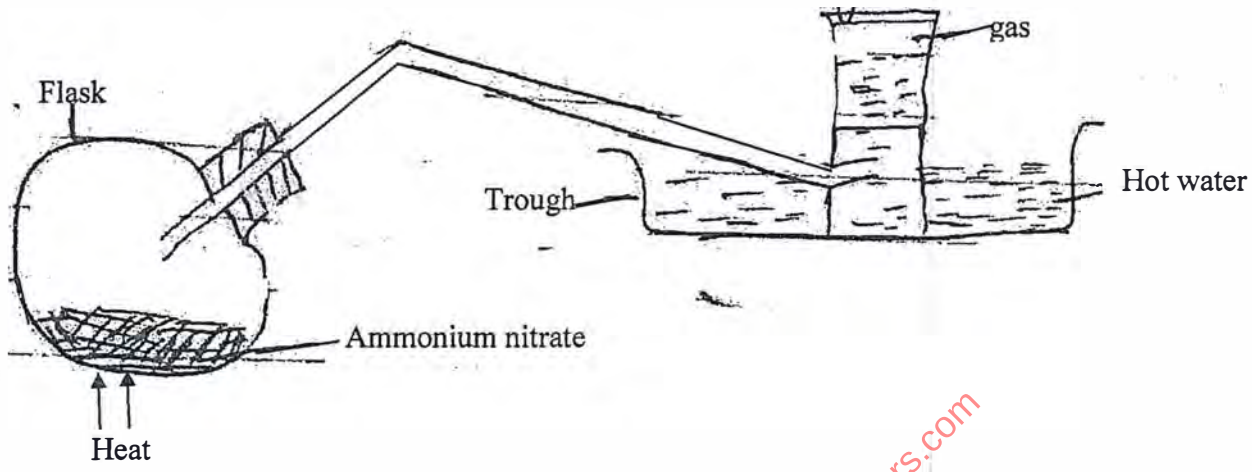
13. The diagram below shows the apparatus for the laboratory preparation of one of the oxides of nitrogen.



a (i) Name the gas being produced (1mark)

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ii) Write the equation for the thermal decomposition of ammonium nitrate to produce the gas. (1mark)

b) The gas is collected over hot water. Explain (1mark)

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14. 60cm3 of oxygen diffused through a porous hole in 50seconds. How long will it take 60cm3 of sulphur (IV) oxide gas to diffuse through the same hole under the same conditions of temperature and pressure. (S = 32, 0=16) (3marks)

15. a) Starling with purple leaves of a cabbage, describe how you can prepare a simple acid base indicator. (2marks)

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b) Explain how the simple acid-base indicator you prepared in (a) above can be used to show lemon juice is acidic (2marks)

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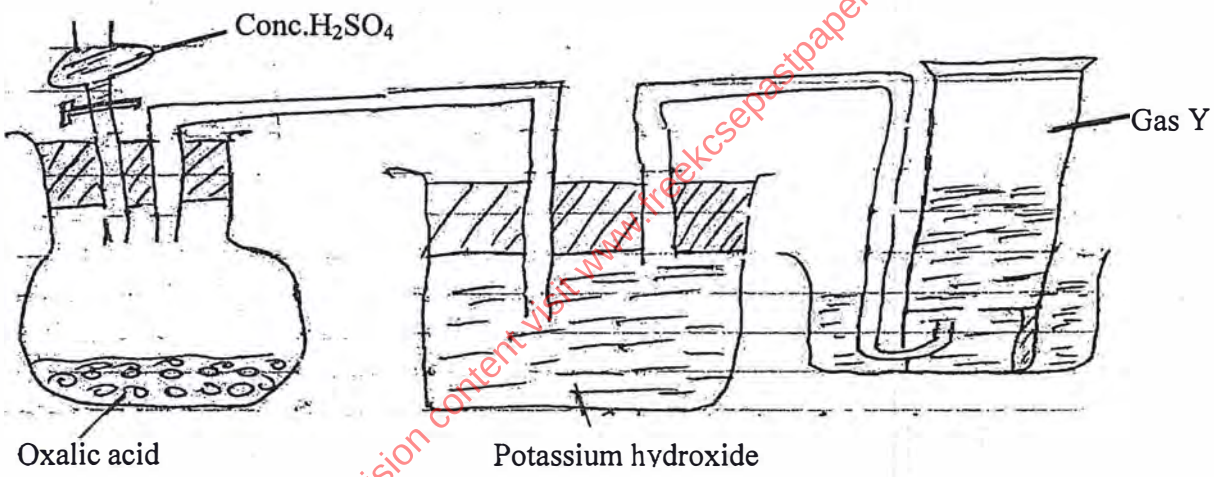
16. Study the diagram below and answer the questions that follow.



(i) State the role of conc. Sulphuric (VI) acid in the above set up. (1mark)

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(ii) Name the gas Y (1mark) .....

(iii) Name another substance that can be used in place of potassium hydroxide. (1mark)

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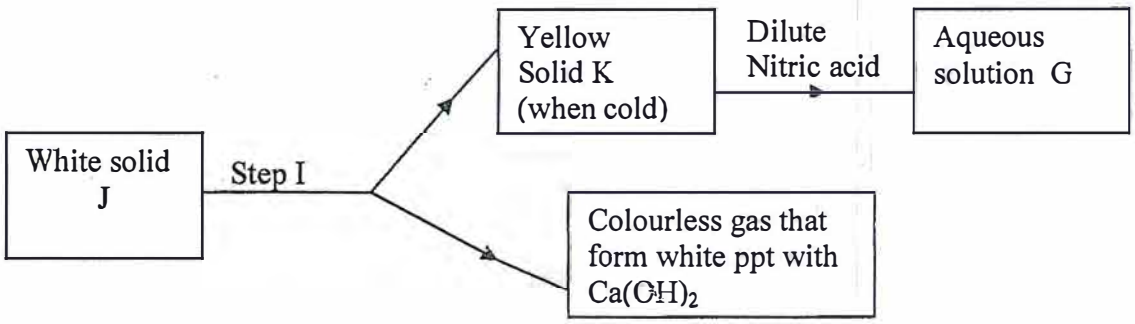
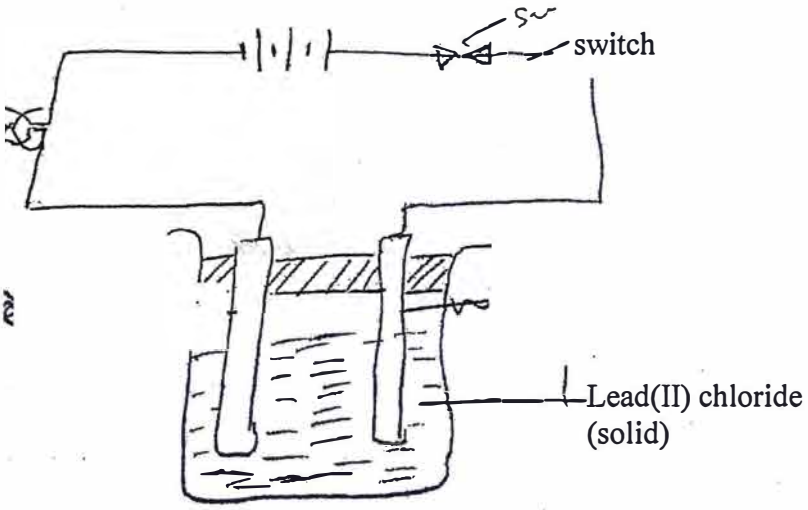
17. Study the flow chart below and answer the questions that follow.





(a) On the diagram label

(i) Cathode anode (2marks)

(ii) Show the direction of flow of electrons (1mark)

(iii) Complete the diagram by indicating the condition that is missing and must be present for the electrical conduction to take place. (1mark)

(b) State the observations expected at each electrode during the electrical conduction.

Anode (1mark)

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Cathode (1mark)

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(c) Write equations for the reaction that take place at the electrodes (2marks)

Anode

Cathode

(d) The experiment above should be carried out in the fume chamber. Give a reason. (1mark)

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(i) Identify solid K (1mark) .....

(ii) Identify gas M.....

(iii) Name the type of reaction that takes place in step II. (1mark) .....

18. An organic compound P contains 54.55% carbon, 9.09% hydrogen and the rest oxygen. If the relative formula mass of P is 88, determine the molecular formular of P. (4marks) (C= 12,H= 1, O=16)

b) You are given aqueous sodium sulphate and aqueous sodium hydrogen sulphate. Describe an experiment that can be used to distinguish between the two salts. (2marks)

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SECTION B

19. a) On the axes below draw a sketch graph to show the behavior of a fixed mass of a gas at constant temperature. (2marks)

(e) What observation was made in the bulb when the missing condition was provided. (1

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21. The diagram below shows a part of the periodic table with some elements represented by t
Use the letters in answering the questions that follow.

A								F
					D		E	
						I		G
B								
C						J		H

(i) Give the formula and nature of the oxide of E. (2mark)

(ii) Write a balanced equation for the reaction between A and D. (2 mark)

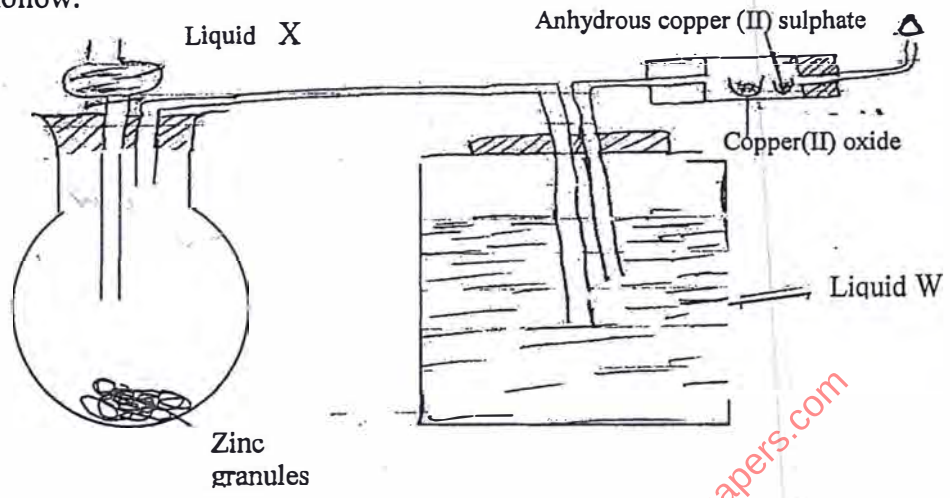
(iii) Compare the atomic radii of I and G, account for their difference. (2marks)

(iv) Select the most reactive metal element. Give a reason. (2marks)

(v) Which two elements would react to form an ionic compound? Explain (2marks)

(vi) An element W forms an ion with the electronic configuration 2.8 and a charge of

22. A student set up the apparatus as shown below to prepare dry hydrogen. Study it and answer the questions that follow.



(i) Identify any mistake in the set up above.(1mark) .....

(ii) Identify (a) Liquid X.....

(b) Liquid W ..... (2marks)

(iii) Give any 2 observations made in the combustion tube and account for each observation. (2marks)

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(iv) (a) Write a balanced equation for the reaction between copper(II) oxide and hydrogen gas (1mark)

(b) Which property of hydrogen gas was under investigation in the set up above.(1mk)

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(v) Which other oxide would be used in place of copper (II) oxide in the above set-up (1mark)

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(vi) State any two industrial uses of hydrogen gas (2marks)

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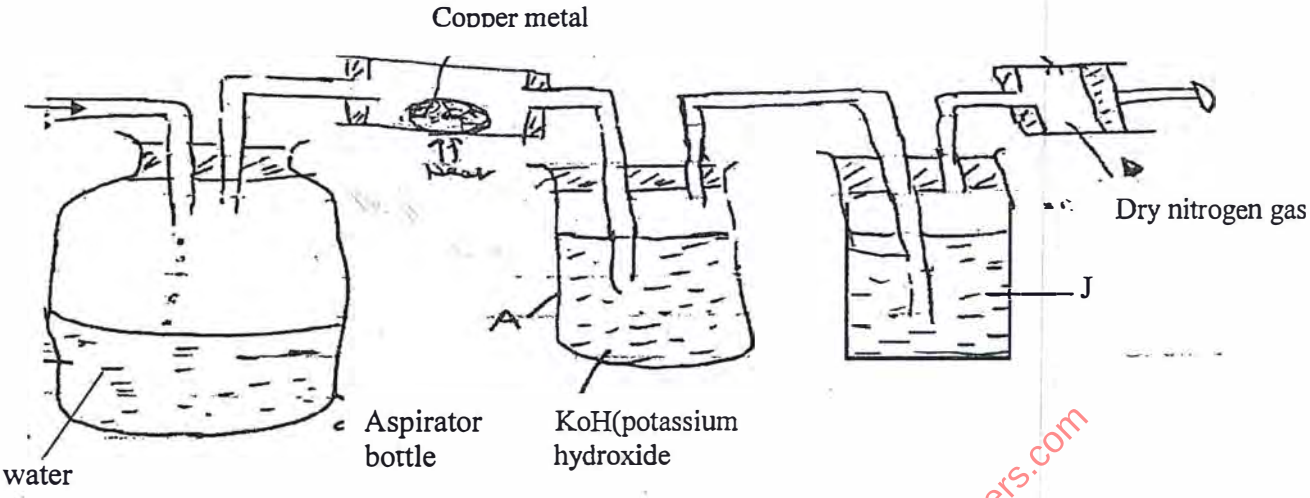
23. Study the diagram below and answer the questions that follow



(i) Name substance J and state its use (2marks)
Name: ……..
Use :……..

ii) Why was water passed into aspirator bottle. (1mark)

(iii) State the observation that will be made in the combustion tube. (1 mark)

(iv) Write the equation for the reaction in test tube A. (1mark)

(v) What other gas is present in the syringe other than nitrogen gas. (1mark)

b) State two uses of nitrogen gas (2marks)

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c) Nitrogen gas burns at very high temperature in engines of motor vehicles producing nitrogen (II) oxide gas.

i) Write an equation to show nitrogen burning in oxygen to form nitrogen (II) oxide.

ii) Explain how nitrogen (II) oxide cause, environmental pollution. (2marks)

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