

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

SCHOOL..... CANDIDATES SIGN.....

DATE .....

233/1  
CHEMISTRY  
FORM 2  
END OF TERM THREE  
TIME: 2 HOURS

## END OF TERM (III) EXAMINATION -2019

*Kenya Certificate of Secondary Education (K.C.S.E)*

233/1  
CHEMISTRY  
FORM 2  
END OF TERM THREE  
TIME: 2 HOURS

### INSTRUCTIONS TO THE CANDIDATES

- Answer all the questions in this paper in the spaces provided.
- Write legibly and neatly

### EXAMINER'S USE ONLY

QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
1-18	50	
SECTION B		
19	12	
20	13	
21	12	
22	13	
TOTAL	100	

**SECTION A 50MKS)**

1. The diagram below shows a set-up to investigate the process of rusting. Study it and answer the questions that follow



(i) State and explain the observation made on the iron nails in the two test tubes at the end of the experiment. (2mks)

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(ii) State one condition that accelerates rusting (1mk)

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2. Below are PH values of some solutions

Solution	Z	Y	X	W
PH	2.2	6.5	7.2	13.5

(i) Which solution is likely to be:  
 Acid rain ..... (½ mk)  
 Potassium hydroxide ..... (½ mk)

(ii) A basic substance V reacted with both solutions Z and W. What is the nature of V (1mk)

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(iii) Identify two substances that show the characteristics in question (ii) above (1mk)

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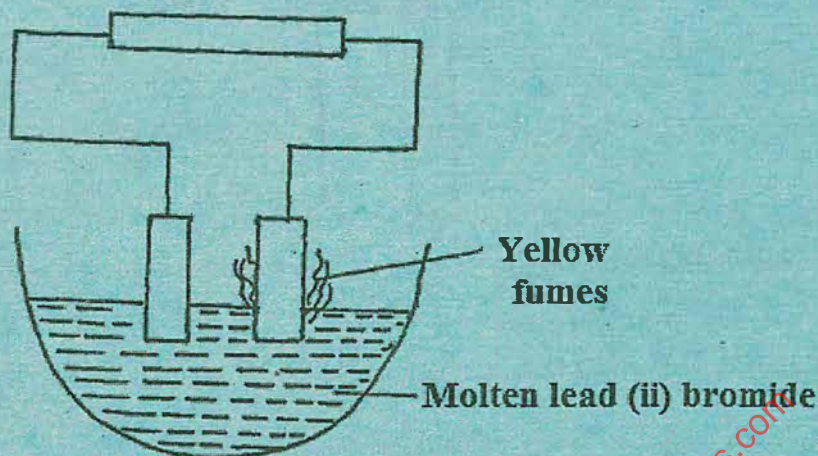
3. Describe how you can prepare a simple acid base indicator using red hibiscus flowers (3mks)

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4. Use the set up below to answer the questions that follow.



a) On the diagram, label the cathode (1mk)

b) Write the equation for the reaction at the anode (1mk)

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.....

c) On the diagram, show the flow of electrons (1mk)

5. Explain why calcium carbonate and dilute Sulphuric (VI) acid are not used for preparation of Carbon (IV) oxide in the laboratory (2mks)

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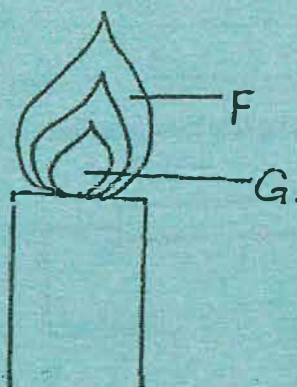
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6. Complete the following table of elements, their symbols and valences. (3mks)

Element Name	Symbol	Valency
Potassium	-	-
Phosphorus	-	-
Silver	-	-

7. Study the figure below and answer the questions that follow



a) Name the regions labeled:-

F.....

(½ mk)

G .....

(½ mk)

b) Draw a well labeled wooden splint that has been placed across region G

(2mks)

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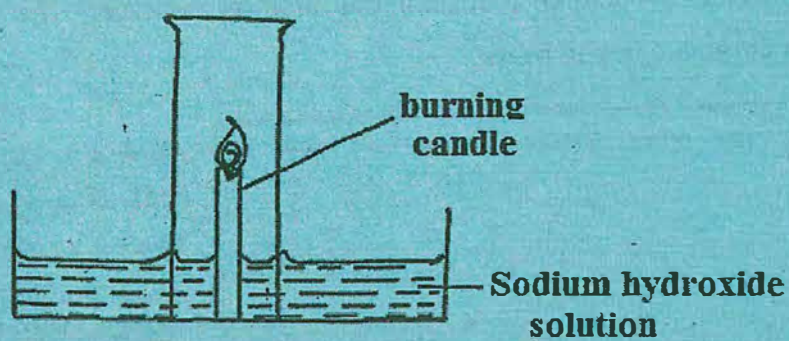
8. Metal S removes combined oxygen from P reacts with cold water but Q does not. Q reacts with an oxide of R and not with an oxide of P arrange the metal in the order of decreasing reactivity (2mks)

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9. An experiment was set as shown below



a) Draw another diagram to show what you would expect to observe at the end of the experiment

(2mks)

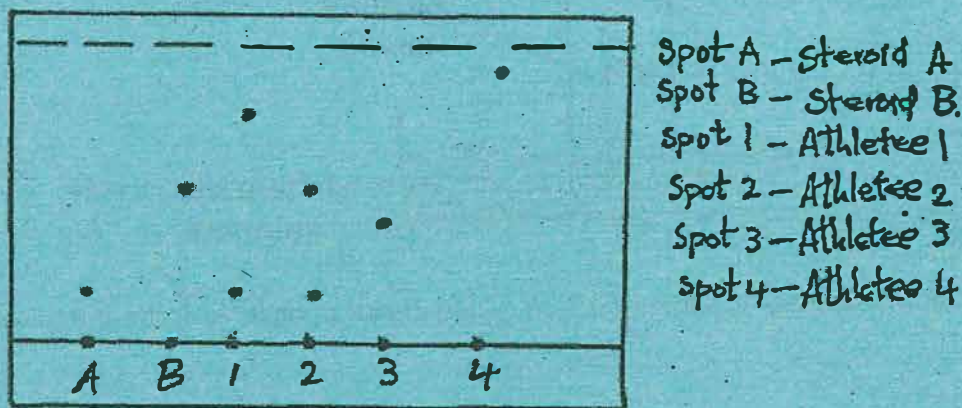
b) Explain the two observations made in the above experiment

(1mk)

10. Once an object starts to rust, the process continues until the object is completely destroyed. Explain

(2mks)

11. Urine sample from four athletes were investigated by the Doping Association and a chromatography done alongside steroids A and B. Methanol was used as a solvent. The results are shown in the ascending paper chromatography below.



(i) What is the role of methanol in the above chromatography (1mk)

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(ii) Which of the two steroids is most soluble? (1mk)

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(iii) Which of the athletes had abused drug (1mk)

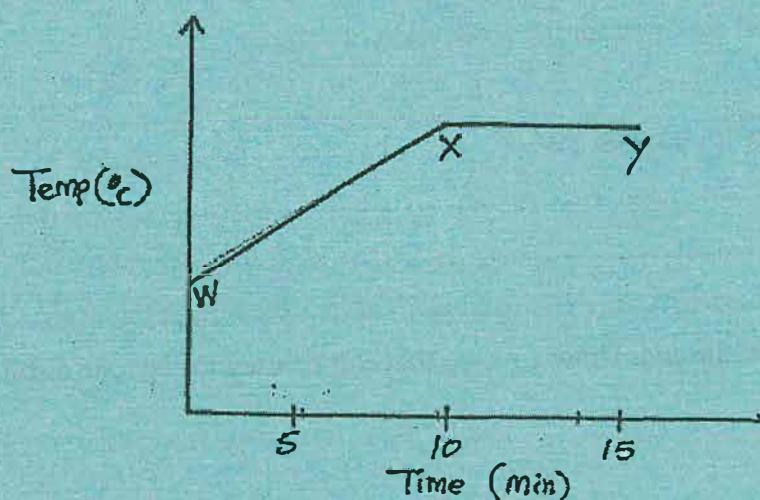
Explain

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12. A student added Copper (II) Sulphate to 15cm<sup>3</sup> of distilled water and stirred until some remained undissolved. Describe how the student can obtain crystals of Copper (II) Sulphate (3mks)

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13. The diagram below shows a curve obtained when water at  $20^{\circ}$  was heated for 15 minutes



(i) What happens to water molecules between points W and X? (1mk)

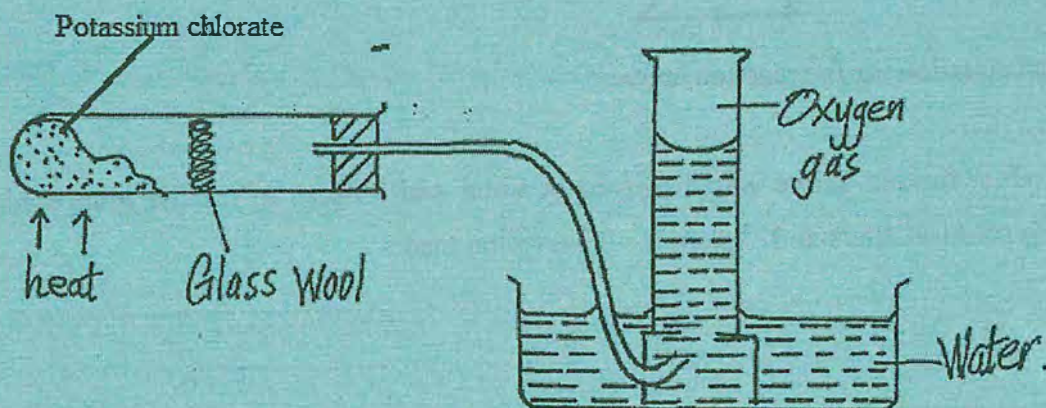
(ii) In which part of the curve does a change of state occur (1mk)

(iii) Explain why the temperature does not rise between points X and Y (1mk)

14. a) Define an alkali (1mk)

b) Give two examples of alkalis (2mks)

15. A student set-up the apparatus below in order to prepare a sample of oxygen gas using Potassium Chlorate



(i) State one property that enables oxygen to be collected by the above method (1mk)

(ii) Write a chemical equation for the production of oxygen (1mk)

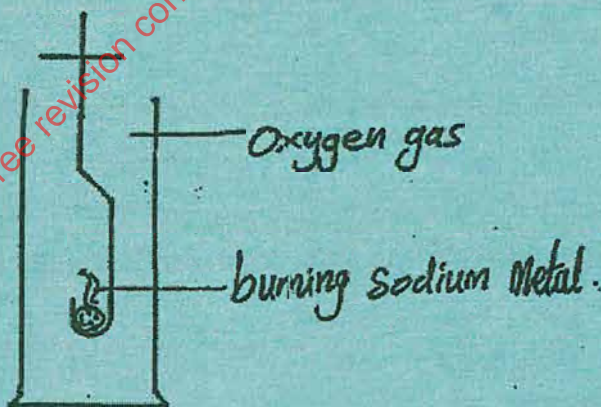
(iii) Describe the test for oxygen gas (1mk)

16. a) Iodine is mixed with sand. Draw a set-up that can be used to separate a mixture of iodine and sand (2mks)

b) State one precaution that should be taken in the above experiment (1mk)

17. Describe the steps followed when lighting the Bunsen burner to produce a non luminous flame (2mks)

18. The following is a set up showing burning sodium metal in oxygen



a) Write an equation for the reaction above (1mk)

b) The product formed above was dissolved in water and 3 drops of methyl orange added to the resulting solution. State and explain the observation made (2mks)





f) Using dots (.) and crosses (x) to represent electrons, draw a diagram to show the bonding in the compound formed when O reacts with S (1mk)

g) Element W is generally unreactive. Explain (1mk)

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(II) The following elements belong to the same group of the periodic table. (The letters are not the actual symbols of elements)

Element	Atomic radius (nm)	Ionic radius (nm)	1 <sup>st</sup> ionization energy KJ/Mol
A	0.136	0.065	736
B	0.089	0.031	900
C	0.174	0.099	590

a) Are elements metals or non-metals? Explain (1mk)

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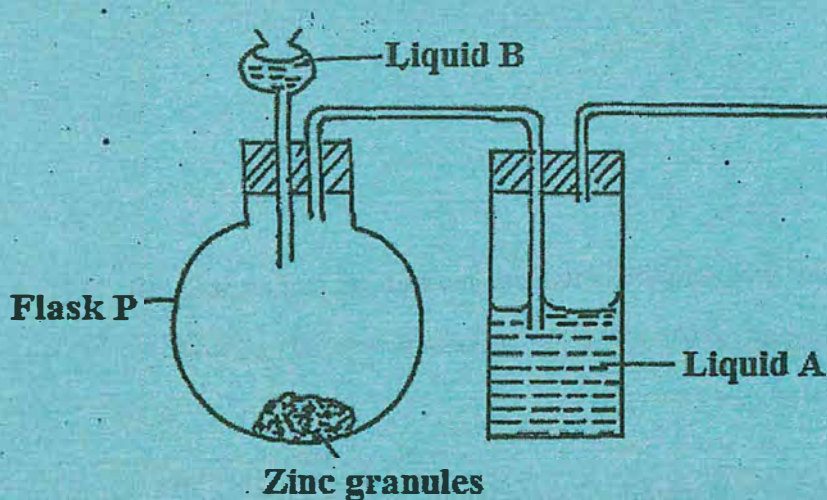
b) Which of the elements is the most reactive? Explain (2mks)

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20. The diagram below represents a set up used to prepare dry hydrogen gas.



- (i) a) Identify the substance  
 A ..... (1mk)  
 B ..... (1mk)  
 b) Identify any one mistake in the set up above (1mk)
- .....  
 .....  
 .....  
 c) Complete the diagram to show how the dry hydrogen gas is collected (2mks)  
 d) Name the substance that can be used as a catalyst in the above reaction (1mk)
- .....  
 .....  
 e) State any 2 industrial uses of hydrogen gas (2mks)
- .....  
 .....  
 (ii) a) Give two observations made when a small piece of Sodium metal (the size of rice grain) is placed in water. (2mks)
- .....  
 .....  
 .....  
 b) (i) The resulting solution formed when Sodium Metal is lowered in water turns red litmus paper blue and has no effect on blue litmus paper. Explain this observation (1mk)
- .....  
 .....

(ii) Write an equation for the above reaction

(1mk)

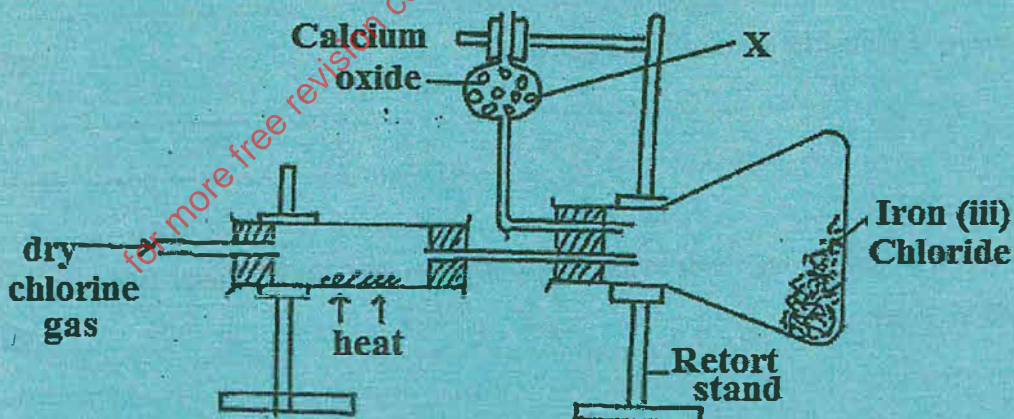
21. a) Giving examples differentiate between a normal salt and an acid salt

(2mks)

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b) Given the following reagents:- Lead (II) oxide dilute nitric (V) acid distilled water and Sodium Carbonate solution. Describe how you would prepare solid Lead (II) Carbonate (3mks)

c) The diagram below shows how to prepare Solid Iron (III) Chloride. Study it and answer the questions that follow



(i) Name apparatus X

(1mk)

.....  
.....  
.....

(ii) Give the method of salt preparation

(1mk)

(iii) Give a reasons as to why Calcium Oxide is preferred instead of anhydrous Calcium Chloride in the set-up

(1mk)

(iv) Explain why dry chloride gas has to be used

(1mk)

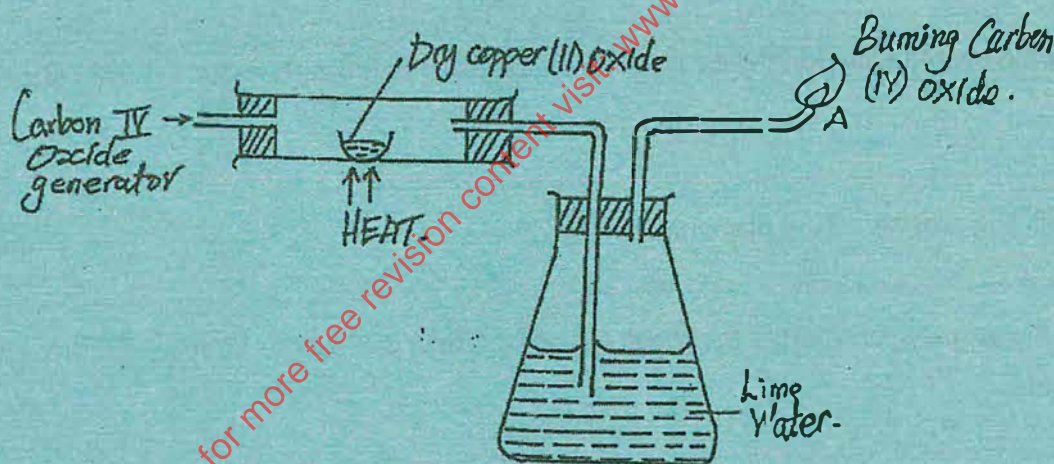
Write a balanced chemical equation between heated iron and Chloride gas

(1mk)

d) State two uses of Sodium Carbonate

(2mks)

22. a) The set up below was used to investigate the reducing properties of Carbon (II) Oxide gas.



(i) Outline one observation made in the combustion tube

(1mk)

(ii) What is the main purpose of limewater

(1mk)

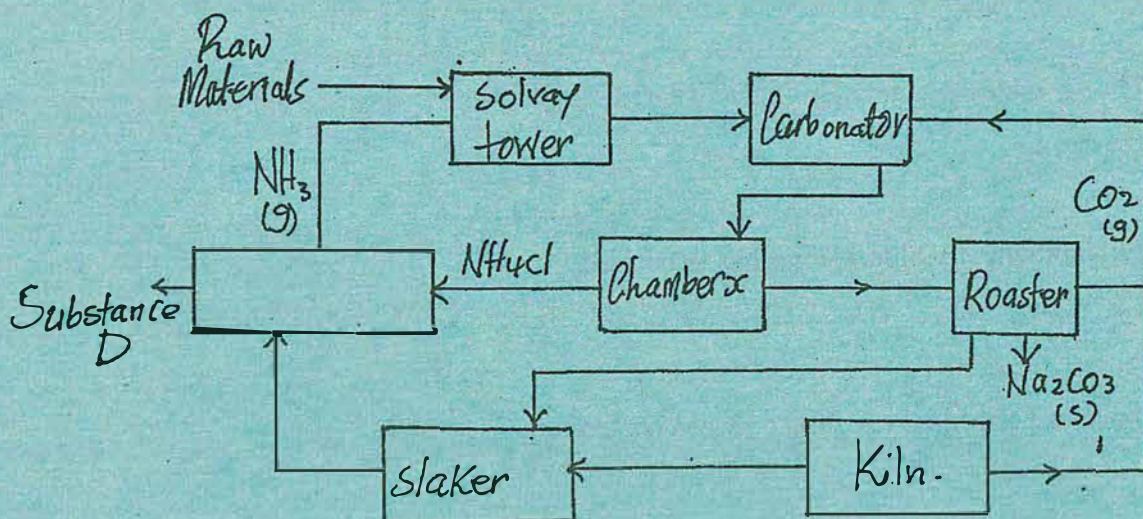
(iii) Why should the unreacted Carbon (II) Oxide be burnt at section A

(1mk)

(iv) Write a balanced equation for the reaction that takes place at section A when the unreacted Carbon (II) Oxide is burnt

(1mk)

b) Below is an illustration of Solvay process for manufacture of sodium carbonate. Use it to answer the questions that follow



(i) Name the two raw materials for the process other than ammonia gas (1mk)

(ii) The Solvay tower produces a lot of heat. State how the heat produced is controlled (1mk)

(iii) Write an equation for the reaction taking place in the roaster (1mk)

(iv) Write the overall equation for the reaction taking place in the carbonator (1mk)

(v) Identify the process taking place in Chamber X (1mk)

(vi) State the property of Sodium hydrogen Carbonate that enables it to be separated from ammonium Chloride (1mk)

(vii) State two substances that can be recycled (1mk)

(viii) Why is recycling important in this process (1mk)

(ix) Identify substance D (1mk)

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