NAME: …… ADM. NO:……..……

SCHOOL …… DATE: ……..……..

CANDIDATE'S SIGNATURE……..……..

233/1
CHEMISTRY
PAPER 1
THEORY
MARCH/APRIL 2015
TIME: 2 HOURS

CROSS COUNTRY EXAMS 2015

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

Chemistry
Paper 1
Theory

INSTRUCTIONS TO CANDIDATES:

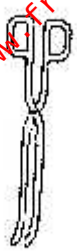
- *Write your **name school** and **index number** in the spaces provided above.*
- ***Sign** and write the **date** of examination in the spaces provided above.*
- *Answer **all** the questions in the spaces provided below each question.*
- *Mathematical tables and electronic calculators may be used*
- *All working **MUST** be clearly shown where necessary.*

For Examiner's Use Only

Question	Maximum score	Candidate's score
1-28	80	

This paper consists of 11 printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing.

1. Identify and state the use of the apparatus represented below. (2 marks)



Name……
Use……

2. Give the systematic name of each of the compounds represented by the formulae below. (3 marks)

(a) $CH_3C{\equiv}CCH_3$

……..

(b) $CH_3CH{=}CHCH_2CH_3$

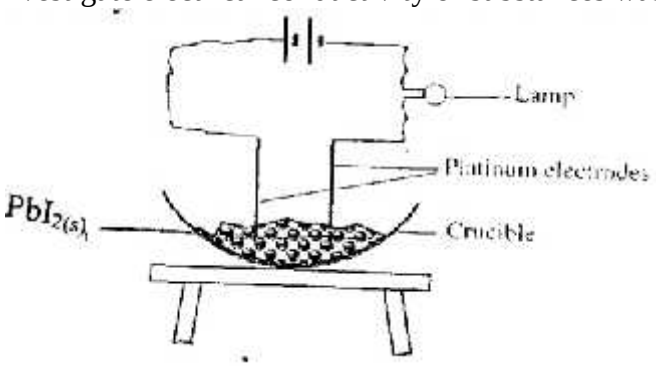
……..

3. A fixed mass of a gas occupies $105cm^3$ at -14 ^oC and 650mmHg. At what temperature will it have a volume of $15cm^3$ if pressure is adjusted to 690mmHg? (3marks)

4. a) Using dots (**.**) and crosses (**x**) to represent electrons, show the bonding in the compounds formed between magnesium and fluorine. (Atomic numbers; Mg= 12, F=9) (1 mark)

b) State one likely physical property of the compound formed between magnesium and fluorine in (a) above. (1 mark)

5. A set-up to investigate electrical conductivity of substances was assembled as shown below.



The bulb did not light.

(a) What was missing in the set-up? (1 mark)

……

(b) The bulb lit when the omission was corrected. Explain. (2 marks)

……

……

6. An oxide of copper in a porcelain boat was reduced by a stream of hydrogen. The results obtained were as follows;

Mass of porcelain boat = 4.5g
Mass of boat + Oxide = 6.40g
Mass of boat + Copper = 6.02 g

i) Determine the empirical formula of the oxide. (3 marks)

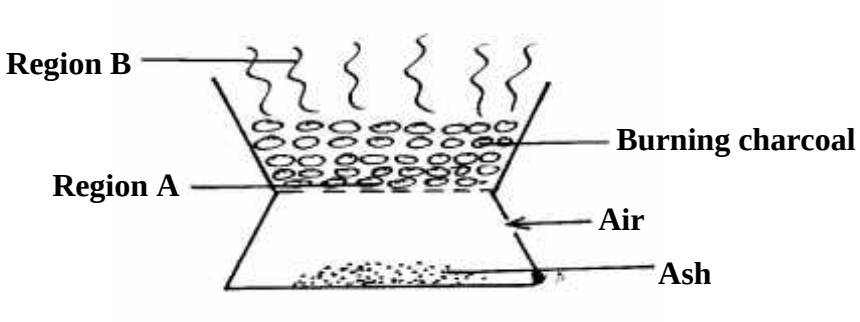
ii) If the relative formula mass of the oxide is 80, determine its chemical formula.
(Cu = 64, O = 16) (1 mark)

7. Starting with copper metal, describe how to prepare solid copper (II) carbonate. (3 marks)

……

……

8. The diagram below shows a 'jiko' when in use. Study it and answer the questions that follow



(a) Identify the gas formed at region **B** (1mk)

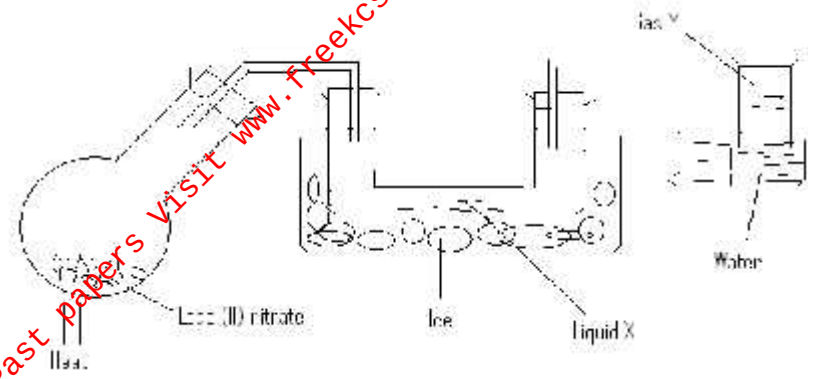
……

……

(b) State and explain the observation made at region **B** (2mks)

……

9. A student set up the following experiment to study the effect of heat on lead (II) nitrate.



i)Identify liquid X (1 mark)

……
…

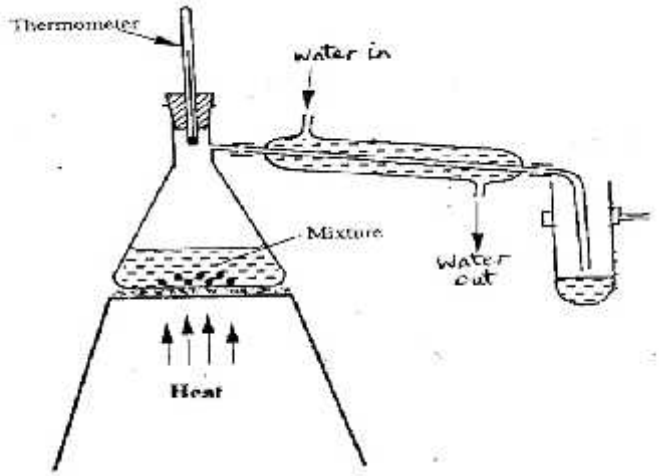
ii)Describe the test for gas Y. (1 mark)

……
…
……
…

iii)Write a balanced chemical equation for the reaction. (1 mark)

……
…

10. The set-up represented below can be used to separate ethanol from its mixture with water.



(a) Identify an error in the set-up. (1 mark)

……

(b) Name this method of separation. (1 mark)

……

(c) What properties make it possible to separate ethanol from water by this method? (1 mark)

……
……

11. Describe how to distinguish between substances I and II . (3 marks)

I.CH_3CH_3 II. $HCCCH_3$

……

……
……
……

12. Element K has two isotopes $^{20}\mathbf{K}$ and $^{22}\mathbf{K}$ with relative abundance of 90% and 10% respectively.

a) What are isotopes? (1 mark)

……

……

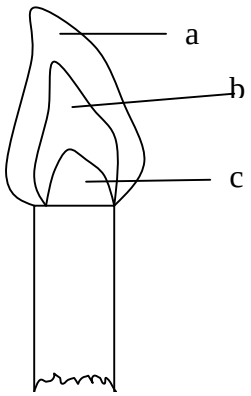
b) Determine the relative atomic mass of element K. (2 marks)

13. Give one application of calcium oxide. (1 mark)

……

……

14. Consider the diagram below.



Name the regions labeled a, b, c. **(3 marks)**

a ……

b ……

c ……

15. State one use of:

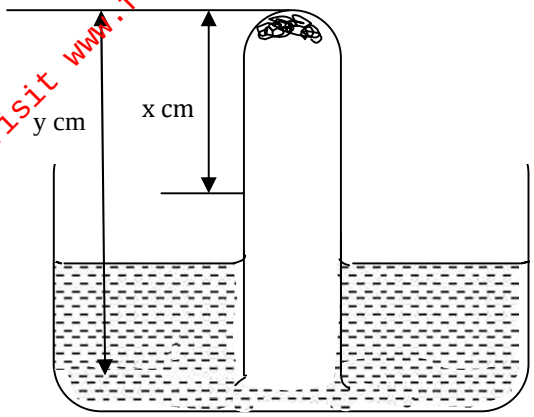
a) Calcium nitrate (1 mark)

……

b) Magnesium hydroxide (1 mark)

……

16.. Some moist iron wool was placed in a test tube and the tube was inverted and set up as shown below.



The apparatus was left for one week. The water level rose and iron wool turned red-brown.

(i) Write the chemical equation to show the rusting of iron. **(1 mark)**

……

(ii) Write the expression for an approximate percentage. **(1 mark)**

……
……

(iii) State two similarities between rusting and combustion.

(a) ……**(1 mark)**

(b) ……**(1 mk)**

17. Sulphur burns in air to form a gaseous product.

i) What is the colour of the flame of burning sulphur? (1 mark)

……
…

ii) Give an equation for the reaction that takes place when the gaseous product is bubbled through water. (1 mark)

……
…

iii)State one importance of the product formed in 17(ii) above. (1 mark)

……
…

18. The $_{P}H$ values of some solutions labeled **E** to I are given in the table **below**. Use the information to answer the questions that follow.

pH	14.0	1.0	8.0	6.5	7.0
Solution	E	F	G	H	I

(a) Identify the solution with the highest concentration of hydroxide ions. Give a reason for your answer. (2 marks)

_____

_____

_____

(b) Which solution can be used as a remedy for acid indigestion in the stomach?(1 mark)

_____

19. Four metals are labeled P, Q, R and S (not actual symbols). Metal P displaces metal S from its oxide but cannot displace R from its oxide. Q when mixed with the oxide of R and heated, a reaction occurs.
Arrange the metals in order of reactivity, starting with the most reactive. (2 marks)
……
…

20. A certain element Y has atomic number 15 and mass number of 31.
(a) Calculate the number of neutrons in the element.
(1mk)

_____

(b) Write the electron arrangement of the ion formed by element Y. (1mk)

_____

(c) How would the atomic size of the above element compare with another atom X whose atomic number is 11 and mass number 23? Explain. (1mk)

_____

_____

21. The table below shows the first ionisation energies of elements P and Q.

Element	1st Ionisation energy kJ/mole
P	494
Q	418

a)What do these values suggest about the reactivity of P compared to that of Q? Explain. (2 marks)

……

……

……

a) State two factors that influence ionization energy. (1 mark)

……

……

22. Steam is passed over heated iron filings in a combustion tube.

(a) Name the products of this reaction. (2 mark)

……

…

……

…

(b) Write an equation for the reaction that occurs. (1 mark)

1. ……

…… Diamond and graphite are allotropes of carbon.

(i) What are allotropes? (1mk)

……

……I

n terms of structure and bonding explain why diamond is used in drilling through hard rocks while graphite is a lubricant (2mks)

……

……

24. 30cm^3 of 0.5M hydrochloric acid was used to neutralize 25cm^3 of sodium hydroxide solution. Determine the concentration of sodium hydroxide in grams per litre. (3 marks)

(H=1, O=16, Na= 23)

25. The table below gives some information about the physical properties of four substances which are represented by letters**. L M N** and **K.**

Substance	Melting point	Heat of vaporization	Electrical Conductivity	
			Solid	molten
L	High	High	Poor	Poor
M	High	High	Good	Good

N K	High Low	High Low	Poor Poor	Good Poor

Select with reasons an element which is likely to be:

(i) Copper metal (1mk)

……

……S

ilicon (iv) oxide (1mk)

……

……P

otassium iodide (1mk)

……

26. a) Write balanced chemical equations for reactions between chlorine and; (2 marks)

i) Concentrated sodium hydroxide

……

ii) Dilute sodium hydroxide.

……

b) State one observation made when a gas jar of moist hydrogen sulphide is inverted over a gas jar of dry chlorine gas. (1 mark)

……

27.a) Hydrogen sulphide gas is bubbled through bromine water.

i) Give two observations made. (1 mark)

……

……

ii) Write an equation for the reaction that takes place. (1 mark)

……

b) State the test for hydrogen sulphide gas. (1 mark)

……

……

28.(a) State Gay-Lussac's law. (1 mark)

……

……

b) When $100cm^3$ of a gaseous hydrocarbon ($C_xH_{y)}$ burns in $300cm^3$ of oxygen, $200cm^3$ of carbon(IV)oxide and 200 cm^3 of steam are formed.

Deduce the formula of the hydrocarbon. (2 marks)