

Name..... Index No...../.....

School.....

Candidates Signature.....

Date.....

233/1

CHEMISTRY

Paper 1

(THEORY)

July/August 2013

TIME 2 HOURS

THE NAKURU DISTRICT TRIAL EXAMINATIONS - 2013

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

233/1

CHEMISTRY

Paper 1

(THEORY)

July/August 2013

TIME: 2 HOURS

INSTRUCTIONS TO CANDIDATES

- Write your name and Index Number in the spaces provided above.
- Sign and write date of examination in the spaces provided above.
- Answer **ALL** questions in the spaces provided.
- Mathematical tables and electronic calculators may be used.
- All workings **MUST** be clearly shown where necessary.

Questions	Maximum Score	Candidate's Score
1		
2		
3		
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7		

1 (a) Using electrons only, distinguish between oxidation and reduction (2 marks)

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(b) Identify the oxidizing agent in the reaction below and explain your answer (1 mark)



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2. (a) Both chlorine and iodine are halogens.

(a) What are halogens (1mark)

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(b) In terms of structure and bonding, explain why the boiling point of chlorine is lower than that of iodine (2marks)

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3. The table below shows properties of chlorine, bromine and iodine. Complete the blank spaces.

Element	formula	Colour and state at room temperature	Solubility
Chlorine	Cl ₂	i).....	Soluble
Bromine	Br ₂	Brown liquid	ii).....
Iodine	I ₂	iii).....	slightly soluble

(3marks)

4. Calcium oxide is used to dry ammonia gas

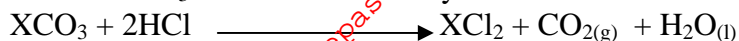
(a) Explain why calcium oxide is not used to dry hydrogen chloride gas (2 marks)

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(b) Name one drying agent for hydrogen chloride (1 mark)

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5. A certain carbonate XCO_3 reacts with dilute hydrochloric acid according to the equation



If 1g of the carbonate reacts completely with 20cm^3 of 1M hydrochloric acid, calculate the atomic mass of **X**. (C=12.0, O=16.0) (3 marks)

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6. Using dot (.) and crosses (x) to represent electrons, show bonding in the compounds formed when the following elements react: (Si=14, Na=11, Cl=17)

(a) Sodium and chlorine

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(b) Silicon and chlorine

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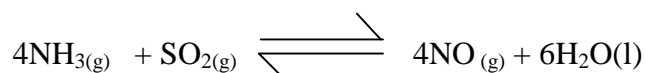
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(c) Identify the type of bond in (a) and (b) above (1 mark)

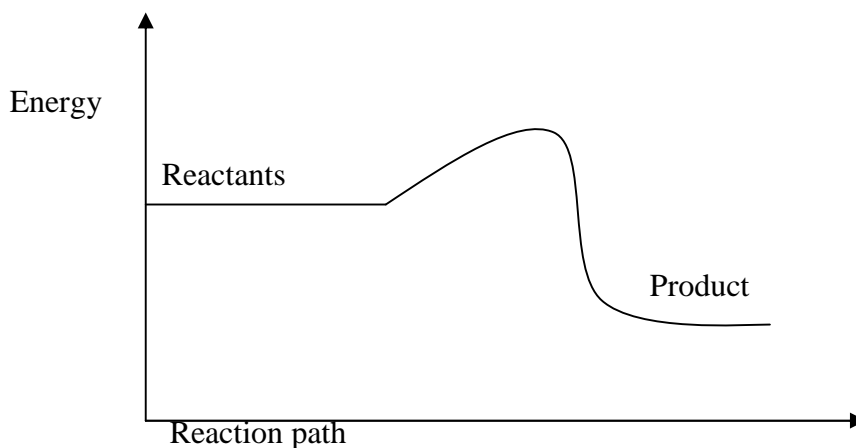
(a).....(½ mark)

(b).....(½ mark)

7. Ammonia can be converted to Nitrogen (II) oxide as show in the equation below



The energy level diagram for the above reaction is as shown below



- (a) Explain how an increase in temperature would affect the yield of nitrogen (II) oxide (2 marks)

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On the energy level diagram, sketch the energy level diagram that would be obtained if the reaction is carried out in the presence of platinum catalyst (1mark)

8. 200g of a radioactive substance was reduced to 12.5g in 20.8 years. Calculate the half life of the substance (3 marks)

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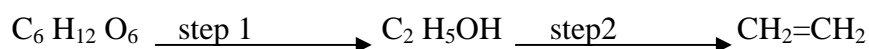
9. Name the process that takes place when

(i) Crystals of Iodine are heated

(ii) Sodium hydroxide completely reacts with dilute sulphuric acid

(iii) Petrol is obtained from crude oil

10. Ethanol obtained from glucose can be converted to ethene as shown below.



Name and describe the process that takes place in step 1 and II

Step 1 1½ mark

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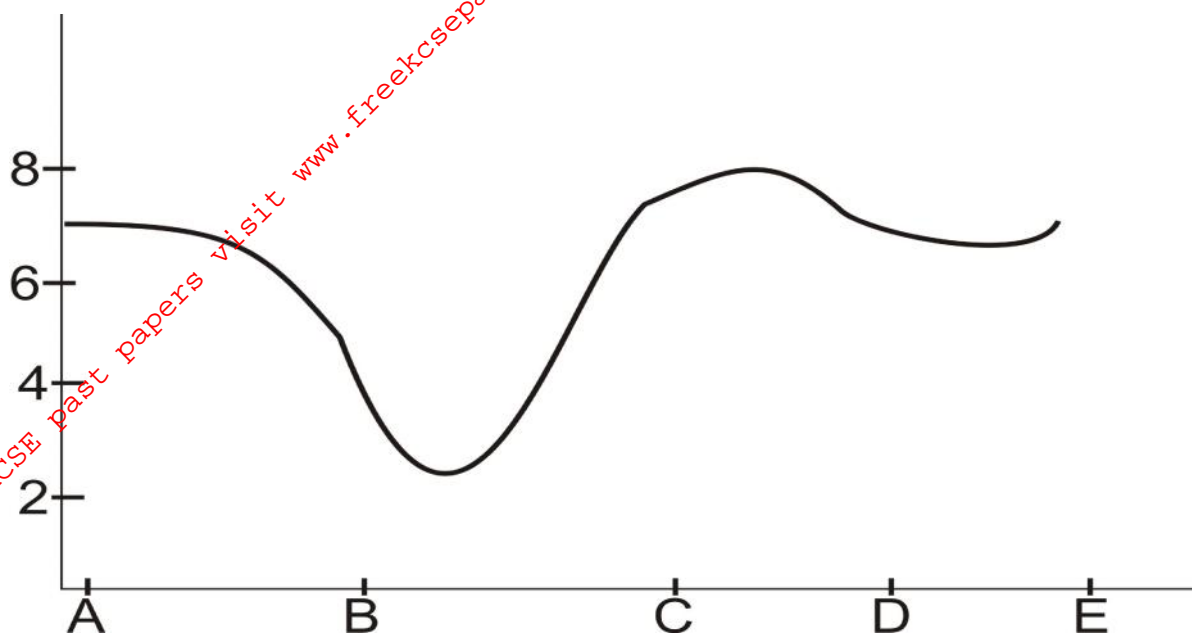
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Step 2 1 ½ mark

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11. The graph below shows how the Ph value of soil in a farm changed over a period of time.



(i) Describe how the Ph of the soil can be determined (2mark)

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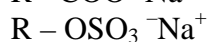
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(ii) State one factor that may have been responsible for the change in the soil Ph in the time interval AB

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12. The structures below represent two cleansing agents.



In the table below, identify their names and give one advantage of using each one of them.

	Name	Advantage	Disadvantage
$R - COO^- Na^+$			
$R - OSO_3^- Na^+$			

13. The table below shows the standard reduction potential for four half cells. Study it and answer the questions that follow. Letters are not actual symbols of the elements)

		E° volts
$A_2(aq) + 2e$	\longrightarrow	$2A^-(aq)$ + 0.54
$B^{2+}(aq) + 2e$	\longrightarrow	$G(s)$ -0.44
$C^{2+} + 2e$	\longrightarrow	$C(s)$ -0.34
$2D^+ + 2e$	\longrightarrow	$D_{2(g)}$ 0.00

- (i) Identify the strongest reducing agent (1mark)

- (ii) Write an equation for the reaction which takes place when B is added to a solution containing C^{2+} ions

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- (iii) Calculate the E° value for the reaction in (ii) above

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14. A skull belonging to an ape was excavated near Lake Nakuru. After investigation by an Archaeological researcher, it was noted that carbon -14 activity was 12 ½ % of that found in skull of a recently existing ape. If carbon-14 has a half of 5600 years, how old is the skull that was excavated. (2marks)

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- (b) State one difference between nuclear reaction and chemical reaction (1mark)

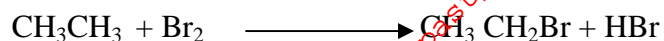
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15. Name the following compounds

- (i) $CH_3(CH_2)_3CH_3$



(b) The equation below is the reaction between ethane and bromine



What is the name of this type of reaction?(1mark)

- 16 Chlorine gas is prepared by the reaction between concentrated hydrochloric acid and potassium manganate (VII) as shown by the equation below.



(a) In terms of oxidation state, explain why this reactions is a redox reaction (2marks)

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(b) State one precaution to be taken when preparing chlorine gas in the lab. (1mark)

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- 17 (a) Explain why 18M sulphuric(VI) acid does not conduct electricity and has no effect on dry blue litmus paper. (2 marks)

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(b) What do you think would be observed if solid sodium carbonate was used in (a) above instead of the blue litmus paper?

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- 18 (a) State grahams law of diffusion (1 mark)

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(b) Ammonia gas diffuses 1.41 times faster than gas XH_3 . Determine the relative atomic mass of element X. (H= 1, N=14)

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- 19 Describe how a pure sample of barium sulphate can be obtained from a mixture of iodine, sodium chloride and barium sulphate (3marks)

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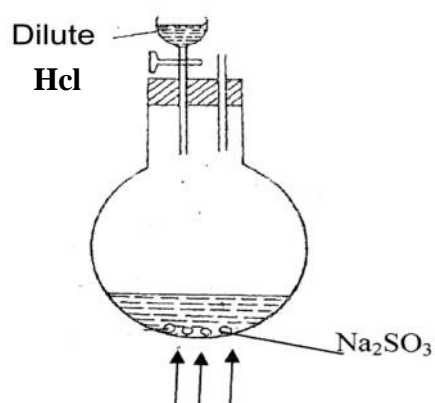
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20. The set up below was used to prepare a gas in the laboratory.



(a) Complete the diagram to show how a dry sample of the gas could be collected. (2marks)

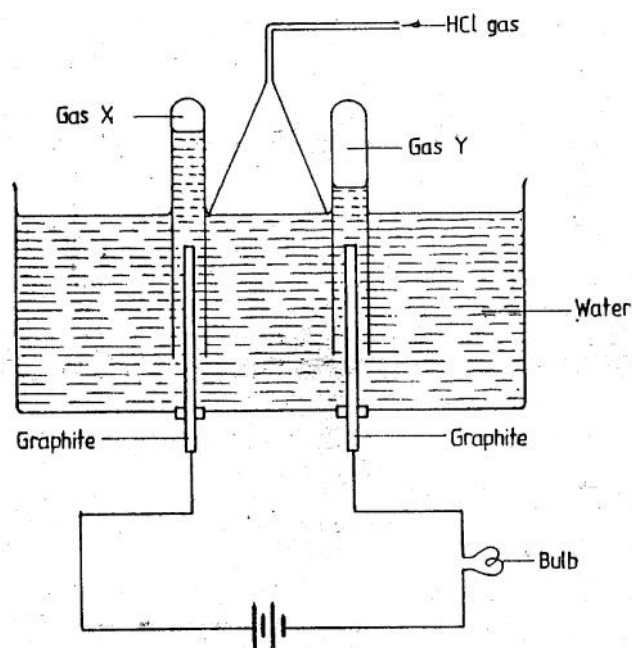
(b) What would you observe when the gas is bubbled through acidified potassium manganate(VII) (1mark)

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21. Study the diagram below and answer the questions that follow:



When some hydrogen chloride gas is allowed into the water and the mixture stirred, the bulb lights and gases **x** and **y** are formed.

a) Name

Gas **x** (1mark)

Gas **y**

b) Explain using equations why the volume of gas **x** is less than that of gas **y** (2marks)

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22. Use the information in the table below to answer the questions that follow. The letters do not represent the actual symbols of the elements.

Element	D	C	D	E	F
Atomic No.	18	5	3	5	20
Mass No.	40	10	7	11	40

(a) Which two letters represent the same element?

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(b) Determine the number of neutrons in an atom of element G.

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24 The chart below is a part of the periodic table. S

(The letters are not actual symbols of the elements.)

(b) Determine the number of neutrons in an atom of element D

246

The diagram illustrates two 3x2 grids. The left grid has cells labeled A, B, C, and D. The right grid has cells labeled B and E.

A	
C	D

			B		
					E

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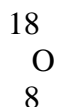
(iv) Write an equation to show the action of heat on the nitrate of element C. (1 mark)

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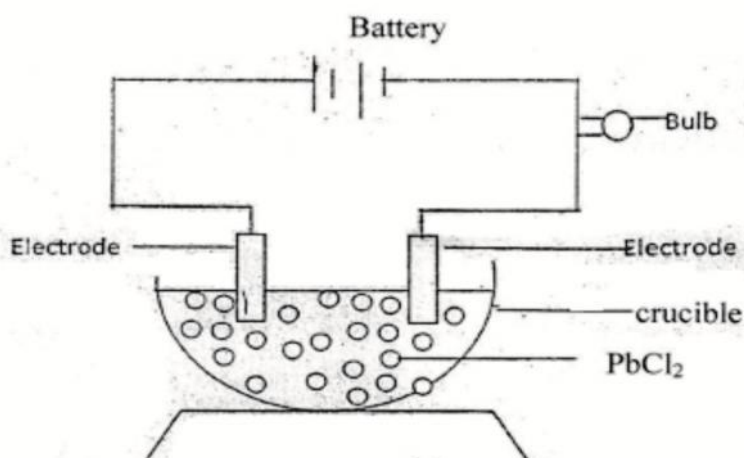
25 (a) what are Isotopes? (1mark)

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(c) Determine the number of neutrons in (1mark)



26 In an experiment to investigate the conductivity of substances, a student used the set up shown below.



The student noted that the bulb did not light

(a) What had been omitted in the set up? (1 mark)

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(b) State and explain the observations made at the Anode (2 marks)

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27. When a sample of ethane was burnt, the heat produced raised the temperature of 500g of water by 21.5k (specific heat capacity of water = $4.2 \text{ g}^{-1} \text{ K}^{-1}$)

(a) Calculate the

(i) Heat change for the reaction

(2 marks)

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(ii) Given that the molar heat of combustion of ethane is $-1560 \text{ kJ mol}^{-1}$, calculate the mass of ethane burnt (RFM of ethane =30) (1mark)

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