

NAME:.....INDEX NO:.....

SCHOOL:.....CANDIDATE'S SIGNATURE:.....

DATE:.....

233/2  
CHEMISTRY  
PAPER 2  
JUNE-2016  
TIME: 2 HOURS

**CENTRAL YEARLY MEETING OF FRIENDS (CYMF) -2016**  
*Kenya certificate of Secondary Education*

233/2  
CHEMISTRY  
PAPER 2

**INSTRUCTIONS TO CANDIDATES**

*-Answer ALL questions in the spaces provided after every question.*

**FOR EXAMINER'S USE ONLY**

QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
1	10	
2	12	
3	12	
4	13	
5	10	
6	12	
7	11	
<b>TOTAL SCORE</b>	<b>80</b>	

*This paper consists of 11 printed pages Check the Question paper to ensure that all pages are printed as indicated and no question are missing.*

1. The grid below is part of the periodic table. Use it to answer the questions that follow. (The letters are not the actual symbols of the elements)

			A		B	C		
D			E	F		G		
						H		

a) Which is the most reactive non-metallic elements shown in the table? Explain. (2mks)

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b) i) Write the formula of the compound formed when element A reacts with element B. (1mk)

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ii) Name the bond type in the compound formed in b(i) above.

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c) i) What is the name given to the family of elements where C, G and H belong? (1mk)

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ii) Write an equation for the reaction that occurs when C in gaseous form is passed through a solution containing ions of element H. (1mk)

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d) The melting points of elements F and G is  $1410^{\circ}\text{C}$  and  $-101^{\circ}\text{C}$  respectively. In terms of structure and bonding, explain why there is a large difference in the melting points of F and G. (2mks)

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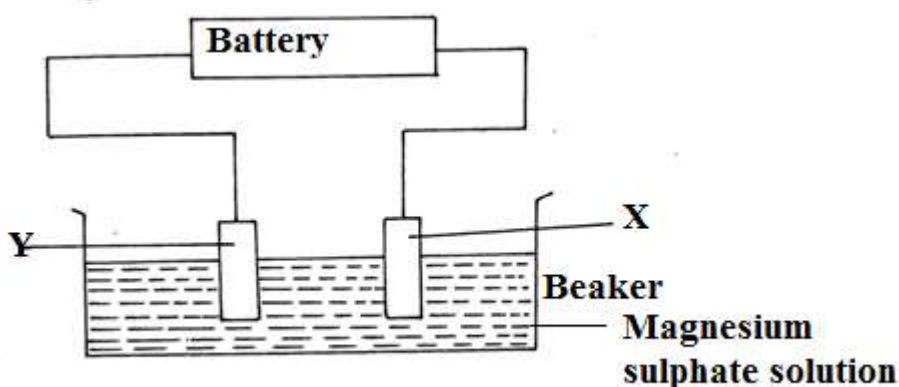
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e) D forms two oxides. Write the formula of each of the two oxides. (1mk)

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f) K is an element that belongs to the 3<sup>rd</sup> period of the periodic table and is a member of the alkaline earth elements. Show the position of K in the grid. (1mk)

2. (a) The set-up below was used to investigate products formed at the electrodes during electrolysis of aqueous magnesium sulphate using inert electrodes. Use it to answer the questions that follow:-



i) During the electrolysis, hydrogen gas was formed at electrode x. Identify the anode, give a reason for your answer. (2mks)

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ii) Write the equation for the reaction which takes place at electrode Y. (2mks)

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iii) Why is the concentration of magnesium sulphate expected to increase during electrolysis. (2mks)

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iv) What will be observed if red and blue litmus papers were dipped into the solution after electrolysis. (2mks)

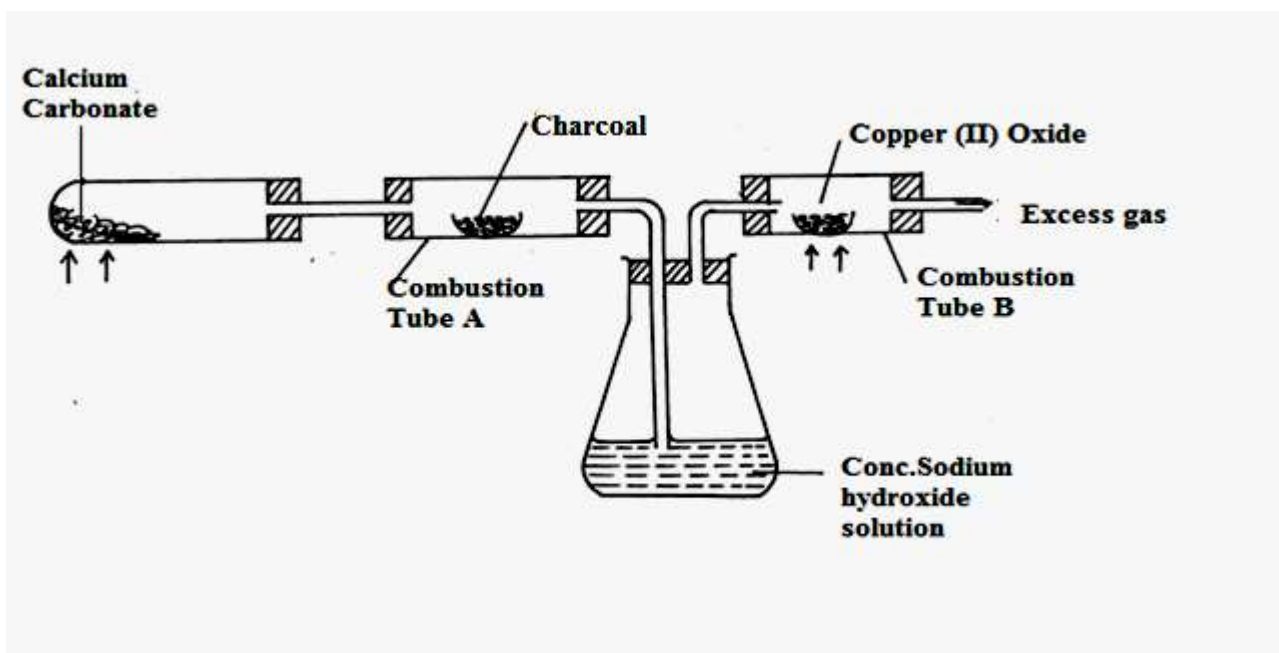
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b) During electrolysis of magnesium sulphate, a current of 0.3A was passed for 30 minutes, calculate the volume of the gas produced at the anode. Molar gas volume  $24\text{dm}^3$ , 1 faraday=96500C (3mks)

c) State two application of electrolysis. (2mks)

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3. Study the following set-up apparatus and use it to answer the questions that follow:



a) i) What is the role of concentrated sodium hydroxide solution in the above set-up. (2mks)

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ii) Suggest one other compound that could have been used in place of conc. Sodium hydroxide solution. (1mk)

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b) State and explain the observation made in combustion tube B at the end of the experiment. (2mks)

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c) i) Write an equation for the reaction that took place when calcium carbonate was heated. (1mk)

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ii) Suggested one other compound that can be used in place of calcium carbonate. (1mk)

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d) What property of charcoal is shown in combustion tube A. Explain your answer. (2mks)

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e) i) What observation will be made at the end of the experiment if copper (ii) oxide was replaced with lead (ii) oxide. (2mks)

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ii) Write an equation for the reaction in e(i) above. (1mk)

4. a) A form three student carried out an experiment where they titrated 20 cm<sup>3</sup> of M<sub>2</sub>CO<sub>3</sub> with 0.5M HCl using phenolphthalein indicator. The M<sub>2</sub>CO<sub>3</sub> solution was prepared by dissolving 6.47g of salt in distilled water then made upto 250cm<sup>3</sup> of solution. Complete the table below and answer questions that follows.

<b>Titration</b>	<b>I</b>	<b>II</b>	<b>III</b>
<b>Final burette reading (cm<sup>3</sup>)</b>	20.2		45.2
<b>Initial burette reading (cm<sup>3</sup>)</b>		20.2	30.2
<b>Volume of titre cm<sup>3</sup></b>	15.2	15.0	

(1 ½ mk)

b) calculate the average titre (show all your working) (1mk)

c) Determine number of moles of acid used. (2mks)

d) Write the equation of the reaction above. (1mk)

e) Determine number of moles of the carbonate (M<sub>2</sub>CO<sub>3</sub>) used. (2mks)

f) Calculate the molarity of the carbonate M<sub>2</sub>CO<sub>3</sub> used. (2mks)

g) Determine the relative formulae mass of carbonate  $M_2CO_3$  used. (2mks)

h) Show how relative atomic mass of M is obtained. (1 ½ mks)

5. a) State Charles law. (1mk)

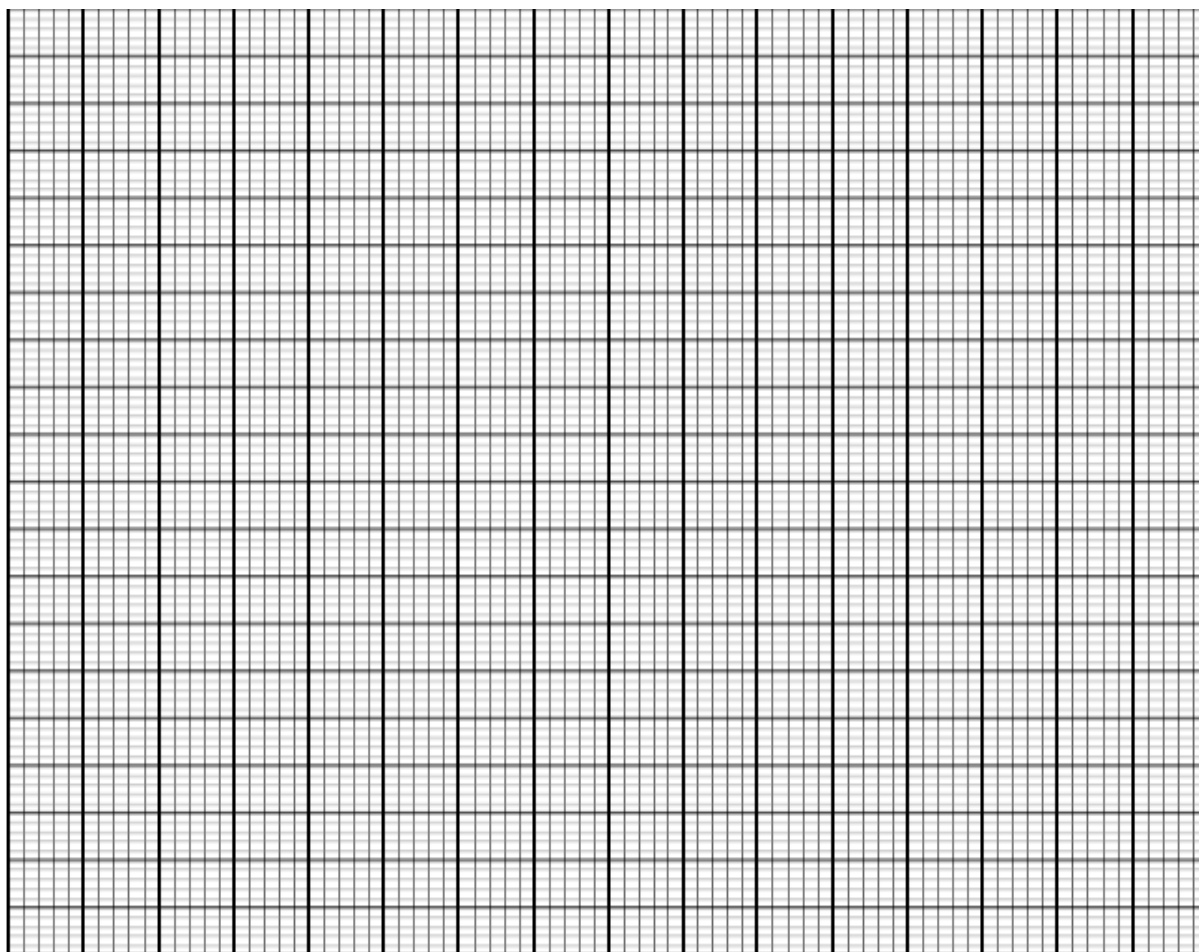
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b) A gas occupies  $200\text{cm}^3$  at  $0^\circ\text{C}$  and  $740\text{mmHg}$  pressure. What volume will occupy at  $47^\circ\text{C}$  at the same pressure? (3mks)

c) The following table gives sample results from an experiment carried out to investigate the relationship between the volume of a fixed mass of gas with its temperature.

<b>Temperature<math>^\circ\text{C}</math></b>	0	20	40	60	80
<b>Volume of the gas (<math>\text{cm}^3</math>)</b>	140	150	160	170	180

i) Plot a graph of volume (Y-axis) against temperature (x-axis).

(4mks)



ii) Determine the volume of a gas at 50<sup>0</sup>C from the graph.

(1mk)

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iii) Determine from the graph the temperature in (<sup>0</sup>C) when the volume of a gas is 165cm<sup>3</sup>. (1mk)

6. a) Define the following terms as used in organic chemistry.

i) Hydro carbon

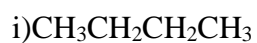
(1mk)

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ii) Isomer

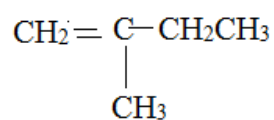
(1mk)



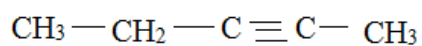
b) Name the following compounds.



ii)



iii)



c) Draw the structure of the following:

i) But-1-yne

ii) 3,3-dimethylbut-1-ene

iii) 2,2-dimethylpropane (3mks)

d) Distinguish between alkenes and alkanes. (2mks)

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e) State two sources of alkenes.

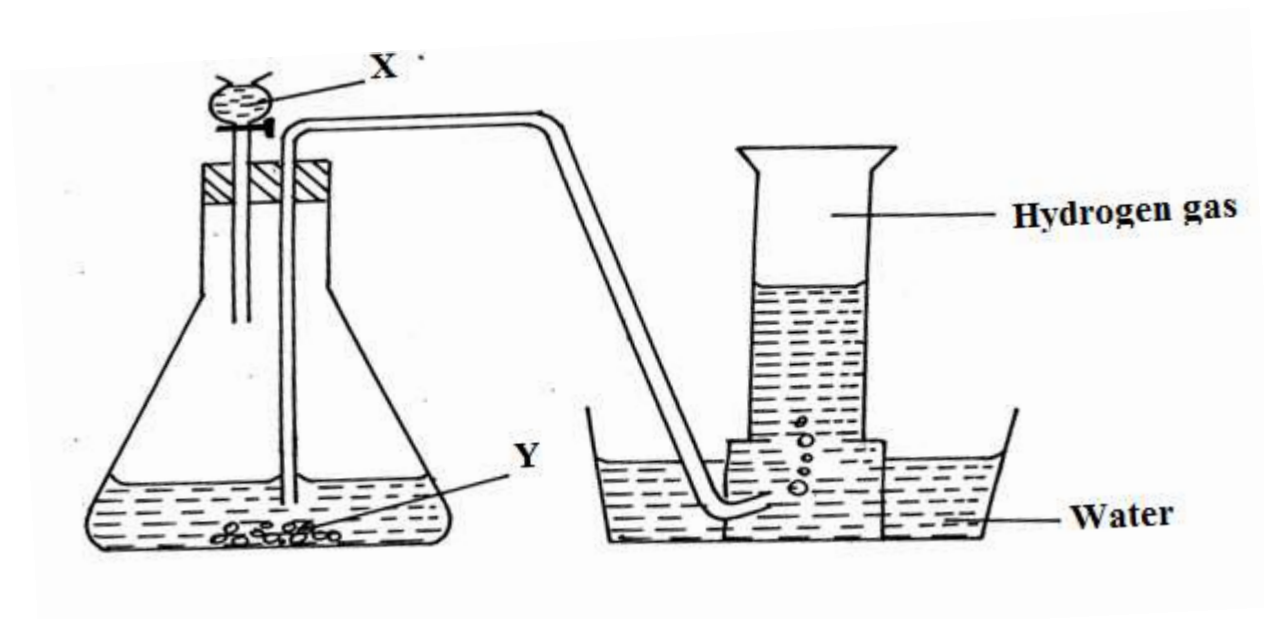
i)

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ii)

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7. The figure below is asset up of apparatus for the preparation of hydrogen gas.



a) State mistake made in the set up.

(1mk)

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b) Identify substance

i) X.....

ii) Y.....

c) Write an ionic equation for the reaction between X and Y.

(1mk)

i)X.....

ii)Y.....

d)State and explain the observation made when hydrogen gas was passed over heated copper(ii)oxide in a combustion tube. (2mks)

e) Under suitable conditions hydrogen reacts with nitrogen to produce ammonia.

i) Name the catalyst used in the reaction. (1mk)

ii) Explain why the catalyst used should be powdered. (1mk)

iii)Give a reason why concentrated sulphuric (vi) is not a suitable drying agent for ammonia gas. (1mk)

iv) State two commercial uses of hydrogen gas. (2mks)

