KENYA NATIONAL EXAMINATION COUNCIL
REVISION MOCK EXAMS 2016
TOP NATIONAL SCHOOLS

MOI GIRLS ELDORET
CHEMISTRY
PAPER 1
TIME: 2 HOURS

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233/1
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MOI GIRLS ELDORET KCSE TRIAL AND AND PRACTICE EXAM 2016

INSTRUCTIONS TO CANDIDATES:

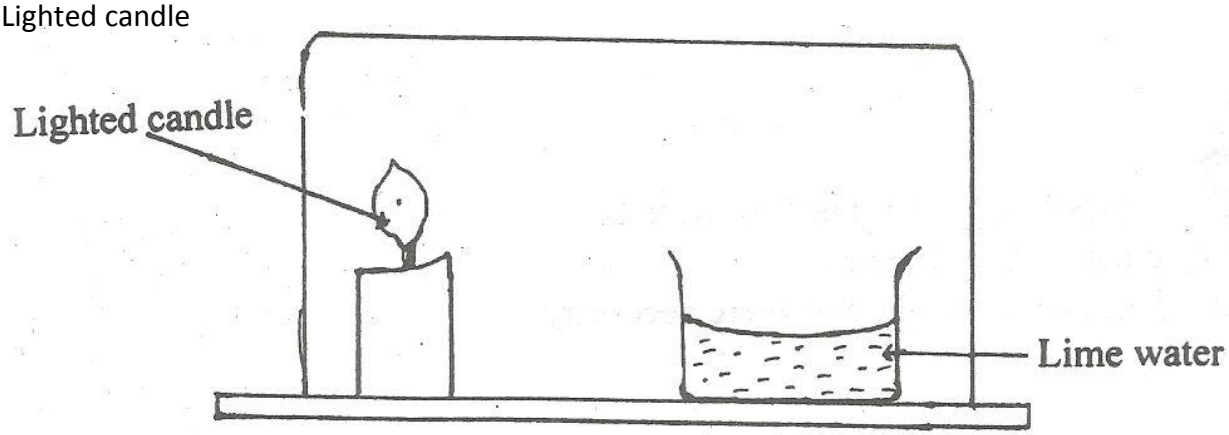
- Write your name and Index number in the space provided above.
- Answer ***all*** the questions in the spaces provided.
- All working **must** be clearly shown where necessary.
- Mathematical tables and electronic calculators can be used.

Question	**Maximum score**	**Candidate's score**
Score 1 - 29	80	

1. Use the information in the table below to determine the relative atomic mass of copper.
(2 marks)

Isotope	Fractional abudance
$^{65}_{29}Cu$	0.31
$^{63}_{29}Cu$	0.69

2. Study the arrangement below and answer the question that follows.
Lighted candle



Explain what will be observed after some time. (3 marks)

3. Briefly explain industrial application of the following processes.
(a) Crystallisation. (1 ½ marks)
(b) Fractional distillation. (1 ½ marks)

4. Four solutions of pH 7, 2, 8.5 and 13 respectively were each reacted with calcium turnings.
In which of the solutions would <u>hydrogen</u> gas be produced. Explain each case. (3 marks)

5. Study the information in the table below and answer the questions that follow.

	ic arrangement	dius (nm)

(a) Explain why the ionic radius of K^+ is greater than that of Na^+. (1 mark)
(b) Account for the difference in ionic radius of Mg^{2+} and Na^+. (2 marks)

6. Use the following equations to determine the heat evolved when aluminium metal is reacted with iron (III) oxide. (3 marks)

$2Al_{(s)} + {}^3/_2O_{2(g)} \longrightarrow Al_2O_{3(s)}$; $\Delta H, = -1673.6 jKmol^{-1}$

$2Fe_{(s)} + {}^3/_2O_{2(g)} \longrightarrow Fe_2O_{3(s)}$; $\Delta H_2 = -836.8 kJmol^{-1}$

7. Describe how you would prepare a dry sample of zinc carbonate in the laboratory starting with zinc chloride solid. (3 marks)

8. The solubility of salt Y at 60^0C is 40g/100g of water and 48g/100g of water at 100^0C.
(i) How much salt of Y would satulate 190g of water at 100^0C. (1 ½ marks)
(ii) 150g of saturated solution of Y at 100^0C is cooled to 60^0C. Calculate the mass of Y that crystallizes out. (1 ½ marks)

9. Below are the bond dissociation energies of some elements.

Bond	Bond dissociation energy
C – C	343 $kJmo^{-1}$
C – H	414 $kJmo^{-1}$
H – H	435 $kJmo^{-1}$
$C_{(s)} \longrightarrow C_{(g)}$	711 $kJmo^{-1}$

Use this information to calculate the heat of reaction for:-

$2C_{(s)} + 3H_{2(g)} \longrightarrow C_2H_{6(g)}$ (3 marks)

10. (I) An oxide of carbon contains 42.8g by mass of carbon and has R.M.M. of 28. What is its molecular formular? (3 marks)
(C = 12; O = 16)

(II) Sulphur dioxide gas was bubbled into acidified potassium dichromate and iron (iii) sulphate solutions respectively. Explain the observations made in each case.

(i) With potassium dichromate. (1 ½ marks)

(ii) With iron (III) sulphate. (1 ½ marks)

12. A known volume of ozonised oxygen diffuses through a small hole in 55 seconds; whereas the same amount of oxygen mixed with chlorine takes 67 seconds under the same conditions. Determine the molecular mass of ozone. (Cl = 35.5 ; O = 16) (3 marks)

13. (a) Give the name of the following compound $CH_3CH = CHCH_2CH_3$. (1 mark)

(b) Ethane and ethene react with bromine according to the equations given below.

(i) $C_2H_{6(g)} + Br_{2(g)} \xrightarrow{\text{u.v light}} C_2H_5Br_{(l)} + HBr_{(g)}$

(ii) $C_2H_{4(g)} + Br_{2(g)} \longrightarrow C_2H_4Br_{2(l)}$

Name the type of bromination reaction that takes place in:- (2 marks)

14. An organic compound with the formular $C_4H_{10}O$ reacts with potassium metal to give hydrogen gas and a white solid.

(a) Write the structural formular of the compound. (1 mark)

(b) To which homologous series does the compound belong. (1 mark)

(c) Write the equation for the reaction between the compound and potassium metal. (1 mark)

15. In the Haber process, the optimum yield of ammonia is obtained when a temperature of 450^0C, a pressure of 200 atmospheres and an iron catalyst are used.

$N_{2(g)} + 3H_{2(g)} \rightleftharpoons 2NH_{3(g)}$ $\Delta H = -92kJ$.

(a) How would the yield of ammonia be affected if the temperature was raised to 600^0C. Explain. (2 marks)

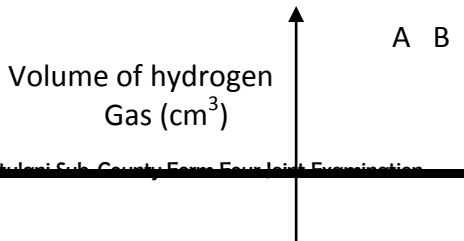
(b) Explain the effect on the yield of lowering the pressure below 200 atmospheres. (1 ½ marks)

16. Two experiments were carried out as follows and the volume of hydrogen gas evolved measured at intervals of 10 seconds for 100 seconds.

(i) 8cm of magnesium ribbon was added to 1M $HCl_{(aq)}$

(ii) 8cm of magnesium ribbon was added to 0.5M $HCl_{(aq)}$.

Graphs of volume of hydrogen gas evolved against time were plotted as shown below.



Time (mins)

(a) Which of the graphs was obtained for reaction (i). Explain. (2 marks)

(b) Explain the general shape of the graphs. (1 mark)

17. The set-up below was used to prepare hydrogen chloride gas and react it with iron powder. Study it and answer the questions that follow.

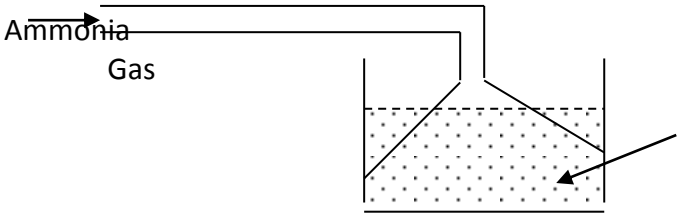
Concentrated sulphuric acid Combustion tube Iron powder Glass wool Heat To pump Sodium chloride Sodium hydroxide solution

At the end of the reaction, the iron powder turned into light green solid.

(a) Identify the light green solid. (1 mark)

(b) At the beginning of the experiment; the pH of the solution in container 'L' was about 14; at the end; the pH was found to be 2. Explain. (2 marks)

18. Ammonia gas was passed into water as shown below.

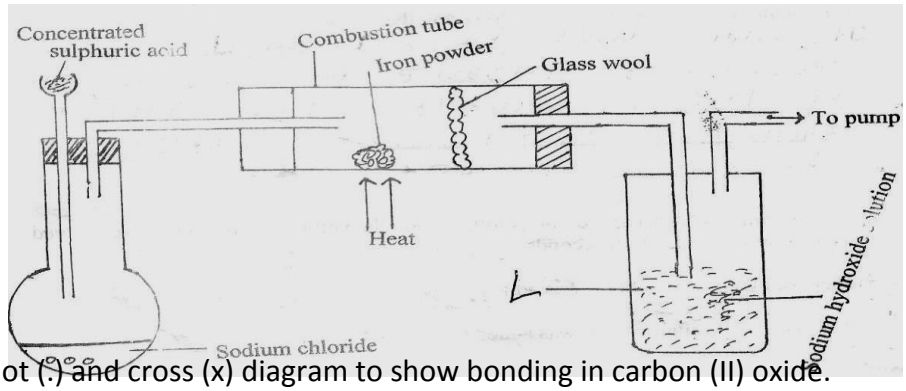


(a) When a red litmus paper was dropped into the resulting solution; it turned blue. Give a reason to this observation. (1 mark)

(b) What is the function of the funnel. (1 mark)

19. During purification of copper by electrolysis, 1.48g of copper were deposited when a current was passed through aqueous copper (II) sulphate for 2 ½ hours. Calculate the amount of current that was passed.

(Cu = 63.5; IF = 96500C) (3 marks)



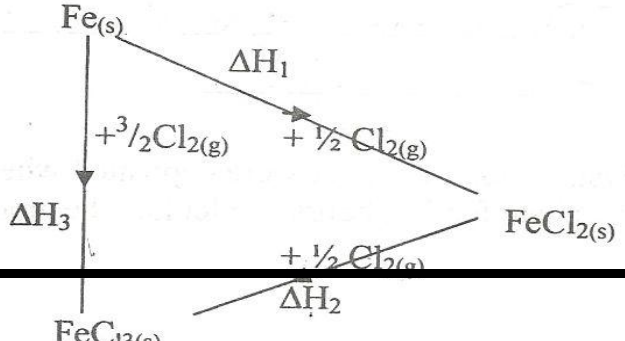
20. Draw a dot (.) and cross (x) diagram to show bonding in carbon (II) oxide. (2 marks)

21. Write the discharge equations (half equations) for the electrode reactions when molten sodium chloride is electrolysed using graphite electrodes.

Anode (1 mark)

Cathode (1 mark)

22. Study the energy diagram and then answer the questions that follow.



(a) What does ΔH_1 and ΔH_3 represent

(i) ΔH_1 (1 mark)

(ii) ΔH_3 (1 mark)

(b) Write down the relationship between $\Delta H_{1(l)}$, ΔH_2, and ΔH_3. (1 mark)

23. Complete the diagram below to show how particles from a radioactive source can be distinguished from each other. Label your diagram clearly.

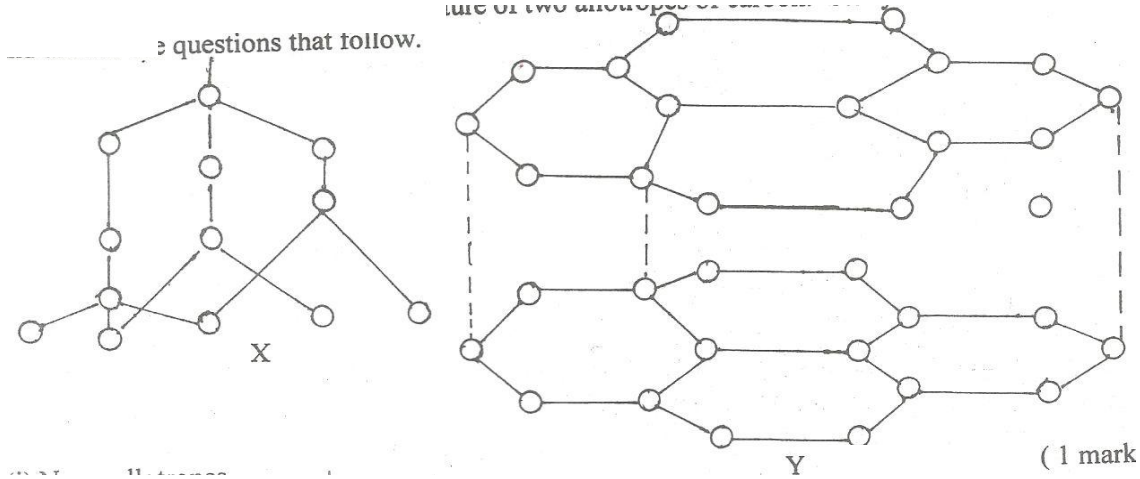
24. The diagram below represents a set-up that was used to react iron with water.
Study it and answer the questions that follow.

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

(b) Why should it not be advisable to use potassium in place of iron in the above set-up. (1 mark)

(c) The glass wool is heated prior to heating of iron. Explain this procedure. (1 mark)

25. The following diagrams show the structure of two allotropes of carbon. Study them and answer the questions that follow.



(1 mark

(i) Name allotropes (1 mark)

(ii) Give ONE use of X. (1 mark)

(iii) Which allotrope conduct electricity? Explain. (1 mark)

26. The formula below represent the active ingredients in a soap and a detergent respectively.

(i) $CH_3(CH)_{16}\ COO^-\ Na^+$

(ii) $CH_3\ (CH_2)_6\ CH\ CH_3\ CH_2\ SO_3^-\ Na^+$

(a) Explain why 1 is not suitable for washing using water from a river. (1 mark)

(b) Give one advantage and one disadvantage of II. (2 marks)

27. Use the following standard electrode potentials to answer the questions that follow.

$Zn^{2+}_{(aq)} + 2e^- \longrightarrow Zn_{(s)}\ \ E^{\theta}V = -0.76$

$Cl_{2(g)} + 2e^- \longrightarrow 2Cl^-_{(aq)}\ E^{\theta}V = +1.36$

(a) Calculate the e.m.f of the following cell:

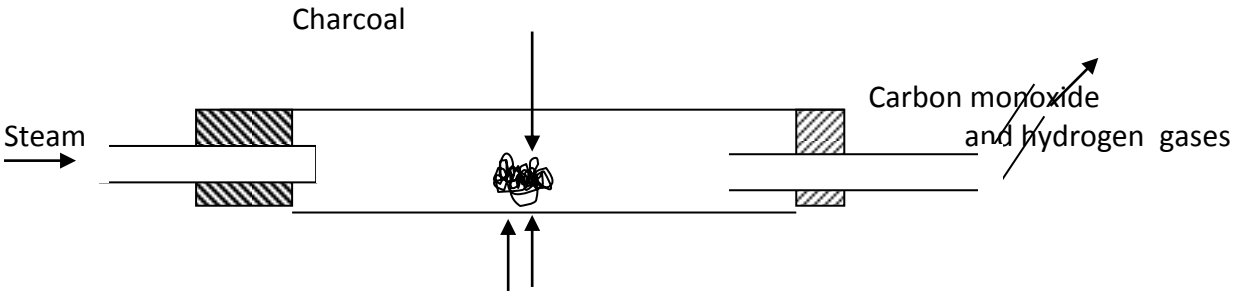
$Zn_{(s)} / Zn^{2+}_{(aq)} // 2Cl^-_{(aq)} / Cl_{2(g)}$ (2 marks)

(b) Write down the equation for the overall cell reaction. (1 mark)

28. (a) Suppose 180cm^3 of a 2.0M solution is diluted to 1.0dm^3. What will be the concentration of the resulting solution. (2 marks)

(b) Why is water not used to put off oil fires ? (1 mark)

29. When steam was passed over heated charcoal as shown in the diagram below hydrogen and carbon monoxide gases were formed.



(a) Write the equation for the reaction which takes place. (1 mark)

(b) Name one use of carbon monoxide gas which is also a use of hydrogen gas. (1 mark)