KENYA NATIONAL EXAMINATION COUNCIL
REVISION MOCK EXAMS 2016
TOP NATIONAL SCHOOLS

MANG'U SCHOOL
CHEMISTRY
PAPER 1
TIME: 2 HOURS

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233/1
CHEMISTRY
PAPER 1
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MANG'U SCHOOL 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 - 31	80	

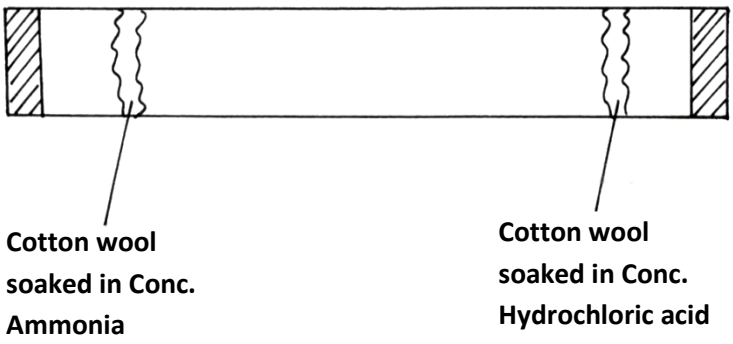
1. Two elements **A** and **B** have electronic configurations 2.8.3 and 2.6 respectively.
   a) To which group and period does element **B** belong? (1mk)
   b) If the two react, what is the formula of the compound they form (1mk)
2. a) Draw a dot (•) and a cross (**x**) diagram to show bonding in Cl_2O. (2mks)
   b) Explain why the compound Cl_2O has a very low melting and boiling point. (1mk)
3. The empirical formula of a compound is CH_2 and it has a molecular mass of 42.
   a) What is the molecular formula of this compound? (1mk)

   b) Write the general formula of the homologous series to which the compound belongs. (1mk)

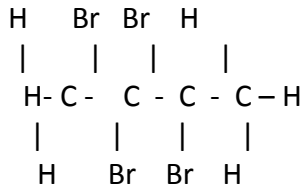
c)

Draw the structural formula of the third member of this series and give its IUPAC name. (1mk)

4. 3.22g of hydrated sodium sulphate, Na_2SO_4 X H_2O were hearted to a constant mass of 1.42 g. determine the value of x in the formula (Na=23.0, s = 32.0, O = 16, H = 1) (3mks)
5. In an Experiment to study diffusion of gases, the following set up was used.



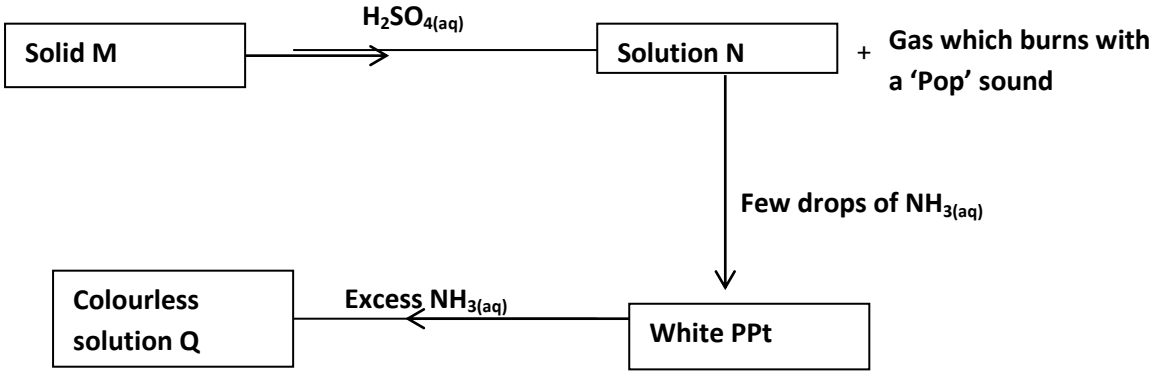
   i) State and explain observations made in the experiment. (2mks)
   ii) Write an equation for the reaction that occurs in the experiment. (1mk)
6. Describe how a mixture of sodium carbonate and Lead (II) carbonate can be separated. (3mks)
7. A compound G reacts with 2 moles of bromine to form another compound whose graphical formula is.



   i) What is the formula and name of compound **G** (2mks)
   ii) State the observations made when acidified potassium chromate (VI) is added to compound G (1mk)
8. In terms of structure and bonding explain why diamond has a high melting point while graphite has a low melting point. (2mks)
9. Identify the acid and base in the equation below. (2mks)

$$NH_4^+{}_{(aq)} + H_2O_{(l)} \rightleftharpoons NH_{3(aq)} + H_3O^+{}_{(aq)}$$

10. What is the oxidation number of chlorine in $ClO^-{}_4$ (1mk)
11. The scheme below shows some reaction sequence starting with solid M



(i) Name Solid **M** (1mk)

(ii) Write the formula of complex ion present in Solution **Q** (1mk)

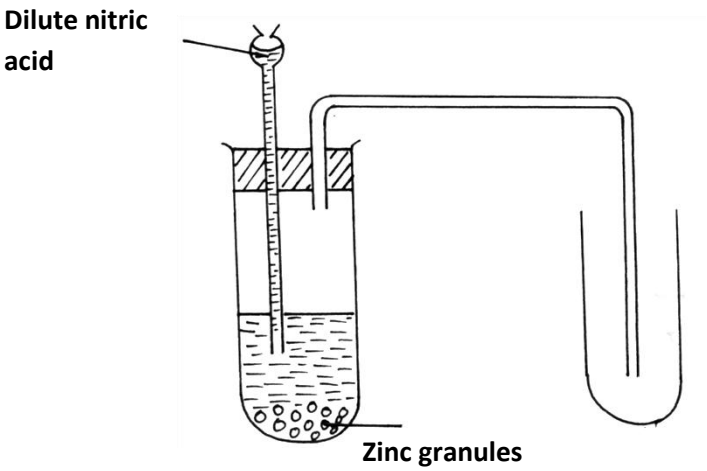
(iii) Write ionic equation of reaction between barium nitrate and solution N. (1mk)

12. Complete the following reactions. (2mks)

(i) $CH_3CH_2OH \xrightarrow[170^oC]{\text{Excess conc. } H_2SO_4}$

(ii) $CH_3CH_3 \xrightarrow[\text{U.V light}]{\text{1 mole } Cl_{2\,(g)}}$

13. Below is a set up used to collect hydrogen gas.



a) Identify with reasons, **two** mistakes in the set up. (2mks)

b) Explain the role of hydrogen in the manufacture of margarine. (1mk)

14. A white solid K was heated. It produced a brown gas **A** and another gas **B** which relights a glowing splint. The residue left was yellow even after cooling.

a) Identify gases **A** and **B** (2mks)

b) Write a balanced chemical equation for the decomposition of solid **K**. (1mk)

15. $100cm^3$ of 2M Nitric acid reacted with 12.5g of a carbonate MCO3 of metal M, calculate the relative atomic mass of M (C = 12, O = 16) (3mks)

16. Dilute hydrochloric acid is warmed with sodium sulphide.

a) Write an equation for the reaction that occurs. (1mk)

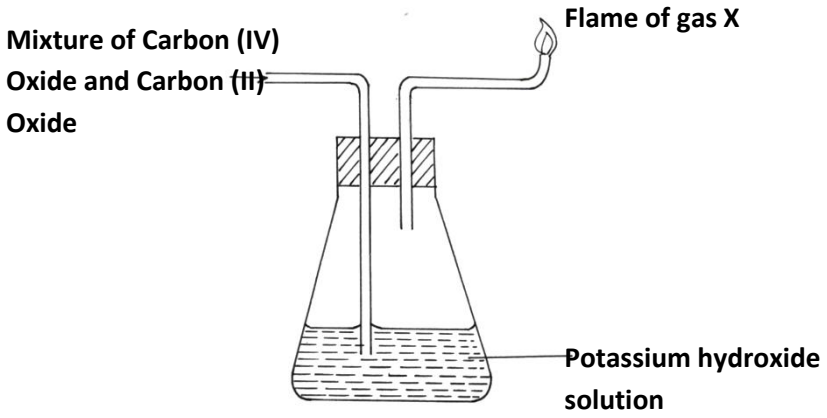
b) State a chemical test for the gas evolved. (1mk)

17. Write ionic equations for electrolysis of dulite sulphuric acid using platinum electrodes at: (2mks)

(i) Anode
(ii) Cathode

18. An atom **X** contains 90% of $^{16}_{8}$**X** isotope and 10% of $^{18}_{8}$**X** isotope. Calculate the relative atomic mass of **X**. (2mks)

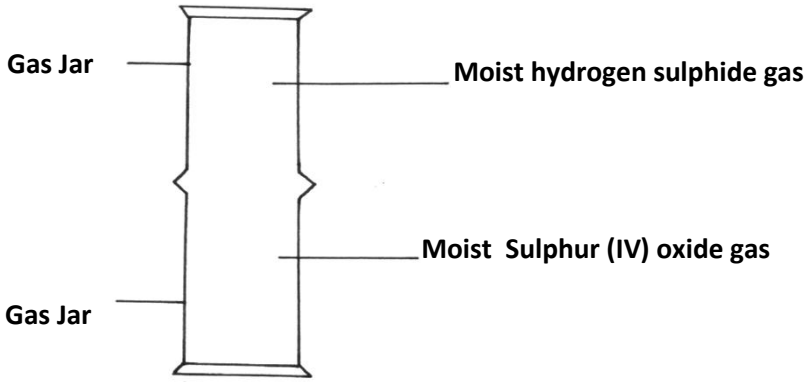
19. A mixture of carbon (IV) Oxide and carbon (II) oxide is passed through potassium hydroxide solution as shown in the following set up.



(I) Name gas **X** (1mk)
(ii) Why should gas **X** be burned. (1mk)
(iii) Write a well balanced chemical equation for the reaction that takes place in the conical flask in the first few seconds. (1mk)

20. Explain why aluminum articles are not easily corroded. (1mk)

21. State the observation made in the set-up below.



a) Observations. (1mk)
b) Explain observation in (a) above. (2mks)

22. When a current of 2.5 amperes was passed through a cell containing N^{2+} ions of a metal for 25minutes, the mass of the cathode increased by 0.36g. (*1 faraday = 96500 coulombs*) Determine the relative atomic mass of element N. (3mks)

23. A solution containing 0.1m sulphuric acid has a pH of 2 while 5M has a pH of more than two. Explain. (2mks)

24. Explain the following:-
a) Helium is used instead of Hydrogen in balloons for metrological research.(1mk)
b) The boiling and melting points of alkali metals decreases down the group while the melting and boiling points of halogens increase down the group. (2mks)

25. Potassium exists as a radioactive Isotope $^{40}_{19}K$ as well as the non radioactive isotope $^{39}_{19}K$

a) State how the **two** isotopes differ from each other with respect to their nuclear composition. (1mk)

b) The product of a radioactive decay of $^{40}_{19}K$ is $^{40}_{20}Ca$. Explain the type of radioactive decay it undergoes. (1mk)

c) If the half-life of the radio-active isotope ^{40}K is 1.3×10^9 years. Determine how long it will take for 4kg of the isotope to disintegrate to 1g. (1mk)

26. During the extraction of copper and Zinc from their Ores, some of the processes include.
(i) Crushing
(ii) Mixing of the crushed Ore with Oil and water and bubbling air through it.
a)(i) Name the process(ii) above. (1mk)
(ii) What is the purpose of process (ii) above? (1mk)
b) Bronze is an alloy of copper and another metal. Identify the other metal. (1mk)

27. State and explain the function of tartanic acid in baking powder. (2mks)

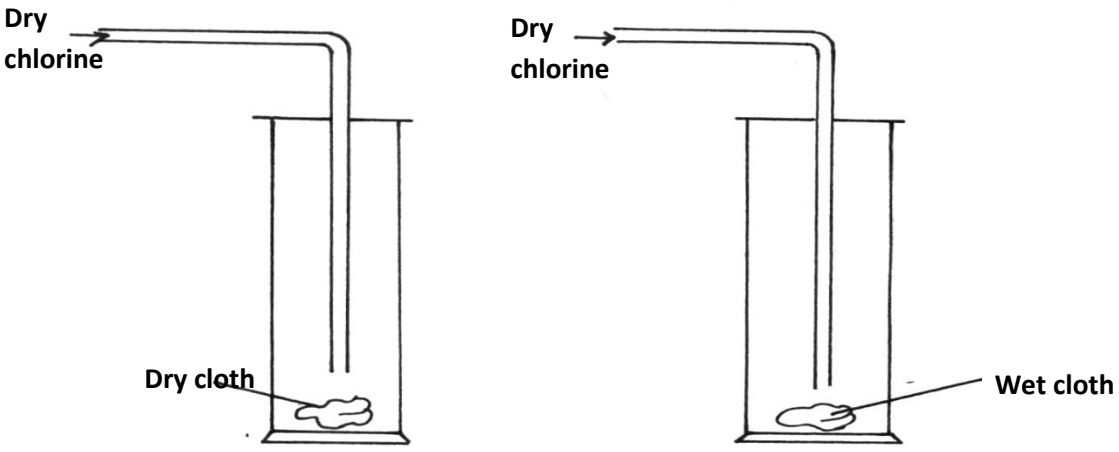
28. The system below is at equilibrium.

$N_{2(g)} + O_{2(g)} \rightleftharpoons 2\,NO_{(g)}$ $\Delta H = +94$ kJ.

Explain how an increase in the following affects the equilibrium position. (3mks)
(i) Temperature
(ii) Pressure.

29. The molar heat of formation of carbon (II) oxide is $-105 kJmol^{-1}$, molar heat of combustion of carbon is $-393 kJmol^{-1}$.
By using an energy cycle diagram, determine the molar heat of combustion of Carbon(II)oxide. (3mks)

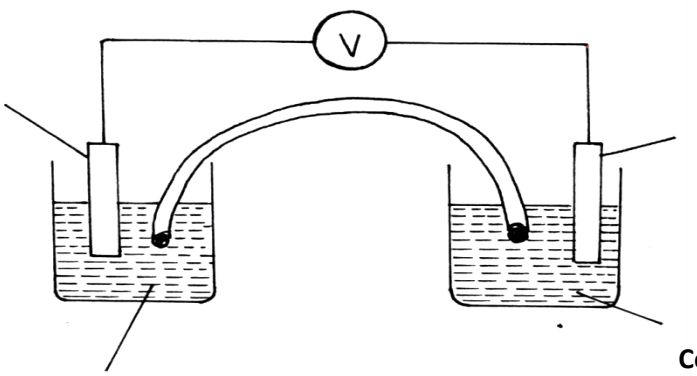
30. Dry chlorine gas was passed through two pieces of coloured cotton cloth as shown.



a) State what is observed in each experiment. (2mks)
Experiment 1
Experiment 2

b) Explain your observation using an equation. (1mk)

31. The diagram below represents an electrochemical cell.



a)

Copper (II)

Zinc sulphate

i) On the diagram label the salt bridge. (1mk)

ii) Show the direction of flow of electrons. (1mk

b) Write the overall ionic equation (1mk)