KENYA NATIONAL EXAMINATION COUNCIL
REVISION MOCK EXAMS 2016
TOP NATIONAL SCHOOLS

KAPSABET BOYS
CHEMISTRY
PAPER 1
TIME: 2 HOURS

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233/1
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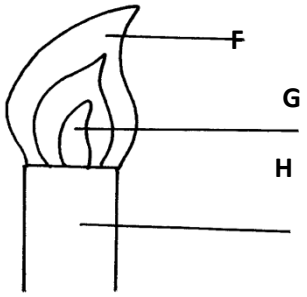
KAPSABET BOYS KCSE TRIAL AND AND PRACTICE EXAM 2016

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	

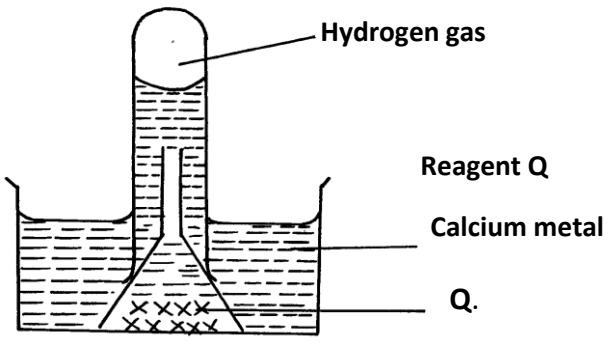
1. State **three** properties common to both ammonia and calcium hydroxide solutions but different from solution of sulphur (IV) oxide in water. (3mks)
2. Describe a simple test that can be carried out in the laboratory to distinguish between manganese (IV) oxide and copper (II) oxide. (3mks)
3. Write any **three** balanced equations of possible reactions that take place when excess magnesium metal is burnt in air. (3mks)
4. In the figure below:



(a) Name the parts labeled **F, G**, and **H**. (1 ½mks)

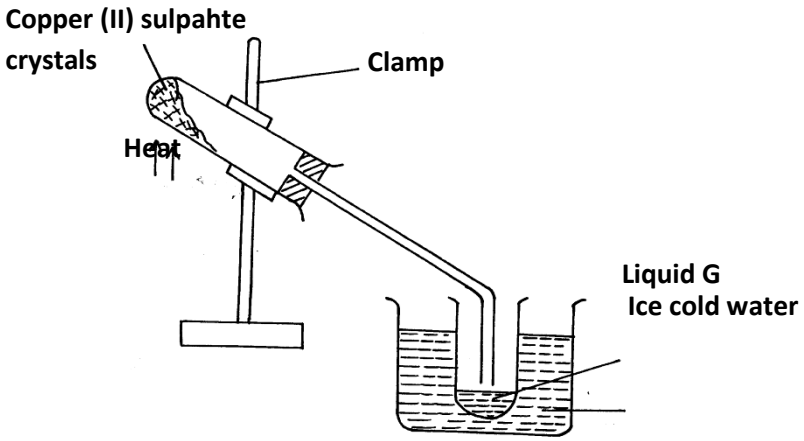
(b) Describe an experiment that would confirm that region labeled G is unsuitable for heating. (1½mks)

5. Give names of the following processes used to: (2mks)
   (a) Obtain a solvent from a saturated solution.
   (b) Remove steam from air
   (c) Separate zinc carbonate from water
   (d) Separate a mixture of nitrogen and helium.
6. Define the following terms
   (a) Anion (1mk)
   (b) Atomic number (1mk)
   (c) Isotopes (1mk)
7. (a) Explain why the following combination of reagents is unsuitable for the laboratory preparation of hydrogen.
   (i) Zinc + dilute nitric acid. (½mk)
   (ii) Lead + dilute hydrochloric acid. (½mk)
   (iii) Copper + Dilute sulphuric acid. (½mk)
   (iv) Potassium + dilute sulphuric acid. (½mk)
   (b) The diagram below was used to obtain hydrogen in the laboratory.



Name reagent (1mk)

8. The diagram below is a set up used to investigate the effect of heat on hydrated copper(II) sulphate. Study the diagram and answer the questions that follow.



(a) Why is boiling tube slanted as shown? (1mk)

(b) What is observed in the boiling tube. (1mk)

(c) Identify liquid **G.** (1mk)

9. In a reaction, an alkanol **B** was converted to pent-2-ene

(a) Give the structural formula of alkanol **B.** (1mk)

(b) Name (i) the type of reaction that converts alkanol **B** to pent-2-ene. (1mk)

(ii) The reagent used. (1mk)

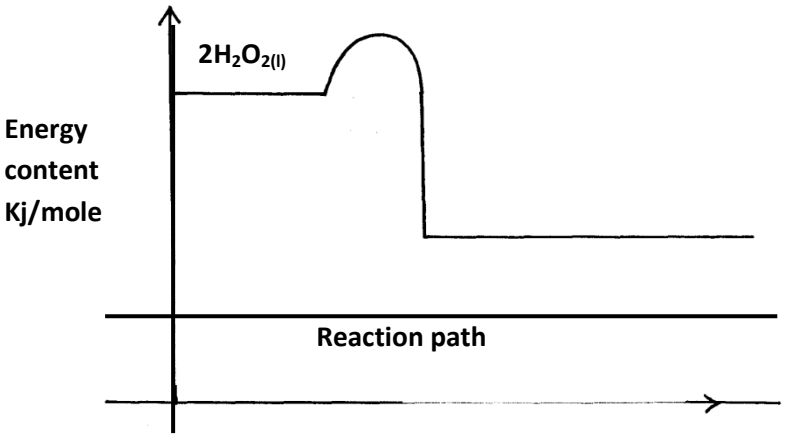
10. In an experiment to study properties of carbon,a small amount of charcoal is placed in a boiling tube. 5.0cm^3 of concentrated nitric acid is added. The mixture is then heated.

(a) What observations are made? (1mk)

(b) Write an equation for the reaction that took place in the boiling tube. (1mk)

(c) What property of carbon is shown in this reaction? (1mk)

11. 0.5g of Manganese (IV) oxide were added to 50 cm^3 of 3.5M hydrogen peroxide. The temperature of the solution rose from 21^oC to 64 ^oC. The information was represented on an energy level diagram as shown.



(a) Determine the number of moles of hydrogen peroxide that decomposed. (1mk)

(b) Calculate the molar enthalpy of decomposition of hydrogen peroxide. (1mk)

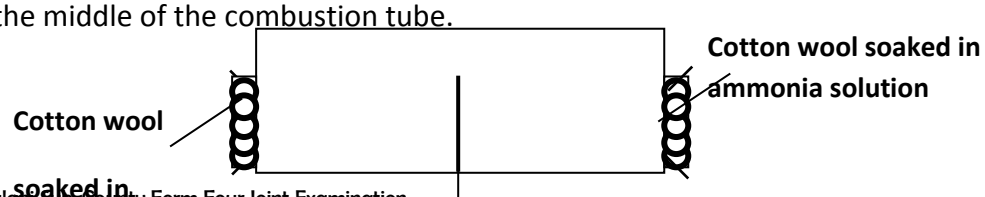
(c) On the same set of axes above sketch the curve that would be obtained if manganese (IV) oxide was not used and other conditions remained constant.

12. The electronic arrangement of two stable ions Q^{2+} and P^{2-} are 2.8.8 and 2.8.8 respectively.

(a) Write the electron arrangement of neutral atoms **Q** and **P**. (2mks)

(b) What is the most likely structure of an oxide element **P**? (1mk)

13. The set up below was used by a student. Filter paper soaked in purple litmus solution was placed in the middle of the combustion tube.

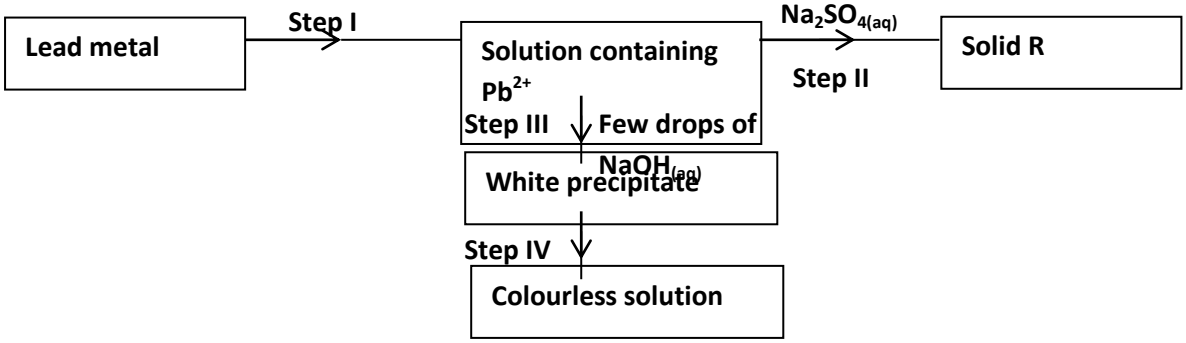


Filter paper soaked in
purple litmus solution

(i) What is the main aim of the experiment. (1mk)

(ii) State the **first** observation likely to have been made in the tube. Explain the observation. (2mks)

14. Study the flow chart below and use it to answer the questions that follow:



(a) Identify the reagent used in step **I.** (1mk)

(b) Name solid **A**. (1mk)

(c) Explain the observation in step **IV**. (1mk)

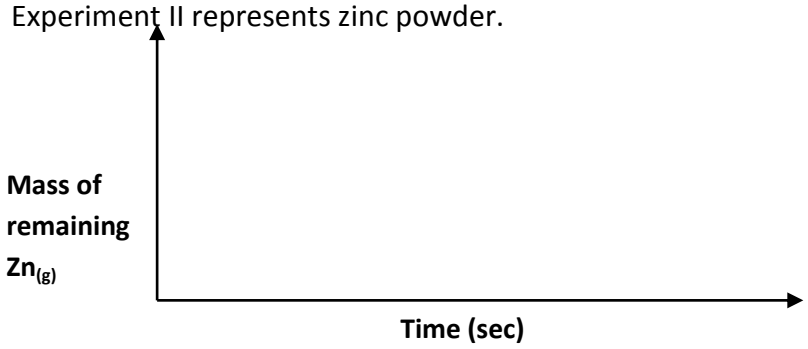
15. In an experiment 1.2g of granulated zinc were reacted with excess 2.0M sulphuric acid. The time taken for the reaction to be completed was recorded. The experiment was repeated using 1.2g of zinc powder.

(a) In which experiment was the time taken shorter? Explain your answer. (2mks)

(b) The mass of remaining mass of zinc was measured as time moved until when the reaction was over. Sketch on the set of axes and label the two curves obtained that would represent the mass of the remaining zinc (1mk)

Experiment I represents granulated zinc.

Experiment II represents zinc powder.



16. When a current of 2.0 amperes was passed through a cell containing aqueous solution of T^{2+} ions of metal T for 9 minutes the mass of the cathode increased by 0.36g.(1Faraday=96,500 coulombs)

(a) Calculate the quantity of electricity used. (1mk

(b) Determine the relative atomic mass of metal **T**. (1mk)

(c) Explain whether metal **T** is less or more reactive than hydrogen gas. (1mk)

17. 60 cm^3 of ozone (O_3) diffused through a semi permeable membrane in 80 seconds. Calculate the time taken for 90 cm^3 of nitrogen (IV) oxide (NO_2) to diffuse under the same conditions. (O=16, N=14). (3mks)

18. Some salts may be classified as double salts or basic salts. Trona with the formula $Na_2CO_3.NaHCO_3$ is an example of a double salt. An example of a basic salt is basic magnesium carbonate with formula $MgCO_3.Mg(OH)_2$.

(a) What is meant by a double salt? (1mk)

(b) Write equations of reactions that occur when dilute hydrochloric acid is reacted with: (2mks)

(i) Trona

(ii) Basic magnesium carbonate

19. The thermochemical equation below shows a dynamic equilibrium between hydrogen iodide gas and its elements:

$H_{2(g)} + I_{2(g)} \rightleftharpoons 2HI_{(g)} \quad \Delta H = +52.4kJ.$

(a) Explain how the following changes would affect the production of hydrogen iodide.

(i) increase in temperature

(ii) decrease in pressure. (2mks)

(b) Calculate the molar enthalpy for formation of $HI_{(g)}$. (1mk)

20. A hydrated salt has the following composition by mass. Iron is 20.2%, oxygen is 23.0% sulphur is 11.5%, water 45.3%. Its relative formula mass is 278. Determine the formula of the hydrated salt. (Fe=56, S=32.0, O=16, H=1) (3mks)

21. Chlorine water is a mixture of some elements and compounds.

(a) Write down the formula of two elements found in chlorine water. (1mk)

(b) Name any **two** compounds in chlorine water. (1mkk)

(c) State any **two** chemical properties of chlorine water. (1mk)

22. Calculate the mass of zinc carbonate that would remain if 17.0g of zinc carbonate was reacted with 50 cm^3 of 4M nitric acid. The equation of the reaction is:

$ZnCO_{3(g)} + 2HNO_{3(aq)} \longrightarrow Zn(NO_3)_2 + CO_{2(g)} + H_2O_{(l)}$

(Zn=65.4, C=12.0, O=16.0) (3mks)

23. A solution of bromine in methyl benzene turns colourless when butane gas is passed through it.

(a) What type of reaction takes place? (1mk)

(b) Write equation of the reaction which takes place. (1mk)

24. Explain this observation:

When hydrogen chloride gas is dissolved in water, the solution conducts electricity while a solution of hydrogen chloride gas in propanone does not conduct electricity (2mks)

25. Francium $^{87}_{}Fr$ decays by emission 4 beta particles to form protactium (Pa)

(a) Write the equation for the nuclear reaction undergone by one radioisotope of Francium. (1mk)

(b) State **two** differences between chemical and nuclear reactions. (2mks)

26. A sealed glass tube containing 250 cm^3 of nitrogen gas at r.t.p was immersed in boiling water. Calculate the pressure inside the tube if the volume of the gas does not change due to expansion of glass. (Room pressure=760mmHg, room temperature=298K). (3mks)

27. (a) Write down the electron arrangement for an atom of element U which has a mass number 14 and contains 8 neutrons. (1mk)

(b) Draw the structure of an atom of A given in (a) above. (2mks)

28. Chlorine and hydrogen sulphide gases introduced into sealed tube as shown:

(a) State the observation that would be made in the tube. Explain. (1mk)

(b) Both chlorine and hydrogen sulphide gas can be prepared using hydrochloric acid as one of the reagents. Write two separate equations showing how each gas can be prepared using $HCl_{(aq)}$ as one of the reagents $Cl_{2(g)}$ (1mk)

$H_2S_{(g)}$ (1mk)