Name: .....Class: .....

Adm.No..... Date: .....

233/1

CHEMISTRY

Paper 1 FORM THREE

END OF TERM TWO EXAM JULY 2019

Time: 2 hours

SUNSHINE SCHOOL

Kenya Certificate to Secondary Education

CHEMISTRY PAPER 1

TIME: 2 HOURS

INSTRUCTIONS

- Write your name and index number in the spaces provided above.
- Sign and write the date.
- Attempt ALL the questions in this paper.
- Electronic non-programmable calculators or mathematical tables may be used.

FOR EXAMINER'S USE

QUESTIONS	MAX. SCORE	CANDIDATE'S SCORE
1 – 29	80	

*This paper consists of **11** printed pages. Candidates are advised to check and to make sure all pages are as indicated and no question is missing.*

1. Calcium oxide can be used to dry ammonia gas.
(a) Explain why calcium oxide is not used to dry hydrogen chloride gas. (1mark)

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

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2. An isotope of **J** has a mass number **34** and has **18** neutrons.
(a) What are isotopes? (1 mark)

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(b) Write down the electronic configuration of the ion of **J**. (1 mark)

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3. An organic compound Y was analysed and found to contain carbon, hydrogen and oxygen only. 1.29g of Y on complete combustion gave 2.64g of CO_2 and 0.81g of water.
Find the empirical formula of Y. (3 marks)

4. Sulphur exist in two crystalline forms.
(a) Name one crystalline form of sulphur. (1 mark

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(b) State one use of sulphur. (1 mark)

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5. Name the most suitable method you can use to separate;
(a) Xanthophyll and chlorophyll in green leaves. (1 mark)

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(b) Oil from simsim seeds. (1 mark)

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6.Nitrogen gas can be obtained from air and can also be obtained by heating ammonium nitrite as shown below.

$$NH_4NO_{2\,(s)} \xrightarrow{\text{Heat}} 2H_2O_{(l)} + N_{2\,(g)}$$

(a) Explain why nitrogen gas obtained from air is heavier than that obtained in the above equation.

(1mark)

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(b) State two industrial uses of nitrogen gas. (2 marks)

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7. Water gas is a mixture or carbon (II) oxide and hydrogen gas while producer gas is a mixture of carbon (II) oxide and nitrogen gas. Using equations, explain why water gas is a better industrial fuel than the producer gas. (3 marks)

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8. State and explain what happens to red and blue litmus paper used in a gas jar full or dry ammonia.

(1 mark)

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b)Using Lead (II) nitrate explain how the presence of chloride ions can be tested. (2 marks)

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9. The table below gives some properties of compounds P, Q , R and S

Compound	B.P. (0C)	M·P.(0C)	Conductivity in water
P	77	-23	Does not conduct
Q	74	-19	Does not conduct
R	-161	-85	Conducts
S	2407	714	Conducts

(a) Which one of the compounds in the table is ionic? Explain. (1mark)

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(b) Give the compound that is liquid at room temperature. (1mark)

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10. In an experiment to determine the pH values of various solutions, universal indicator solution was added to solutions A, B, C and D. The table below shows the results obtained.

Solution	Colour obtained
A	Orange
B	Red
C	Purple
D	Green

a) Which solution is likely to be ethanoic acid? (lmk)

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b) Which solution has the highest concentration of hydroxyl ions per unit volume? (1mk)

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c) Select the solution that is likely to be the oxide of hydrogen. (lmk)

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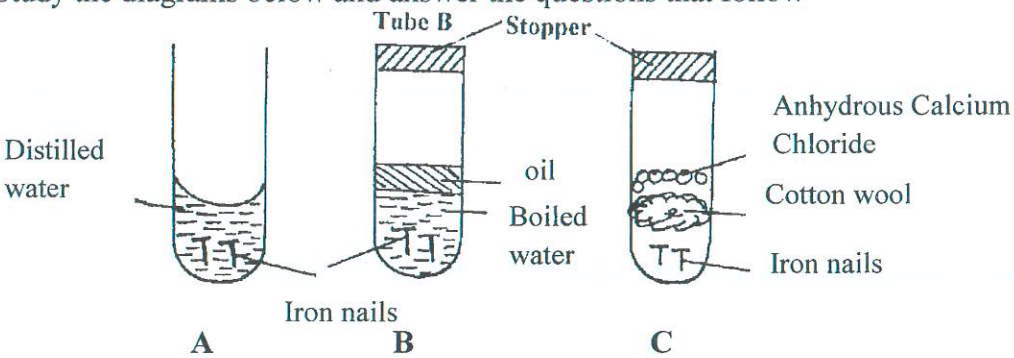
11. Study the diagrams below and answer the questions that follow



a) State and explain the observation made on the iron nails in tube B at the end of the experiment. (2mks)

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b) State two ways of preventing rusting. (1mk)

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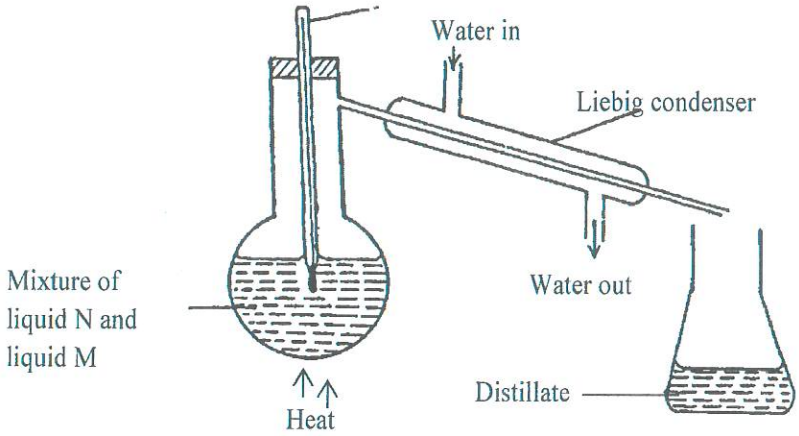
12. The diagram below shows a set up used to separate two organic liquids, liquid **M** (boiling point **56°C**) and liquid **N** (boiling point **118°C**)



a) Identify two mistakes in the above set up. (2mks)

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b) State one large scale application of the method of separation shown above. (1mk)

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13.a) Using dots (•) and crosses (**X**) to represent outer electrons only, draw a diagram to show the structure of a nitrogen (N_2) molecule. (Atomic number **N = 7**) (2mks)

b) Explain why nitrogen gas is generally inert. (1mk)

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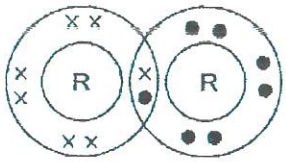
c) Identity the type of bond represented by substance R shown below, explain your answer. (2 marks)



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d) Predict the group of the periodic table into which R belongs. (1 mark)

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14. a) State Charles' law. (1 mark)

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b)A fixed mass of a gas has a volume of **200cm^3** at **25°C** and at a pressure of **101325 Pascal**. What would be its volume at **-23^{0}C** and at **100,000 Pascal**? (2mks)

15. Describe how the following reagents can be used to prepare lead (II) sulphate. Solid potassium sulphate, solid lead (II) carbonate, dilute nitric (V) acid and distilled water. (3 marks)

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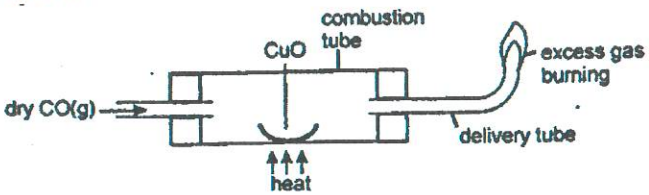
16. The diagram below is a set-up used to investigate a certain property of carbon (II) oxide. Study it and answer the questions that follow.



a) State the observation made in the combustion tube. (1 mark)

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b) By use of an equation, explain the observations in (a) above. (1 mark)

.....

c) Why should excess gas be burnt at the end of the delivery tube? (1 mark)

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17. Aluminium Chloride sublimes at about **180^{0}C**, while Aluminium Oxide melts at **1800^{0}C**.
a)State the types of bonding in each of the two compounds: Al_2O_3 and $AlCl_3$ (2 mks)

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b)Explain why the sublimation temperature of Aluminium Chloride is lower than the melting point of Aluminium Oxide. (1mark)

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18. In an experiment, ammonium chloride was heated in a test tube. A moist red litmus paper placed at the mouth of the test tube first changed blue then red. Explain these observations. (2marks)

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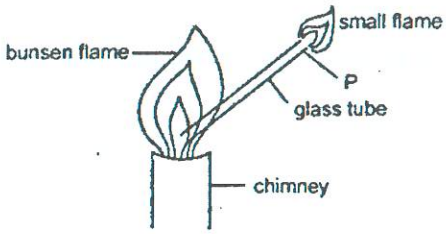
19. A glass tube was inserted into a flame formed when air hole of the Bunsen burner was fully open as shown in the figure below.



a) When a burning splint was brought near point P, a small name lit at this end of the glass tube. Explain. (1mark)

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b)Give two main reasons why the Bunsen burner flame above is preferred for heating than the flame obtained when air hole is closed. (1 mark)

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20 a) A mixture of calcium powder and silver powder was reacted with dilute hydrochloric acid. The solution was filtered. Name

i) The filtrate (1 mark)

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ii) The residue (1 mark)

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b) Write an ionic equation for the reaction that takes place. (1 mark)

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21. Helium, neon and argon are in group (VIII) of the periodic table.
a) Give one use of helium other than filling of air craft tyres. (1 mark)

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b) Other than density give one reason why helium is used to fill aircraft tyres. (1 mark)

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22. a) What do you understand by the term isomers? (1 mark)

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b) Draw two the isomers of the compound C_3H_7Cl and give their systematic names. (2 marks)

23. Fractional distillation of liquid air usually produces nitrogen and oxygen as the major products.
i) Name one substance that is used to remove carbon (IV) oxide from the air before it is changed into liquid. (1mark)

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ii) Describe how nitrogen gas is obtained from the liquid air. (Boiling points of nitrogen = **-196^{0}C**, oxygen = **-183^{0}C**) (2mark)

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24. Study the flow chart below and answer the questions that follow.

calcium hydroxide solution
↓ $CO_2(g)$
white precipitate A
↓ $CO_2(g)$
solution B
↓ heat
white residue + water + gas C

Name:

a) White precipitate A. (1mark)

.....

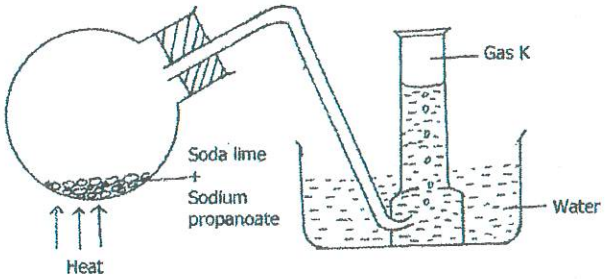
b) Solution B. (1mark)

.....

c) Gas C. (1mark)

.....

25. Study the set-up below and answer the questions that follow.



a) Name gas K. (1mk)

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b) To which homologous series does K belong? (1mk)

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c) Write the chemical equation of the reaction in the round bottom flask. (1mk)

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26. **7cm^3** of a dibasic acid **H_2A** required **25cm^3** of **0.1M** Sodium hydroxide for complete neutralization.

a) How many moles of Sodium hydroxide are contained in **25cm^3**? (1mk)

b) Calculate the molarity of the dibasic acid. (2mks)

27. Oxygen can be prepared in the laboratory by decomposition of hydrogen peroxide.
(a) Write an equation for the reaction. (1mark)

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(b) State a suitable catalyst for the reaction. (1mark)

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(c) State one use of oxygen gas. (1mark)

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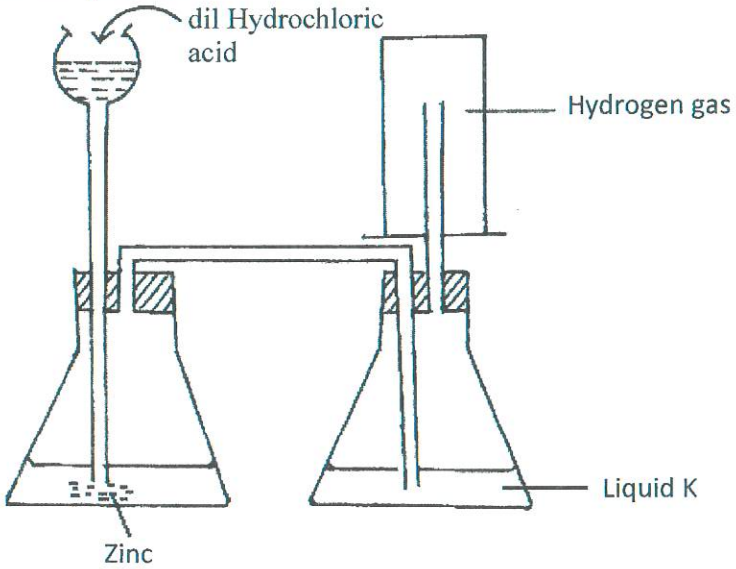
28. The diagram below represents an arrangement for preparing and collecting dry hydrogen. Study it and answer the questions that follow.



(a) Write the equation for the reaction that produces hydrogen gas. (1mark)

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(b) Name a suitable substance that liquid K is likely to be. (1 mark)

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c) Explain why it is not advisable to use nitric (V) acid as an alternative to hydrochloric acid in this preparation experiment. (1 mark)

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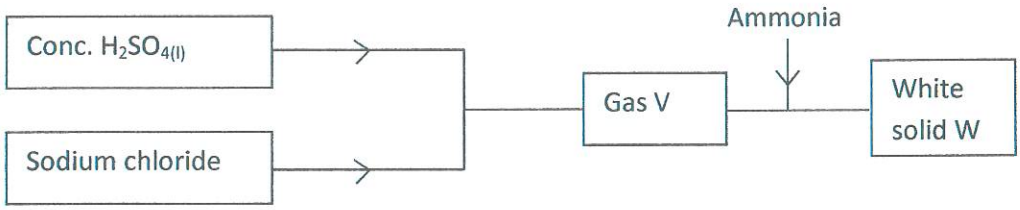
29. Study the flow chart below and answer the questions that follow.



(a) Name

(i) gas V (1 mark)

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(ii) Solid W (1 mark)

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