NAME.....ROLLCALL NO.....CLASS.....

CANDIDATE'S SIGNATURE.....

DATE.....

233/2
CHEMISTRY
PAPER 2
(THEORY)
MARCH 2017
2 HOURS

FORM 4 PRE-MOCK

ALLIANCE GIRLS' HIGH SCHOOL

Kenya Certificate of Secondary Education
PAPER 2
(THEORY)
2 HOURS

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Instructions to candidates:

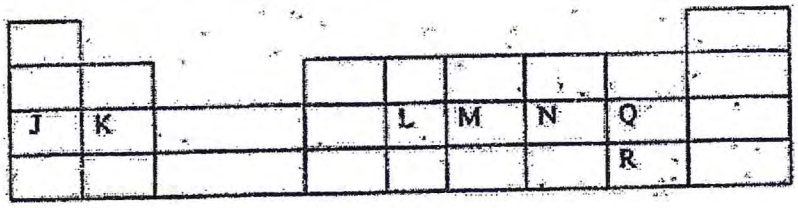
- *Write your **Name, Index number and Rollcall number** in the spaces provided **above.***
- *Sign and write the **date** of examination in the spaces provided **above.***
- *Answer **ALL** the questions in the spaces provided in the question paper.*
- *Mathematical tables and electronic calculators **may be** used.*
- *All working **must be** shown clearly.*

For Examiner's Use Only

Questions	Maximum Score	Candidate's Score
1	13	
2	10	
3	13	
4	10	
5	10	
6	13	
7	11	
Total Score	80	

This paper consists of 11 printed pages. Candidates to check and ascertain that no page is missing.

1. The grid represent parts of the periodic table. Study it and answer question that follow. The letters do not represent the actual symbols of the elements.



(a)(i). Write down the electron configuration of element N (1mk)

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ii) Using dots (.) and crosse(x) to represent electrons, draw a diagram showing the formation of an ion of MH_4^+ (Phosphonium ion) (1mk)

(b) State and explain the observations made when a piece of J is dropped in a trough of water. (3mks)

(c) What type of structure could the oxide of K have? Explain. (2mks)

(d)How does the reactivity of R and Q Compare? (2mks)

(e) 1.2g of K reacted completely with 1110 cm^3 of chlorine gas at s.t.p (1 mole of gas occupies 22.4dm^3).

i.) Write a balanced equation for the reaction between K and chlorine. (1mk)

ii.) Determine the relative atomic mass K. (2mks)

iii) Explain the observation that would be made if a nitrate of K is heated. (1mk)

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2. In an experiment, a piece of magnesium ribbon was cleaned with steel wool, 2.4g of the clean magnesium ribbon was placed in a crucible and completely burned in oxygen. After cooling, the product weighed 4.0g.

(a) Explain why it was necessary to clean the magnesium ribbon. (1mk)

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(b) What observation was made in the crucible after burning. (1mk)

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(c) Why was there an increase in mass? (1mk)

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(d) Write the equation for the reaction which took place in the crucible. (1mk)

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(e) The product in the crucible was shaken with water and filtered. Explain the observation which was made when blue and red litmus papers were dropped into the filtrate. (3mks)

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(f) Calculate the volume of oxygen gas used during the burning (O = 16.0) Molar volume of a gas = 24,000cm^3 at room temperature (3mks)

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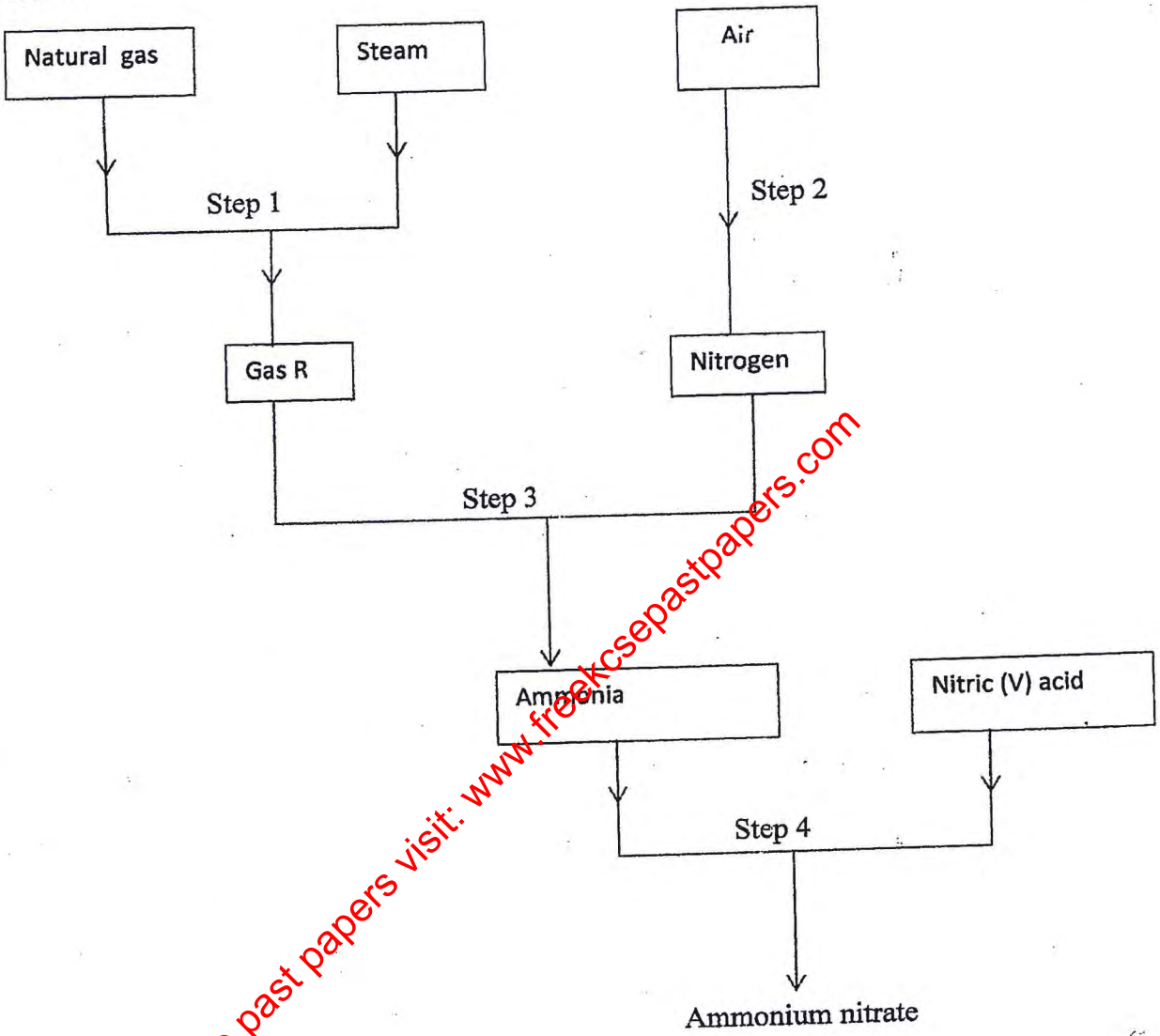
3. The chart below shows the stages, involved in the manufacture of ammonium nitrate in a certain factory. Study it and answer the questions that follow. Note Nitric(V) acid is brought in from a supplier.



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(a) Name gas R. (1m)

.....

(b) Give an equation for the reaction that occurs in step 1. (1m)

.....

(c) What alternative process can be used to obtain gas R. (1m)

.....

(d) Name the processes designated. (2m)

(i) Step 2 .....

(ii) Step 3 .....

(e) Step 4 involves a direct reaction between ammonia and nitric acid and 6.4×10^{23} Kg of ammonium nitrate are made per day;

(i) Calculate the mass of ammonia gas used daily.
(N=14.0, O=16.0, H=1.0)

(3mks)

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(ii) How many moles of fertilizer are produced in 7 working days. (3mks)

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(f) State any **two** uses of Nitric(V) acid. (2mks)

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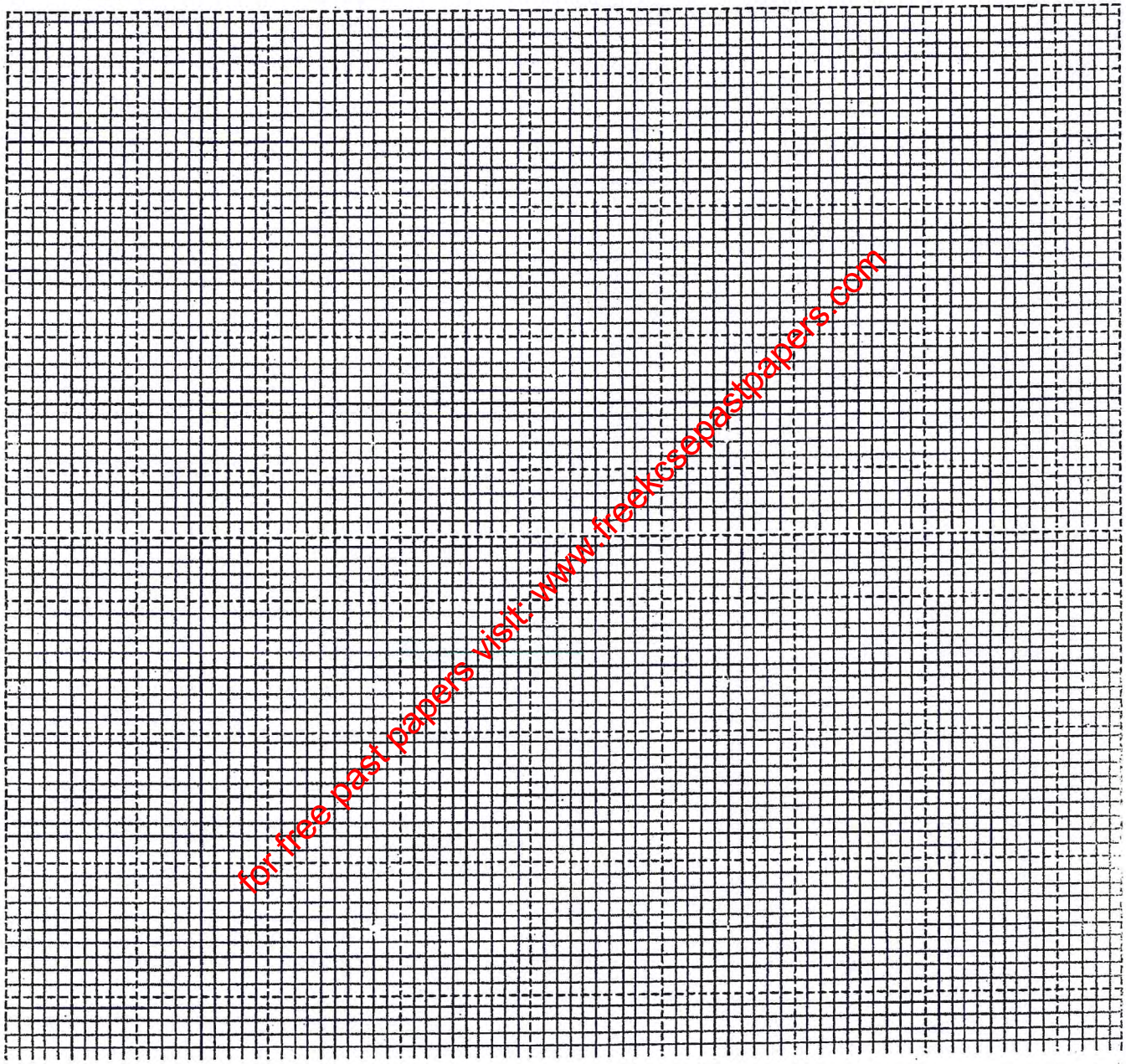
4. 1g of magnesium ribbon was reacted with hydrochloric acid at room temperature in order to investigate how the rate of reaction varies with time. The results obtained were recorded as shown below.

Time (seconds)	0	20	40	60	80	100	120	140	160	180
Volume of gas produced (cm^3)	0	10	20	26	32	35	38	39	40	40

(a) (i) On the graph provided, plot a graph of volume of gas produced against time taken. Label the graph K. (3mks)



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(ii) From the graph determine the rate of production of the gas at 110 seconds. (2mks)

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(b) On the same axis sketch the graph you would expect to obtain if:

(i) The same mass of powdered magnesium was used instead of magnesium ribbon. Label the **graph Y.** (1mk)

(ii) If the temperature of the solution mixture was reduced from 25^0C to 15^0C. Label the **graph Z.** (1mk)

(c) Determine the mass of magnesium ribbon that remained unreacted in this experiment (Mg = 24, Molar gas volume = 24dm3 at r.t.p) (3mks)

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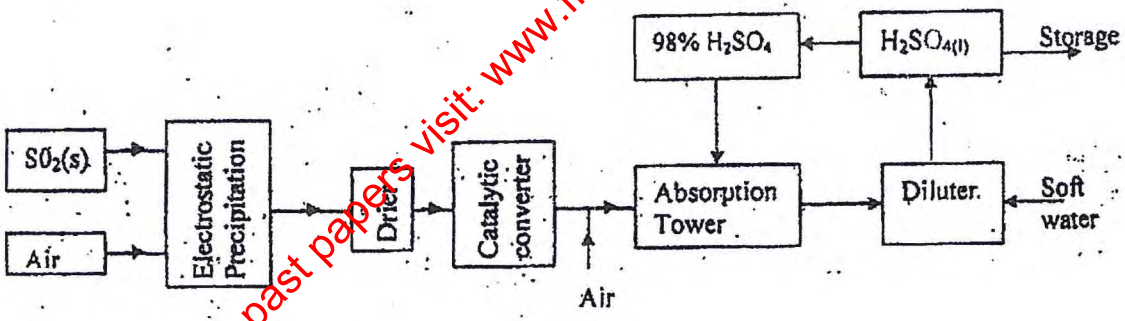
5. The flow chart below shows the industrial preparation of sulphuric (vi) acid. Study it and answer the question the follow.



a).i.) State one source of sulphur (iv) oxide. Write an equation to show its formation. (2mks)

ii.) Name a suitable substance that can be used in the drier. (1mk)

iii) In the catalytic converter, the temperature is adjusted to about 450^0C without external heating. Explain. (1mk)

iv) Write an Equation for the process taking place in a absorption tower. (1mk)

v) Why is it not advisable to use hard water in the diluter? (1mk)

vi.) Name one solid waste produced in this process. (1mk)

b) Nitric (V) acid and hydrogen chloride can be prepared in the laboratory by heating a nitrate and chloride respectively with concentrated sulphuric (VI) acid. What property of concentrated sulphuric (VI) acid makes it suitable for the preparation of nitric (v) acid and hydrogen chloride. (1mk)

c.) How does the bleaching action of sulphur (VI) oxide gas and chlorine gas compare. (2mks)

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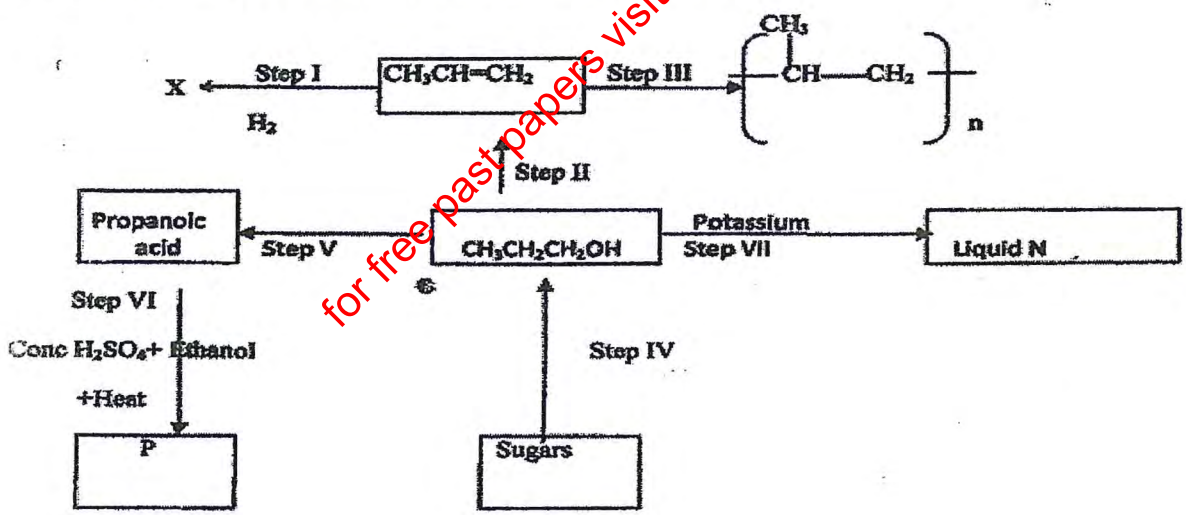
6.Study the reaction below and answer the questions that follow.



a) i) Name the type of reaction in the following steps. (2mks)

I) **Step IV**

.....

II) **Step V**

.....

b) Name the important reagents and conditions in Step II. (2mks)

Reagents

.....

Conditions

.....

.....

c) Write a balanced equation for the reaction taking place in (2mks)

Step VI

Step VII

d) Give the systematic name of N and P (2mks)

N .....

P .....

e) Describe two chemical tests used to differentiate between C_3H_6 and X formed (2mks)

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f) (i) If the relative molecular mass of compound formed in step III is 42,000, determine the value of n in compound (C 12.0, H =1.0) (2mks)

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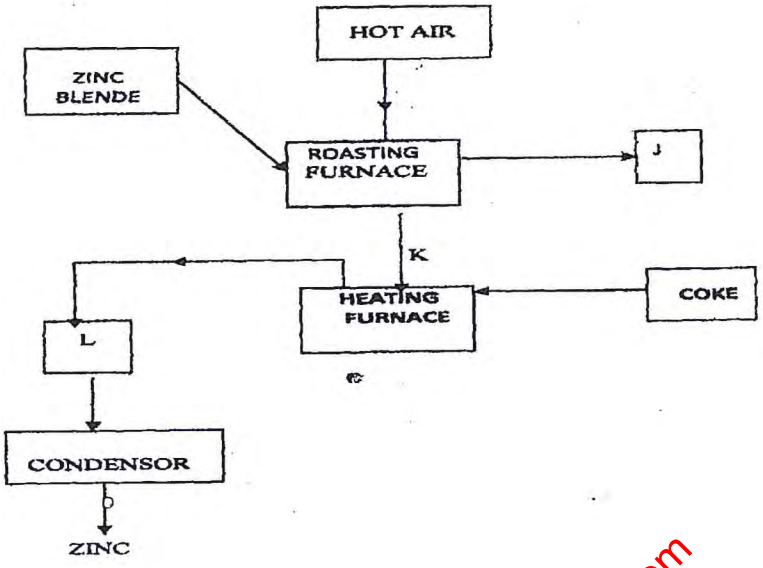
(ii) State one disadvantage of the continued use of items made from the compound formed in (f)(i) above. (1mk)

7. The flow chart below illustrates the extraction of zinc from zinc blende. Use it to answer the questions that follow



i) Name one other ore of zinc metal. (1m

.....

ii) Give a chemical equation for the reaction in the
a) Roasting furnace. (1m

.....

b) Heating furnace

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iii) Name substances J and K

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iv) Why is it necessary to condense substance L?

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v) Explain the pollution effects of substance J.

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vi) Which other factory can be set near the zinc extraction plant? Explain (1mk)

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vii) Give **two** uses of zinc metal apart from galvanization. (2mks)

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