

Name: ..... Index No: .....

Candidate's signature.....

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## KAKAMEGA NORTH SUBCOUNTY JOINT EXAMINATIONS KCSE Trial Exam

**233/2**  
**CHEMISTRY**  
**PAPER 2**  
**JULY 2018**  
**2 Hours**

### INSTRUCTIONS TO CANDIDATES

- Write your name and index number in the space provided
- Answer **All** the questions in the space provided
- Mathematical tables and electronic calculators may be used
- All working **must** be clearly shown where necessary.

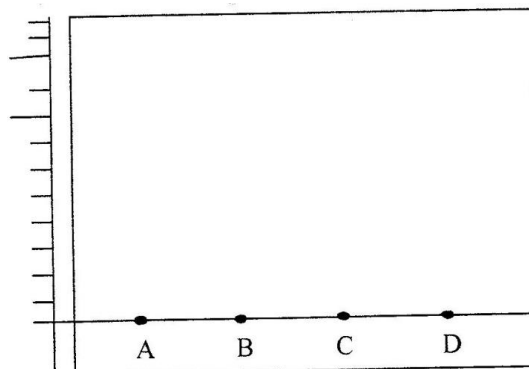
### For Examiner's Use Only

Question	Maximum Score	Candidates Score
<b>1</b>	<b>11</b>	
<b>2</b>	<b>11</b>	
<b>3</b>	<b>16</b>	
<b>4</b>	<b>11</b>	
<b>5</b>	<b>11</b>	
<b>6</b>	<b>9</b>	
<b>7</b>	<b>10</b>	
<b><i>TOTAL</i></b>	<b><i>80</i></b>	

*This paper consists of 10 printed Pages*

*Candidates should check the question paper to ensure that all the pages are printed as indicated and no questions are missing*

1(a) The diagram below shows spots of pure substances **A**, **B** and **C** on a chromatography paper. Spot **D** is that of a mixture.



After development **A**, **B** and **C** were found to have moved 8cm, 3cm and 6cm respectively. **D** had separated into two spots which had moved 6 cm and 8cm.

On the diagram,

(i) Label the baseline (Origin) (1mk)

(ii) Show the position of all the spots and fill development (3mks)

(iii) Identify the substance present in the Mixture **D** (2mks)

(b) Describe how solid ammonium chloride can be separated from a solid mixture of ammonium chloride and anhydrous Calcium Chloride (2mks)

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(c) The table below shows liquids that are miscible and those that are immiscible.

Liquid	$L_3$	$L_4$
$L_1$	Miscible	Miscible
$L_2$	Miscible	Immiscible

Use the information given to answer the questions that follow.

i) Name the method that can be used to separate  $L_1$  and  $L_3$  from the mixture of the two (1mk)

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ii) Describe how a mixture of  $L_1$  and  $L_4$  can be separated (2mks)

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2(a) An atom  $Q$  can be separated as  $^{52}_{24}Q$

What does the number 52 represent?

(1mk)

b) Study the information in the table below and answer the questions that follow (*Letters are not the actual symbols of the elements*).

ELEMENT	Electronic arrangement of the stable Ion	Atomic Radius (nm)	Ionic Radius (nm)
$N$	2.8.8	0.197	0.099
$P$	2.8.8	0.099	0.181
$R$	2.8	0.160	0.065
$S$	2.8	0.186	0.095
$T$	2	0.152	0.068
$U$	2.8	0.072	0.136

i) Write the formula of the compound formed when  $N$  reacts with  $P$

( atomic numbers are  $N=20$  , $P=17$ )

(1mk)

ii) Identify the elements which belong to the third period of the periodic table. Explain.

(2mks)

iii) Which of the elements identified in b(ii) above come first in the third period? Explain

(2mks)

iv) Select *two* elements which are non-essentials

(1mk)

c) The table below gives some properties of substances i, ii, iii and iv. Study it and answer the questions that follow.

SUBSTANCE	Electrical Conductivity		M.P (0C)	B.P (0C)
	<i>Solid</i>	<i>Molten</i>		
i	Does not conduct	Conducts	801	1420
ii	Conducts	Conducts	650	1107
iii	Does not conduct	Does not conduct	1700	2200
iv	Does not conduct	Does not conduct	113	440

i) What type of bonding exists in substances i and ii? (2mks)

i

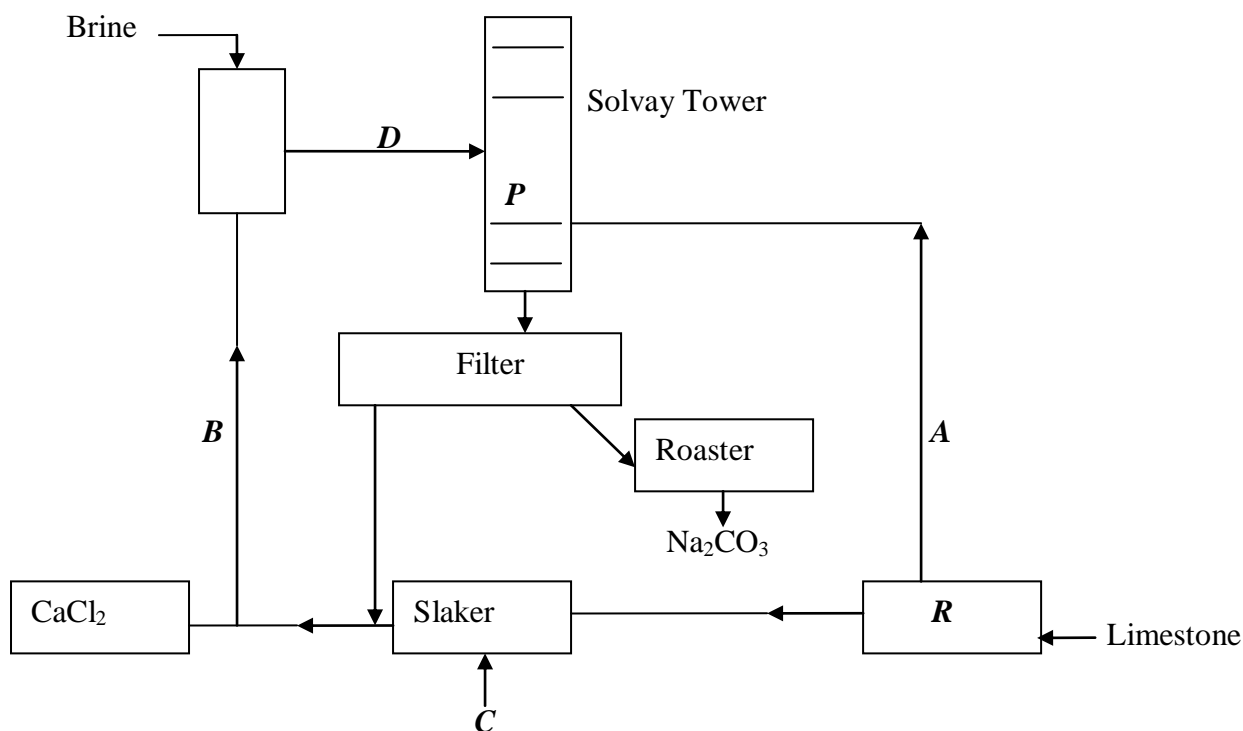
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ii) Which substance is likely to be sulphur? Explain? (2mks)

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3. The scheme below shows the manufacture of sodium carbonate by Solvay process. Study it and use it to answer the questions that follow.



a) Name gas *A* and *B* (2mks)

*A*:

*B*:

b) Name liquid *C* and *D* (2mks)

*C*:

*D*:

c) Write the equation for the reaction which takes place in tower **P** and Chamber **R** (2mks)

**P:**

**R:**

d) Name the product formed in chamber **R** and give **one** of its uses (2mks)

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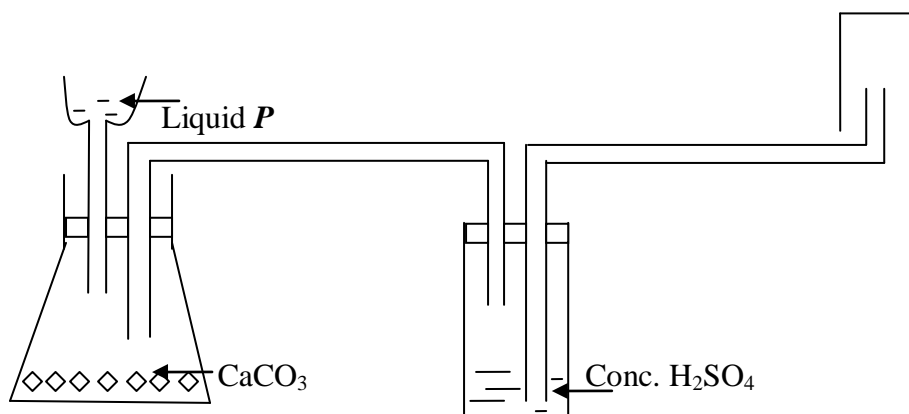
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e) State **two** uses of Sodium Carbonate (2mks)

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f) A student had set up the apparatus as shown below to prepare and collect dry carbon dioxide gas.



a) State a correction for each of the **three** mistakes in the above set up. (3mks)

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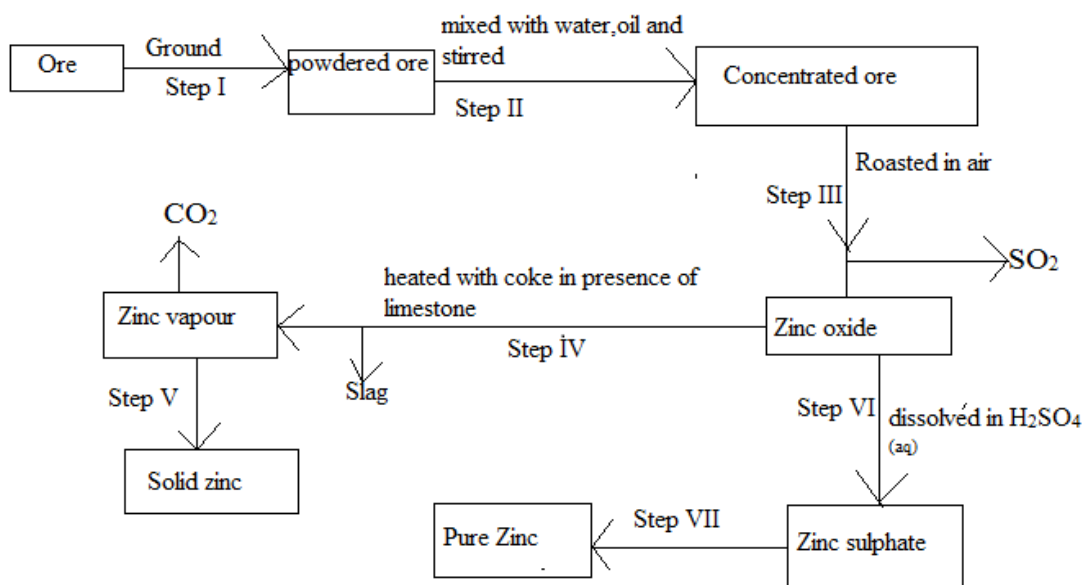
b)  $30\text{cm}^3$  of carbon (II) Oxide gas was reacted with  $10\text{cm}^3$  of oxygen gas, the reacting mixture of gases were bubbled through an alkali. Determine the volume of the residue gas. (3mks)

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4 The diagram below is a flow chart for the extraction of zinc. Study it and answer the questions that follow.



- a) Give the name and formula of the major ore from which Zinc is extracted. (2mks)

Name \_\_\_\_\_

Formula \_\_\_\_\_

- b) Give the name of the process in Steps: (2mks)

II \_\_\_\_\_

VII \_\_\_\_\_

- c) Write the equations for the reaction in steps: (2mks)

III

IV

- d) Suggest another factory that can be set near zinc extraction plant. Give a reason for your answer. (2mks)

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- e) When 3.27g of the pure zinc obtained was reacted with excess dilute sulphuric acid, 1.2dm<sup>3</sup> of hydrogen gas was produced at room temperature and pressure. Determine the relative atomic mass of zinc. (Molar gas volume at room temperature and pressure = 24.0 dm<sup>3</sup>) (3mks)

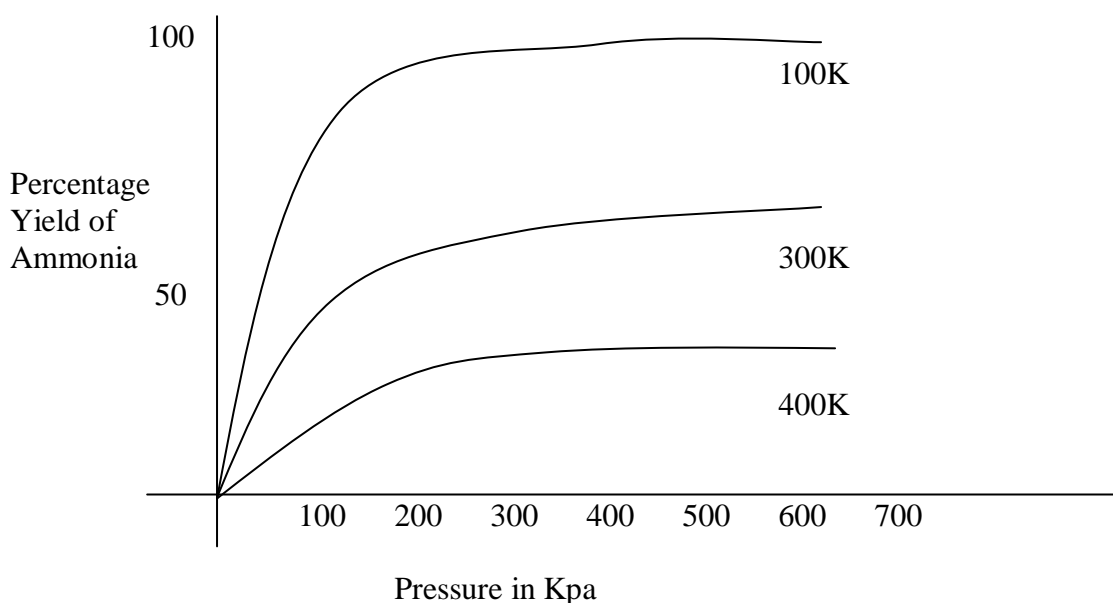
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5. Ammonia is manufactured by the Haber process. Ammonia is used to manufacture nitrogenous fertilisers such as ammonium sulphate.

- (a) The graphs below give information about the percentage of ammonia present in the equilibrium mixture at different temperatures and pressures. The reaction requires the use of a catalyst, which operates most efficiently within the certain range of temperature.



- (i) Name the catalyst used in the Haber process. (1mk)

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- (ii) Write a balanced equation for the formation of ammonia in the Haber process and state the optimum conditions used other than the catalyst. (2mks)

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- (iii) From the graph state and explain whether the reaction of production of ammonia is exothermic or endothermic. (2mks)

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- (iv) If a pressure of 600kpa is used, would the yield of ammonia increase or decrease? Explain. (2mks)

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- (b) Explain how the use of a catalyst can reduce the overall energy requirement for the Haber process. (2mks)

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- (c) A farmer spreads a fertiliser containing ammonium sulphate onto his land. The farmer then spreads calcium hydroxide on his land to reduce its acidity.

- (i) Write an equation for the reaction between ammonium sulphate and calcium hydroxide. (1mk)

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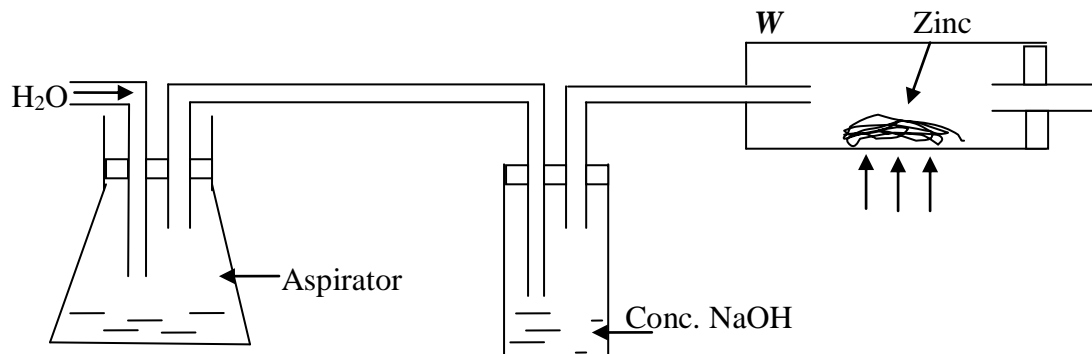
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- (ii) Use this equation to explain why the nitrogen content of the fertiliser will be lowered. (1mk)

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6. (a) Below is an incomplete diagram of a set-up of apparatus used to obtain Nitrogen gas from the air.



- i) Complete the diagram to show how Nitrogen gas is collected. (1mk)

- ii) State the roles of the following

- a) Water entering the aspirator (1mk)

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- b) Sodium hydroxide solution (1mk)

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iii) Write a chemical equation for the reaction that takes place in combustion tube *W* (1mk)

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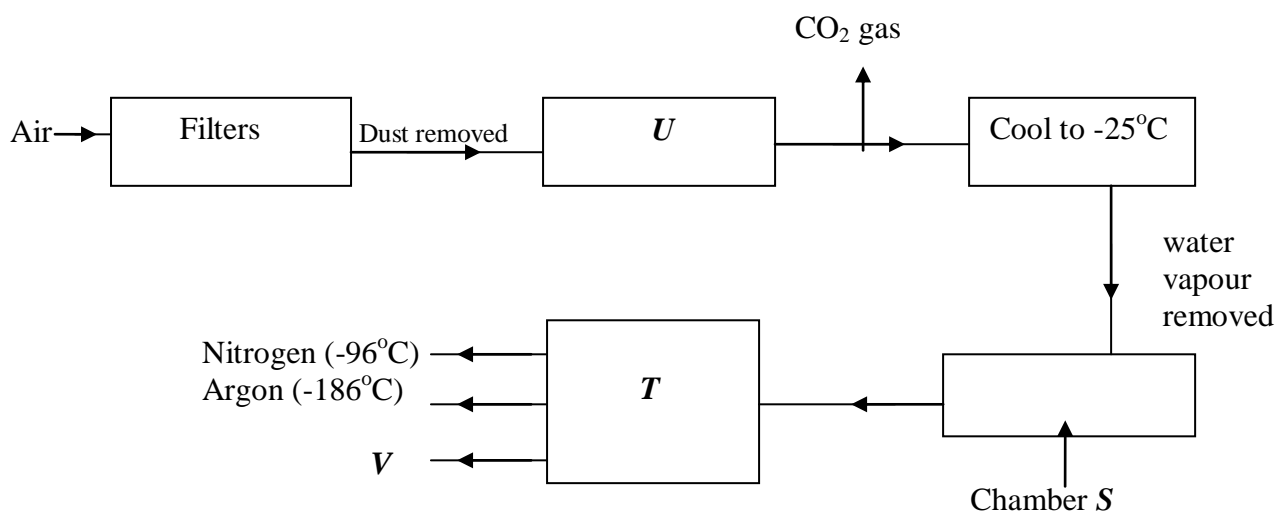
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iv) Nitrogen obtained using the above set-up is not pure. Name *one* major impurity present (1mk)

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c) If pure nitrogen gas is required the process in (a) above is modified as represented by the flow chart below. Study it and answer the questions that follow.



i) Give the identity of:

a) Process *T* (1mk)

b) Substance *U* and *V* (1mk)

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ii) Briefly describe how air is liquefied in chamber *S* (1mk)

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(c) State *one* industrial use of Nitrogen gas (1mk)

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7. A sample of powdered brass is added to excess dilute nitric acid. The mixture is heated gently until all the brass reacts. A blue solution **A** was formed.

- i) Write the chemical formulae of cations present in solution **A**. (2mks)

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- (i) State the observations made when, aqueous sodium hydroxide is slowly added to solution **A** until in excess. (2mks)

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- (ii) Explain the answer in a (i) above using balanced equations. (3mks)

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(b) Another sample of powdered brass is added to excess dilute hydrochloric acid. The mixture is heated and an aqueous solution of a compound **B** together with a solid **C** are formed.

- (i) Name (2mks)

**B**

**C**.

- (ii) Write an ionic equation for this reaction. (1mk)

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