

NAME..... ADM NO.....
SCHOOL..... CANDIDATE'S SIGN.....
DATE

233/2
CHEMISTRY
FORM 3
TIME: 2 HOURS

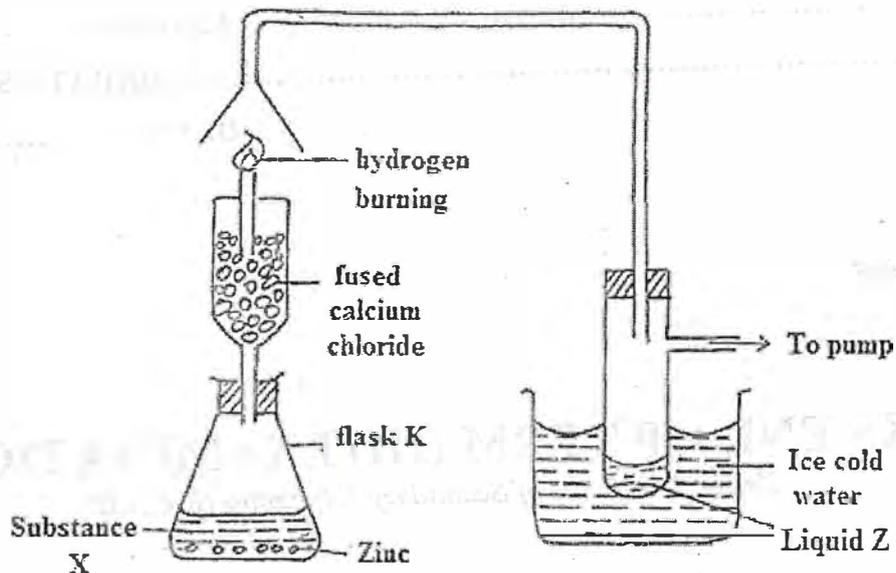
END OF TERM (III) EXAMINATION -2019
Kenya Certificate of Secondary Education (K.C.S.E)

233/2
CHEMISTRY
FORM 3
TIME: 2 HOURS

FOR EXAMINER'S USE ONLY

QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
1	13	
2	10	
3	12	
4	13	
5	10	
6	12	
7	10	
TOTAL	80	

1. a) The diagram below represents the apparatus used to burn hydrogen in air



(i) Name substance X

(1mk)

(ii) Write equation of the reactions that take place at;

a) Flask K

b) The point hydrogen burns

(1mk)

iii) What is the function of fused calcium chloride

(1mk)

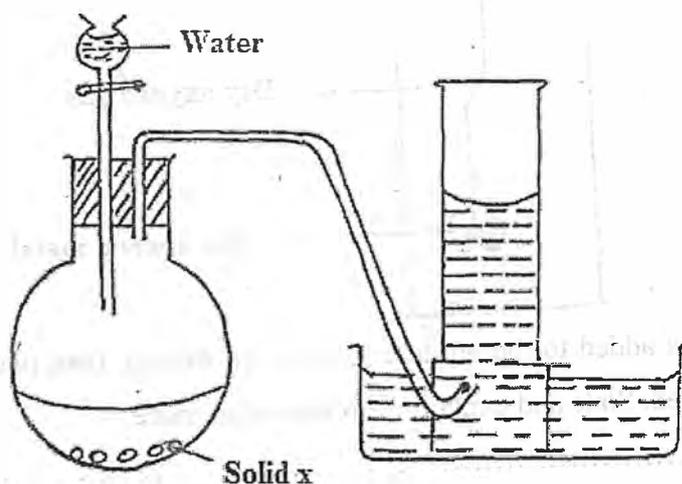
iv) State one chemical test which can help identify liquid Z

(1mk)

v) State one use of hydrogen

(1mk)

b) The diagram below shows preparation of oxygen gas in the laboratory



(i) Identify solid W

(1mk)

(ii) Write a balanced chemical equation for the reaction taking place in the flask

(1mk)

(iii) State why the gas can be collected using the method above

(1mk)

(iv) State one use of oxygen gas

(1mk)

c) Metal K can remove combined oxygen from metal P. Metal M reacts with steam while metal Z doesn't react with steam and water. Metal P reacts with water while metal M does not. Arrange the metals in the order of increasing reactivity

(2mks)

f) Using dots (.) and (x) show the bonding between J and E (1mk)

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.....

.....

g) Study the data below and answer the questions that follow

Formula of compound	NaCl	MgCl ₂	Al ₂ Cl ₆	SiCl ₄	PCl ₅	SCl ₂
Boiling point (°c)	1470	1420	Sublimes	60	75	60
Melting point (°c)	800	710	180(sublimes)	-70	90	-80

(i) Give a chloride that is liquid at room temperature. Explain (1mk)

.....

.....

(ii) Give a reason why SCl₂ has a lower melting point than MgCl₂ (1mk)

.....

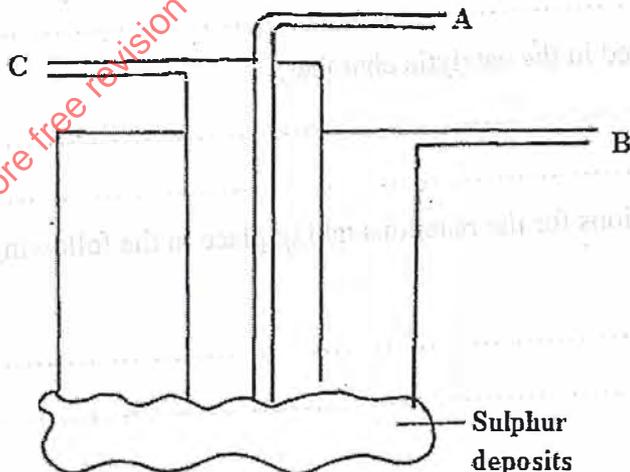
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3. a) Name the two allotropes of Sulphur (1mk)

.....

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b) The diagram below shows extraction of sulphur using fransch process. Study it and answer the questions that follow



(i) Identify the substances that goes through tube:- (2mks)

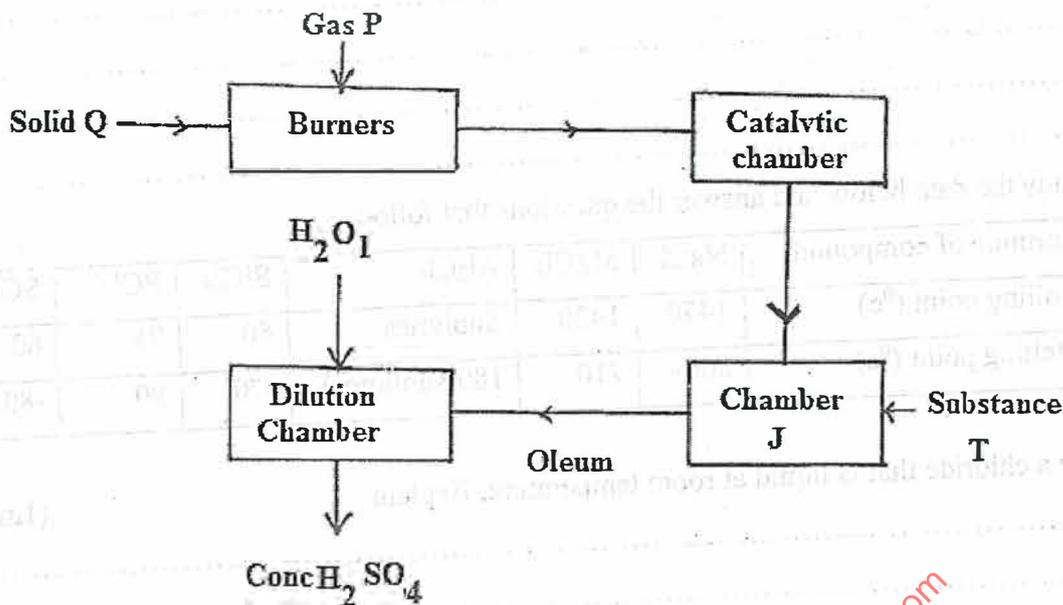
C.....

B.....

(ii) What is the purpose of the substance that goes through tube B (1mk)

.....

- c) The flow chart below is simplified contact process for manufacture of sulphuric (VI) acid. Study it and answer the questions that follow.



- (i) Identify the following (2mks)

Solid Q

Gas P

Chamber J

Substance T

- (ii) Name the catalyst used in the catalytic chamber. (1mk)

- (iii) Write balanced equations for the reactions taking place in the following:- (3mks)

Catalytic chamber

Chamber J

Dilution chamber

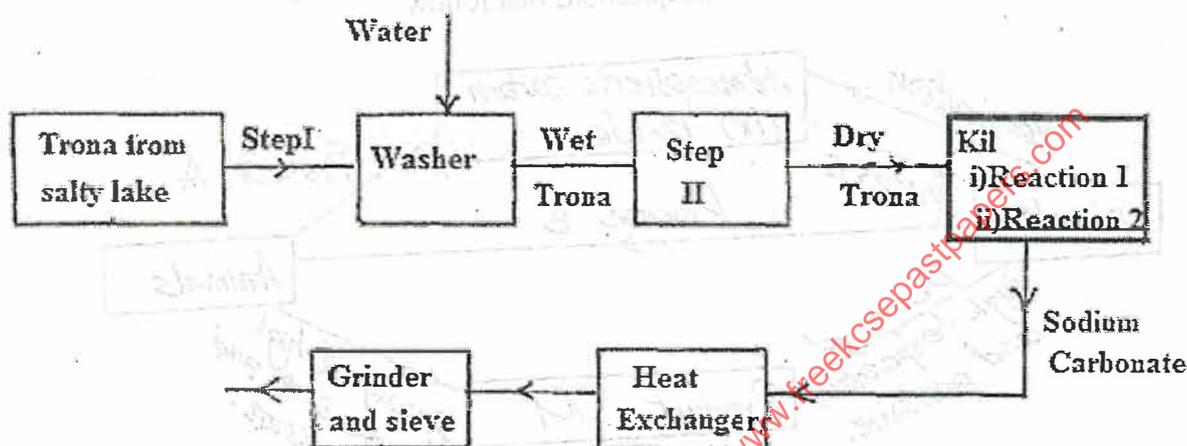
(iv) Both SO_2 and SO_3 are environmental pollutants in the above process

a) State one pollution effect of the gases mentioned above (1mk)

b) Mention one way in which pollution by the gases mentioned in iv (a) is reduced in the contact process (1mk)

4. Trona is a double salt with the formula $\text{Na}_2\text{CO}_3 \cdot \text{NaHCO}_3 \cdot \text{H}_2\text{O}$

The scheme below shows some processes involving trona



(i) a) Give one importance of step I (1mk)

b) Briefly explain what takes place in step I (1mk)

c) Two reactions take place in the kiln at different temperatures

Write chemical equation for:-

Reaction 1 (1mk)

Reaction 2 (1mk)

d) State one importance of the heat exchanger (1mk)

(ii) A mixture of trona and common salt are obtained from Lake Magadi at different temperatures

(i) State the method used to separate the two salt (1mk)

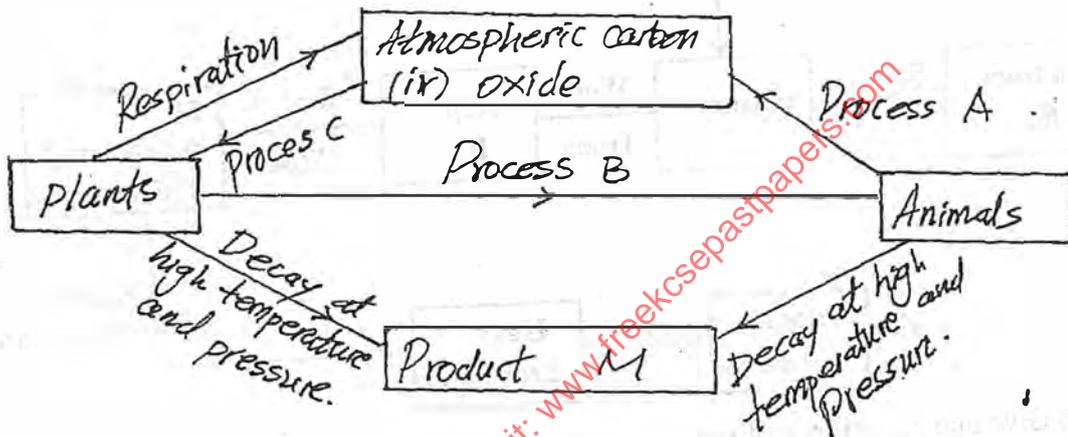
(ii) Which salt is obtained at

21°C (1mk)

40°C (1mk)

(iii) State one use of the salt obtained at 21°C. (1mk)

(iii) Study the cycle below and answer the questions that follow



(i) Identify the processes

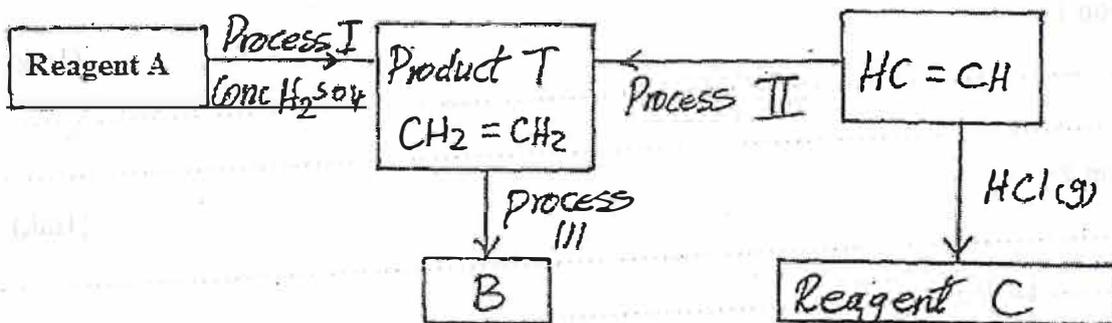
A (1mk)

B (1mk)

C (1mk)

(ii) Name product M (1mk)

5. The flow chart below shows a series of reaction involving organic compounds. Study it and answer the questions that follow



a) (i) Name process A (1mk)

(ii) Give the general formula for the homologous series to which product T belongs (1mk)

(iii) Identify

Product C (1mk)

Reagent A (1mk)

(iv) Give the condition necessary for process I to take place (1mk)

b) Product T polymerizes to produce a large molecule B

(i) Draw the structure of B (1mk)

(ii) The polymer form above was found to have a molecular mass of 53000. Calculate the number of monomer used (1mk)

c) Study the information in the table below and answer the questions that follow

Number of carbon atoms per molecule	Relative molecular mass of hydrocarbon
2	30
3	44
4	58

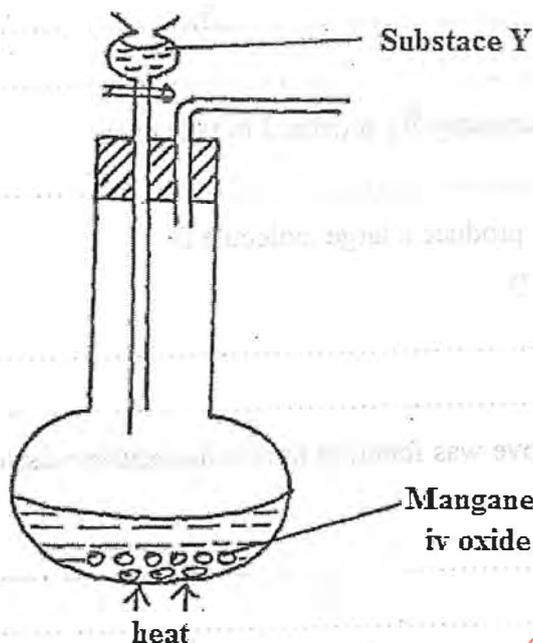
(i) Predict the relative molecular mass for the hydrocarbon with 5 carbon atoms per molecule

(1mk)

(ii) Draw a branched isomer of molecule with four (4) carbon atomic and give its name

(2mks)

6. The diagram below shows incomplete set-up of apparatus used to prepare chlorine gas in the laboratory. Study it and answer the questions that follow



- a) (i) Identify substance Y (1mk)

- (ii) Write an equation for the reaction that takes place in the flask (1mk)

- (iii) Give the name of a substance that can be used in place of Manganese (IV) Oxide when heating is not required (1mk)

- (iv) Complete the diagram to show how dry chlorine gas can be collected (2mks)

- b) Chlorine is bubbled into potassium iodide solution

- (i) State the observation made (1mk)

- (ii) Write an equation for the reaction that took place in b (i) above (1mk)

- c) When Chlorine is reacted with cold dilute sodium hydroxide one of the product formed is sodium hypochlorite

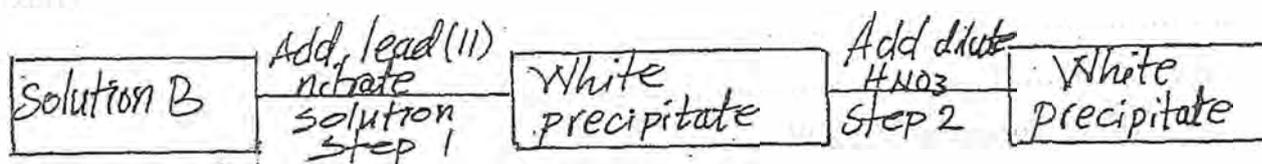
- (i) Write an equation for the reaction (1mk)

(ii) State one use of sodium hypochlorite

(1mk)

d) State and explain the observations made when a dry red litmus paper is placed in a gas jar of dry chloride gas (1mk)

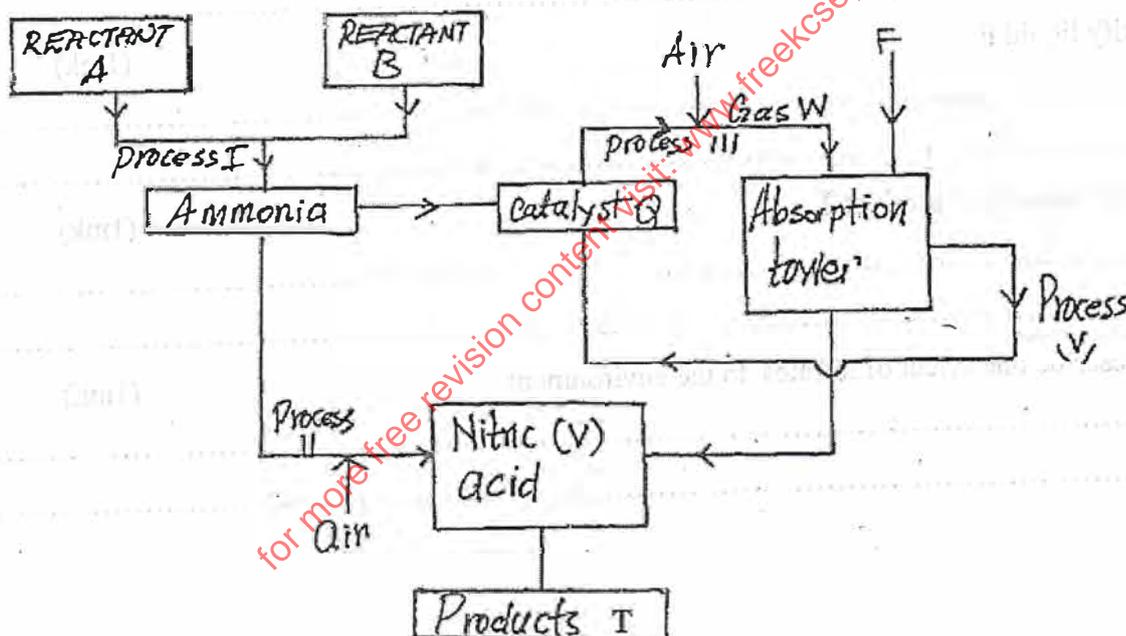
e) Study the scheme below and answer the questions that follow



Identify the two possible anions present in solution B

(2mks)

7. The scheme below shows outward process study it and answer the questions that follow



a) The reactants A and B reacts in ration of 1:3

Name reactant A and B

(2mks)

Reactant A

Reactant B

b) Name (i) Catalyst Q (1mk)

(ii) Gas W (1mk)

c) Write chemical equation for:-

(i) Reaction taking place in the absorption tower (1mk)

(ii) Formation of gas W (1mk)

d) State the importance of process (iv) (1mk)

e) Identify liquid F (1mk)

f) (i) State one use of product T (1mk)

(ii) Describe one effect of nitrates to the environment (1mk)

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