

Name.....

Index No.....

School.....

Candidate's Signature.....

Date

233/2

CHEMISTRY

Paper 2

July/August 2010

2 Hours

BUNGOMA JOINT EVALUATION TEST - 2010
Kenya Certificate of Secondary Education (K.C.S.E)

233/2

CHEMISTRY

Paper 2

July/August 2010

2 Hours

Instructions to candidates

- Write your name and index number in the spaces provided above.
- Sign and write the date of examination in the spaces provided above.
- Answer **all** questions in the spaces provided
- Mathematical tables and electronic calculators may be used for calculations
- **All** working must be clearly shown where necessary

FOR EXAMINER'S ONLY

QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
1	10	
2	13	
3	13	
4	10	
5	13	
6	12	
7	09	
TOTAL	80	

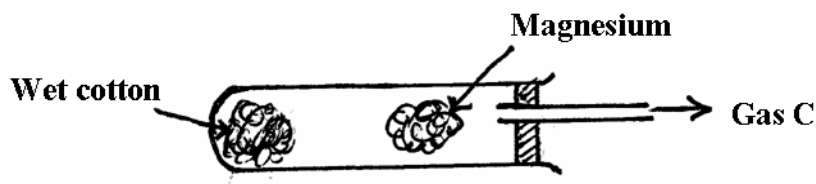
This paper consists of 12 printed pages .Candidates should check the question paper to ensure that all the pages are printed as indicated and no questions are missing

1. a) Study the table below which shows properties of elements across period three and answer

the question that follow.

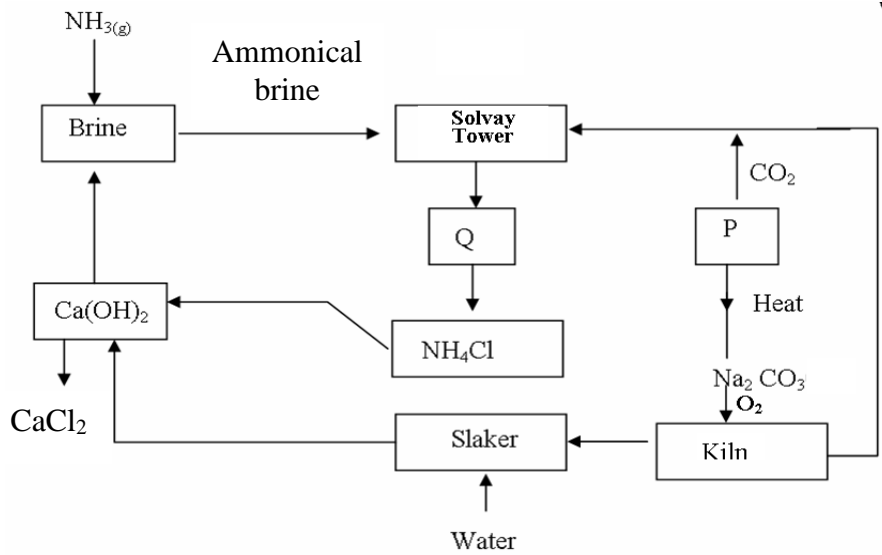
Element	A	B	C	D	E	F	G	H
Atomic radius (nm)	0.156	0.136	0.125	0.118	0.110	0.104	0.099	-
Ionic r Radius (nm)	0.095	0.065	0.050	-	-	0.184	0.181	-
Melting points ($^{\circ}\text{C}$)	97.8	650	660	1410	44.2	119	-101	-186

- i) Explain why the atomic radius of G is smaller than its ionic radius. (1mk)
-
-
- ii) Explain why the melting point of D is higher than the other elements (2mks)
-
-
- iii) Give the formula of the chlorides of element B (1mk)
-
-
- b) The ions of V^{3+} and U^{2-} have identical electronic configuration 2.8. Write down the electron arrangement of the elements U and V (2mks)
- U
- V
- c) The diagram below shows how magnesium reacts with steam



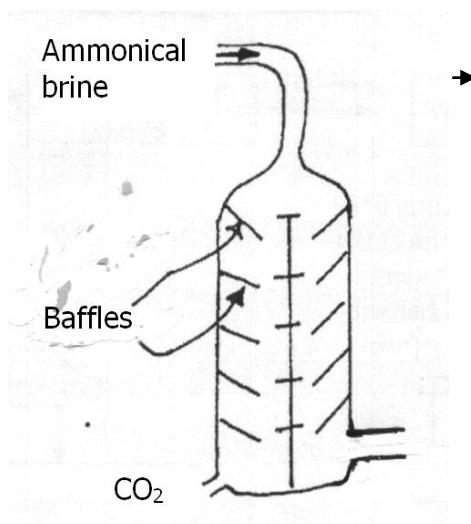
- i) Gas C would not be produced as is in the set-up but when certain condition is introduced gas C is produced. Identify the condition which was omitted in the set-up (1mk)
-
- ii) Describe how gas C is produced after the mistake was corrected in the above set-up (2mk)
-
-
- iii) Why is it not advisable to use potassium in place of lithium? (1mk)

2. The flow chart below shows the manufacture of sodium carbonate. Study it carefully and answer the questions that follow.



- a) i) What is ammoniacal brine? (1mk)
-
- ii) Ammoniacal brine reacts with carbon (IV) oxide to form a mixture of two salts which produce Q. Write an equation to show formation of Q (1mk)
-
-
-
- iii) Name two processes that are used to separate Q into NH₄Cl and P (2mks)
-
-
-
- b) Give two uses of sodium carbonate produced in the process (2mks)
-
-
- c) i) Name the substance that reacts with water that comes into the slaker (1mk)
-
- ii) What happens at the kiln? (1mk)
-
-
- d) Write an equation for the reaction that occurs when P is heated to form solid Na₂CO₃ (1mk)
-
-
- e) Name two substances that are recycled in the process. (1mk)

-
.....
f) Solvay tower is as shown below. Study the diagram and answer the question below

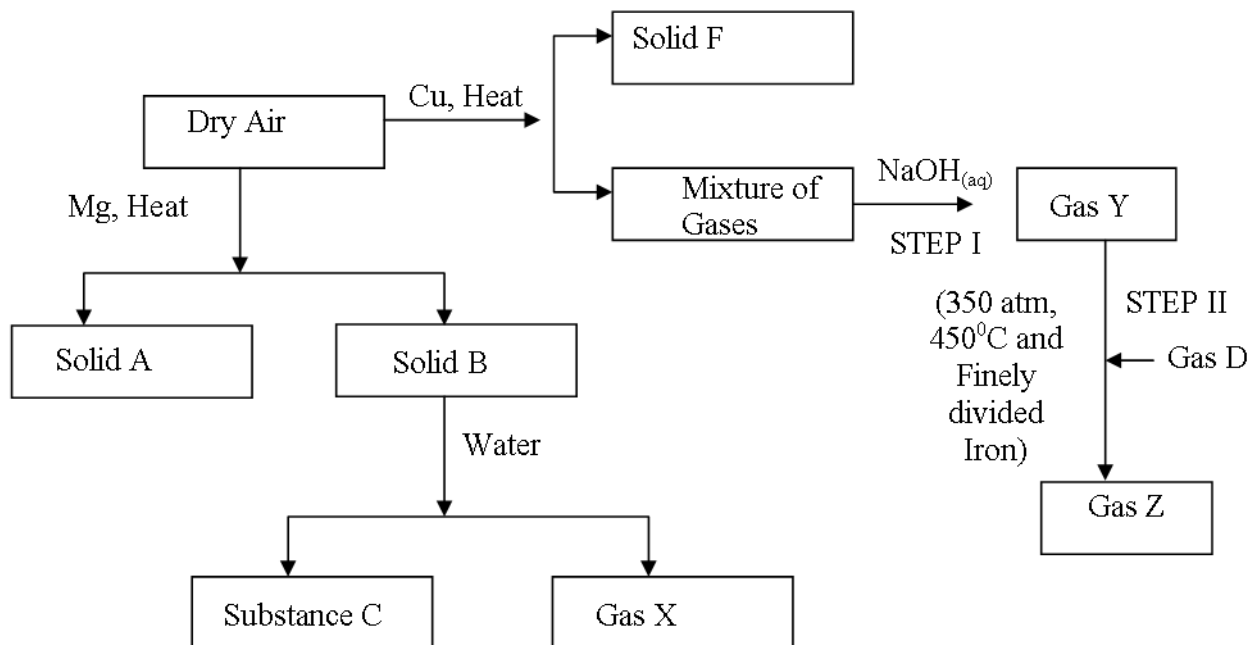


Give two reasons why the bottles are used in the solvay (2mks)

-
.....
g) A factory produces 63.6 tonnes of anhydrous Na_2CO_3 on a certain day by this process. Calculate the number of tonnes of sodium chloride used upon on this particular day. Assume the plant is working at 100% efficiency.

(C = 12, H = 1, Cl = 35.5, Ca = 40, Na = 23) (3mks)

3. Study the diagram below that shows some reactions of dry air, then answer the questions that follow.



- a) Identify; (2mks)
- Solid A
 - Solid B
 - Gas D
 - Gas Z
- b) Why is the amount of solid B obtained much less than solid A? (2mks)
-
-
-
- c) Write a balanced equation for the reaction between solid B and water (1mk)
-
-
- d) i) How can gas Y be obtained from gas X in the laboratory? (2mks)
-
-
- ii) Write an equation for the process in d) i) above (1mk)
-
-
- e) Which gas is absorbed by sodium hydroxide in step I (1mk)
-
- f) Gas Y obtained in step I is impure, Name one impurity it contains (1mk)
-

g) i) What name is given to the process that occur in step II (1mk)

.....

ii) Explain the effect of using much lower temperature than that in step II (2mks)

.....

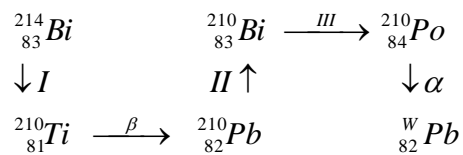
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4. a) What is nuclear reaction? (1mk)

.....

b) Below is a radioactive decay series starting from ${}_{83}^{214}\text{Bi}$ study it and answer the questions that follow.



i) Identify the particles in Step (2mks)

I

II

ii) Determine the value of W (1mk)

iii) Which of the nuclides in the series are isotopes (1mk)

c) Give one use of radioactive isotopes in relation to water or oil pipes. (1mk)

.....

d) Radioactive material pollutes the environment with greater effects. State two ways of controlling the effect of radioactive material to the environment (2mks)

.....

.....

e) State two differences between nuclear reaction and chemical reactions (2mks)

.....

.....

5. I) Sample of crude oil was heated and its vapour passed over red-hot pumice stone. A mixture of gases was evolved, which decolorized bromine in tetra chloromethane and burned in air with a yellow flame.

a) What process is taking place when the vapour from crude oil passes over heated pumice stone? (1mk)

.....

.....

b) Name the most likely type of compound causing the decolorization of

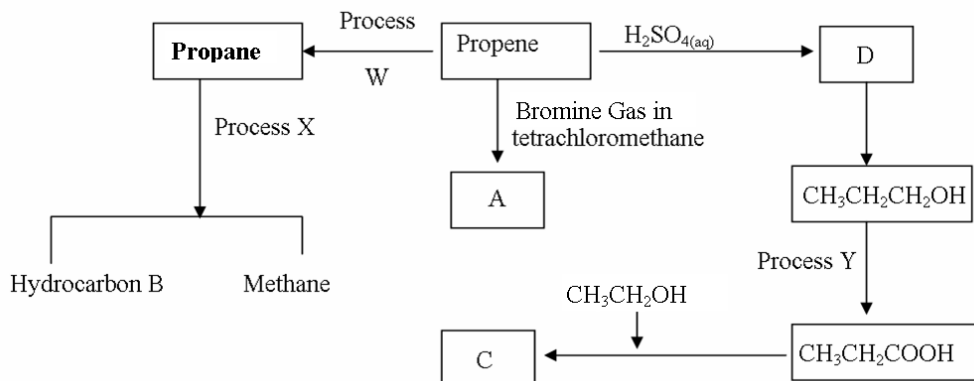
the bromine solution

(1mk)

- c) Name two compounds which could be formed when the gas mixture burns in air

(1mk)

II) Study the flow chart below then answer the questions that follow.



- a) Name processes:

(2mks)

W

X

- b) i) Write the formula of compound D

(1mk)

.....

- ii) State one use of product D

(1mk)

.....

- c) i) Identify the reagent used in process Y

(1mk)

.....

- ii) Write an equation for the reaction taking place when substance formed in process Y reacts with sodium

(1mk)

.....

.....

- d) Identify substance A and B

(2mks)

A

B

- e) i) Write the formula of substance C.

(1mk)

.....

- ii) State observation made during formation of substance C

(1mk)

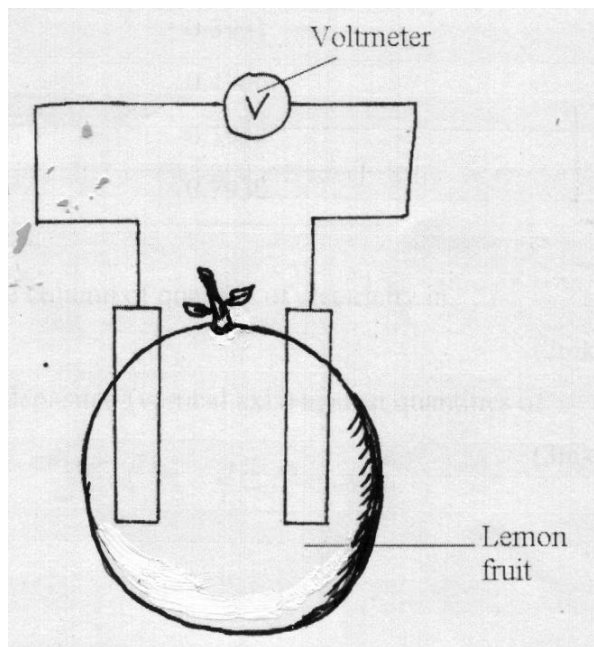
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- iii) State one condition necessary for the formation of C

(1mk)

.....

6. I Two metal strips of copper were inserted into a lemon. The strips were then connected to a voltmeter as shown in the diagram below.



- a) State the observation on the voltmeter. (2mks)

.....

Explain

.....

- b) If the copper strips were replaced with magnesium ribbons how would the new voltage reading compare with the first one. Give a reason. (2mks)

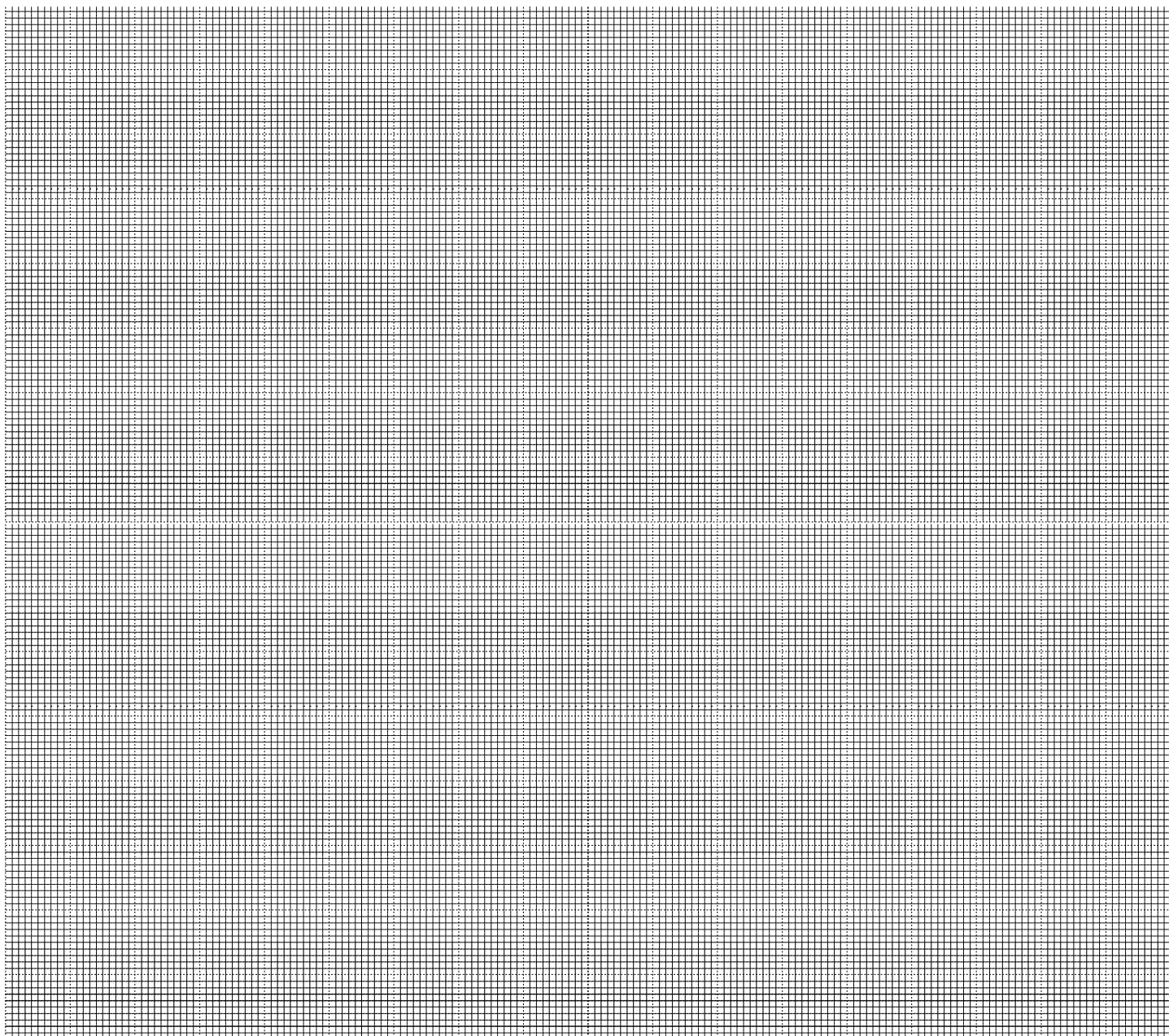
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- II A current of 0.5 amperes was passed through a cell containing copper anode And copper cathode for 10 minutes and the mass of copper deposited was recorded For each experiment as shown in the table below.

Current (Amperes)	Time (Minutes)	Time (Seconds)	Quantity of electricity (C)	Mass of copper deposited (g)
-------------------	----------------	----------------	-----------------------------	------------------------------

0.5	10.0	600		0.0991
1.0	10.0	600		0.1960
1.5	10.0	600		0.2970
2.0	10.0	600		0.3961
2.5	10.0	600		0.4960
2.0	15.0	900		0.5950
2.0	20.0	1200		0.7930

- a) Complete the table by filling the column of quantity of electricity in Coulombs (2mks)
- b) Plot a graph of mass of copper deposited (vertical axis) against quantities of electricity. (3mks)



- c) From the graph
- i) Determine the mass of copper per unit quantity of electricity (2mks)

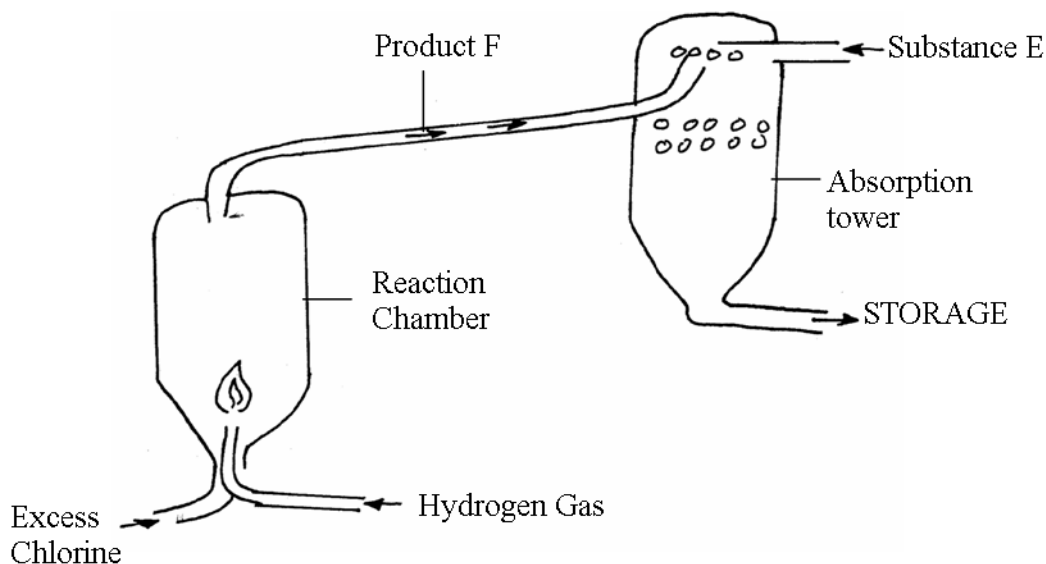
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 ii) Write an expression showing the relationship between mass of copper (M) and quantity of electricity (Q) (1mk)

.....

 iii) Hence determine the mass of copper deposited if 1900C of electricity is passed through the cell. (1mk)

7.



The above diagram shows a set up that can be used for industrial manufacture of hydrochloric acid. Study it and answer the questions that follow.

a) Name
 i) Product F (1mk)

.....
 ii) Substance E (1mk)

.....
 b) Explain one application of hydrochloric acid in textile industry (1mk)

.....

c) Hydrochloric acid was added to iron powder in a test-tube and shaken thoroughly to mix to 1cm³ of the resulting solution, six drops of aqueous

solution of ammonia were added.

i) State the observation made on adding ammonia solution (1mk)

.....
.....

ii) Explain the observation stated above and write an ionic equation for the reaction (2mks)

.....
.....

d) Concentrated hydrochloric acid is 35% pure with a density of 1.18g/cm^3 . Calculate its concentration in moles per litre. (3mks)