

Name: _____ Adm No _____

Signature: _____ Date: _____

233/2

CHEMISTRY

PAPER 2

Time: 2 hours



KCSE ACHIEVERS PREDICTION



Kenya Certificate of Secondary Education

INSTRUCTIONS TO CANDIDATES

- *Write your name and index no in the spaces provided*
- *Sign and write the date of the examination in the spaces provided*
- *Answer all questions in this paper in spaces provided.*
- *All working must be clearly shown where necessary.*
- *Mathematical tables/electronic calculators may be used.*

FOR EXAMINER USE ONLY

QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
1	13	
2	12	
3	09	
4	12	
5	13	
6	13	
7	08	
TOTAL SCORE	80	



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Turn over

1. Study the information in the table below and answer the questions that follows.
The letters do not represent the symbol of the elements.

Element	Atomic number	Melting point (°C)
A	8	-2188
B	9	-219.6
C	12	650
D	13	660
E	14	1410
F	17	-101
G	20	842

- a) Write the electron arrangement for the
- i) Atom of D. (1mark)
-
- ii) Ion of F (1mark)
-
- b) Select an element which is
- i) The most reactive non-metal. (1mark)
-
- ii) Best conductor of electricity. (1mark)
-
- c) To which group of the periodic table does element G belong. (1 mark)
-
- d) How do the reactivity of element C and G compare? Explain (2 marks)
-
-
-
- e) Using dots [•] and crosses [×] to represent outermost electrons, show the bonding in the compound formed between elements B and D. (1 mark)



f) Explain why the melting point of element D is higher than that of element C.(2 marks)

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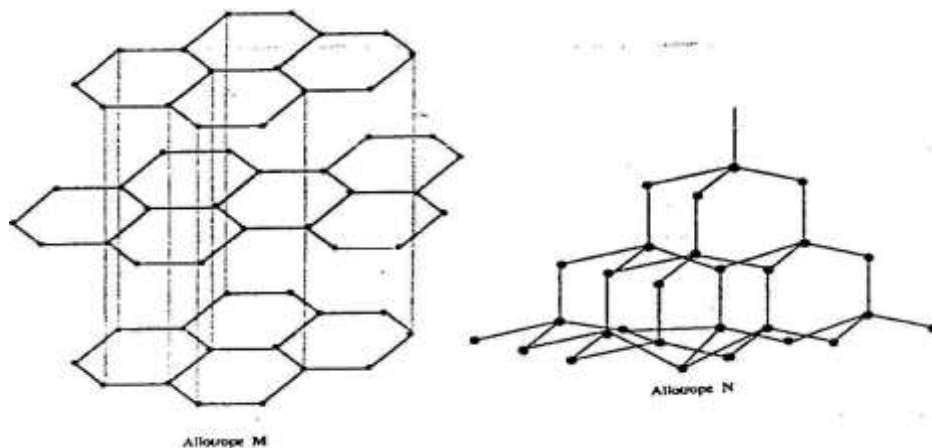
g) Write a chemical equation for the reaction that will occur between C and A. (1 mark)

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h) Compare the atomic and ionic radius of element F. (2 marks)

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2. (a) The following diagrams show the structures of two allotropes of carbon. Study them and answer the questions that follow.



(i) What is meant by the term allotropy? (1mark)

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ii) Name allotrope M and N

(2mark)

M.....

N.....

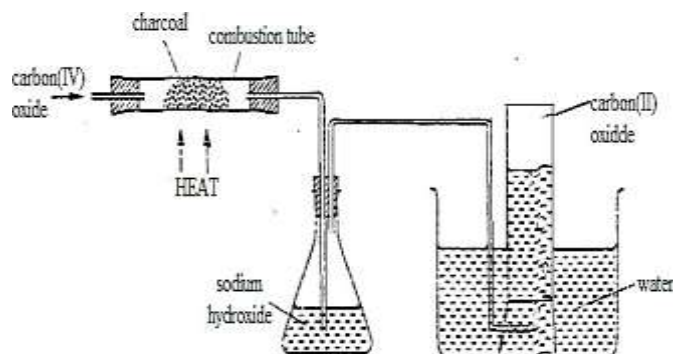
iii) Give one use of N (1mark)



.....
.....
iv) Which allotrope conducts electricity? Explain

(2mark)

b) In an experiment, carbon (IV) oxide gas was passed over heated charcoal and the gas produced collected as shown in the diagram below



i) Write an equation for the reaction that took place in the combustion tube (1mark)

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.....

ii) Name another substance that can be used instead of sodium hydroxide (1mark)

i) Describe a simple chemical test that can be used to distinguish between carbon(IV)oxide and carbon(II) oxide (3marks)

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ii) Give one use of carbon (II) oxide

(1mark)

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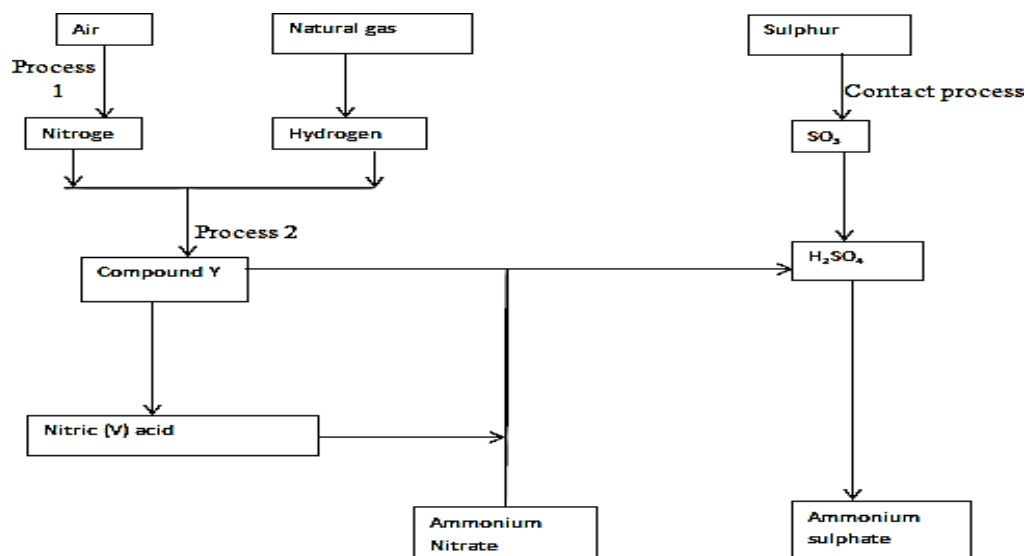


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3. The flow chart below represents some industrial processes leading to the formation of two nitrogenous fertilizers.



a) Name each of the process above

i) Process 1

(1mark)

.....

ii) Process 2

(1mark)

.....

b) Name the catalyst used in

i) Process 2

(1mark)

.....

ii) Ostwald process

(1mark)

.....

iii) Contact process

(1mark)

.....



c) Name compound Y

(1mark)

.....

d) Write the equation for the reaction that leads to formation of ammonium sulphate
(1mark)

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.....

e) Ammonium nitrate is a better fertilizer than ammonium sulphate. Explain and show your working. (N = 14, H = 1, O = 16, S = 32). (2 marks)

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4. a) Study the table below and answer the questions that follows

Formula of hydrocarbon	Boiling points (K)
C ₂ H ₄	-104
C ₃ H ₆	-47.7
C ₄ H ₈	-62
C ₅ H ₁₀	30
C ₆ H ₁₂	63.9

i) What name is given to a series of organic compounds like the ones in the table? (1 mark)

.....

ii) To what class of organic compounds does the above hydrocarbon belong? (1 mark)

.....

iii) Select one hydrocarbon that would be a gas at room temperature (298K); give a reason for your answer. (2 marks)

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iv) Give the formula of the seventh member of the above series. (1 mark)

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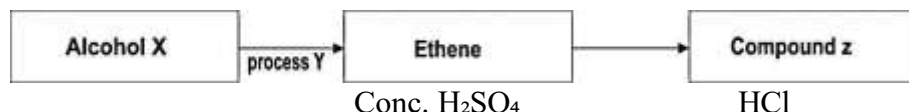
v) What is the relationship between the boiling point and the relative molecular



masses of the hydrocarbons in the table above? Explain your answer.
(2marks)

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



a. Write the formula of

i) Alcohol X

..... (1mark)

ii) Compound Z

..... (1mark)

iii) Name process Y.

..... (1mark)

b) Propane and chlorine react as shown below;



iv) Name the type of reaction that takes place.

(1mark)

.....

v) State the condition under which this reaction takes place.

(1 mark)

.....

c) The table below gives the volume of the gas produced when different volumes of 2M sulphuric (VI) acid were reacted with 0.6g of magnesium powder at room temperature.

Volume of sulphuric acid(cm^3)	Volume of gas (cm^3)
0	0
10	240
20	480
30	600
40	600
50	600



- a) On the grid provided plot a graph of the volume of gas produced against volume of the acid used. (3marks)



b) Write an equation for the reaction between sulphuric (VI) acid and magnesium (1mark)

.....

c) From the graph determine

(i) The volume of the gas produced if 12.5cm³ of 2M sulphuric (VI) acid has been used. (1mark)

.....

(ii) The volume of 2M sulphuric (VI) acid which reacted completely with 0.6g of magnesium powder. (1mark)

.....

d) Explain the effect on rate of production of the gas if;

i) 0.6g of magnesium ribbon was used instead of magnesium powder (1mark)

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ii) 3M sulphuric (VI) acid was used instead of 2M sulphuric (VI) acid (1mark)

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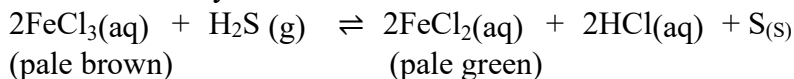
e) Given that one mole of a gas occupied 24000cm³ at room temperature, calculate the relative atomic mass of magnesium. (3marks)

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f) In another experiment, aqueous iron (III) chloride reacts with hydrogen sulphide gas in a closed system as shown below.



State and explain the observation that would be made if dilute hydrochloric acid is added to the system at equilibrium. (2marks)

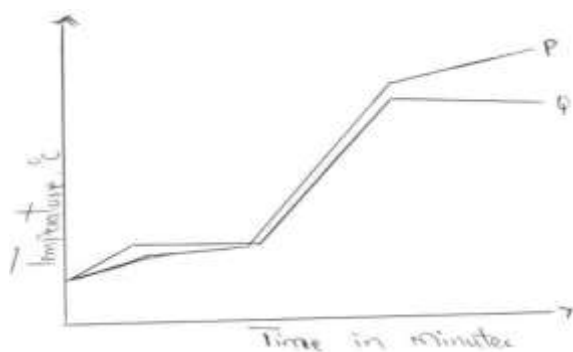
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5. The curves below represent the variation of temperature with time when pure and impure samples of a solid were heated separately.





- a) Which curve shows the variation in temperature for the pure solid? Explain.
(2marks)

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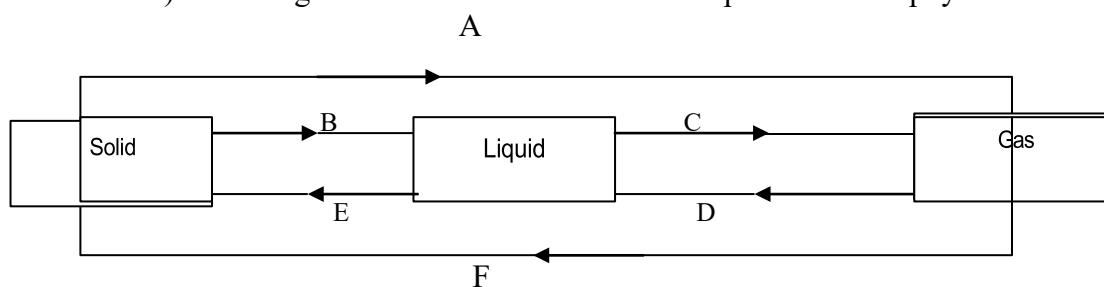
- b) State the effect of impurities on the melting and boiling points of a pure substance.
 i. Melting points (1/2mark)

.....

- ii. Boiling points (1/2mark)

.....

- c) The diagram below shows the relationship between the physical states of matter.



- i) Identify the processes B and D.

B.....(1/2 mark)



D.....(1/2 mark)

ii) Name process A (1mark)

.....

iii) State two substances in chemistry that undergo the process A (2marks)

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.....

iv) Is the process E exothermic or endothermic? Explain (2marks)

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7 a) What method can be used to separate a mixture of ethanol and propanol. (1mark)

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b) Explain how a solid mixture of Sulphur and sodium chloride can be separated into solid Sulphur and sodium chloride crystals. (3marks)

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c) The table below gives the solubility's of potassium bromide and potassium sulphate at 0°C and 40°C

Substance	Solubility g/100g water at	
	40°C	80°C
Potassium bromide	55	75
Potassium sulphate	85	95

When an aqueous mixture containing 60g of potassium bromide and 70 g of potassium sulphate in 100g of water at 80°C was cooled to 40°C some crystals were formed

i) Identify the crystals. (1mark)

.....

ii) Determine the mass of the crystals formed. (1mark)



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.....
iii) Name the method used to obtain the crystals. (1mark)

.....
iv) Suggest one industrial application of the method named in (iii) above. (1mark)
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