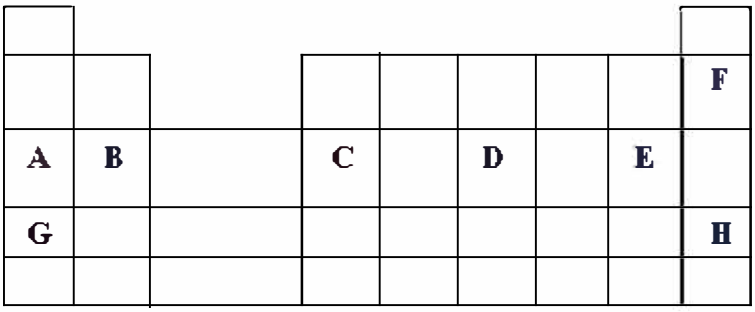
GATANGA FORM FOUR END OF TERM II EXAMINATION 2016
233/2
CHEMIS TRY (THEORY)
PAPER 2

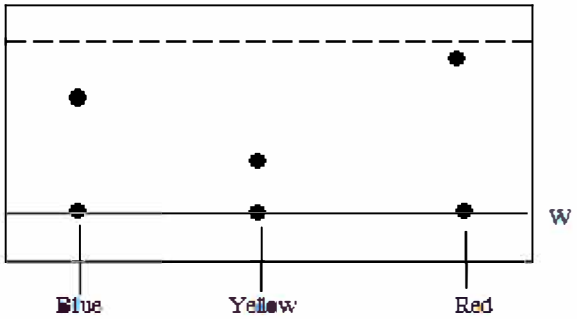
1. The table below shows elements in the periodic table. Use it to answer the questions that follow. The letters are not the actual symbols of the elements.



a) i) Write the electron arrangement of elements; B and A
ii) Write the formula of the compound formed between the elements B and E. (1mk)
b) Element K has atomic number 14. Indicate by use of tick ( ) the position of this element in the table above. (1mk)
c) i) he ionization energy of A is higher than that of G. Explain. (1mk)
ii) The atomic radius of C is larger than that of D. (1mk)
iii) Compare the reactivity of elements A and B.
Explain your answer. (2mks)
d) i) State the name of the group to which elements F and H belong. (1m
ii) Give one use of any of the elements of in group in d(i) above. (1mk)
e) The chloride of B is ionic, while the chloride of C is covalent. Explain this observation. (2mks)
2. (a) A student wrongly categorised air as a compound and not as a mixture. Give two reasons as to why the student was wrong. (2mks)
(b) The table below shows the results obtained when four solvents were used to separate a dye. Study the results and use them to answer the questions that follow.

Solvent	Number of Solute components
A	5
B	1
C	0
D	2

i) Identify the most suitable solvent for this separation. Give a reason for your answer. (2mks)
ii) What does the result of the solvent C tell us about the dye? (1mk)
c) The chromatogram below was obtained from a plant extract. Use it to answer the questions that follow.



i) Name line W (1mk)
ii) What does the dotted line represent? (1mk)
iii) State with a reason the least soluble dye in the moving solvent. (1mk)
d) Below is a list of major component of crude oil and their boiling points.

Component	**Boiling point (^{0}C)**
Bitumen	Above 400
Lubricating oil	350 - 400
Petrol	40 - 175
Gases	Below 40

i) What is the name of the process by which the constituents of crude oil can be separated? (1mk)

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ii) Give one use of the gases component. (1mk)

iii) Give the order by which the components are obtained from the mixture, starting with the first. (1mk)

3. An impure solid of magnesium carbonate weighing 9.5g was placed in a beaker containing 50cm^3 of dilute nitric (V) acid. The volume of carbon (IV) oxide evolved was recorded at 20 seconds interval in the table below.

Time from start of Reaction (sec)	0	20	40	60	80	100	120
Volume of CO_2 at s.t.p (cm^3)	0	650	900	1070	1100	1120	1120

3. a) Write the equation for the reaction between magnesium carbonate and nitric (V) acid. (1mk)

b) i) Plot a graph of volume of carbon (IV) oxide (y-axis) against time. (3mks)

ii) From the graph; calculate the rate of reaction between

I 20 seconds and 40 seconds interval. (2mks)

II 40 seconds and 60 seconds interval. (2mks)

c) Explain the difference in the reaction rates in I and II. (1mk)

d) Why was there no further increase in the volume of carbon (IV) oxide gas after 100 seconds? (1mk)

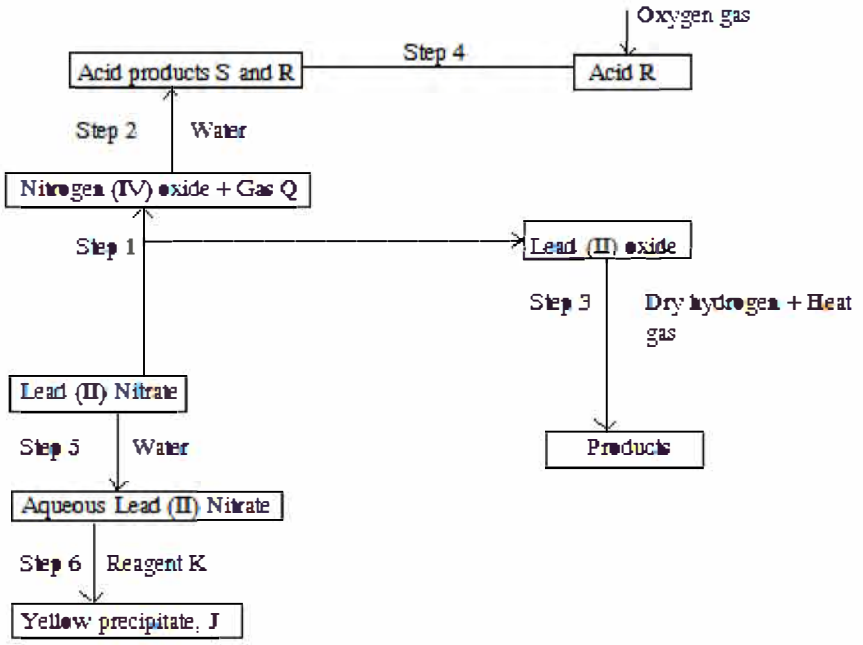
e) How many moles of carbon (IV) oxide were in the maximum volume produced from this reaction? (Molar gas volume at s.t.p. = 22.4 litres) (1mk)

f) What mass of magnesium carbonate will have reacted with the acid after 100 seconds. (Mg = 24, C= 12, O = 16) (2mks)

g) Determine the percentage purity of magnesium carbonate. (2mks)

h) Calculate the original concentration of the nitric (V) acid in moles per litre. (2mks)

4. The flow chart below shows some reactions starting with lead (II) nitrate. Study it and answer the questions that follow.



a) i) State the condition necessary in step 1. (1mk)

ii) Identify;

I Gas Q (1mk)

II The acid products S and R (2mks)

b) Write the balanced chemical equations for the reactions in;

i) Step3 (1mk)

ii)Step 4 (1mk)

c) i) The reaction between lead (II) nitrate and dilute sulphuric (IV) acid starts but stops almost immediately. Explain this observation. (2mks)

ii) Name a suitable reagent that can be reacted with concentrated sulphuric (IV) acid to produce Nitric (V) acid. (1mk)

d) In the industrial extraction of lead metal, the ore is first roasted in a furnance. The solid mixture obtained is then fed into another furnance together with coke, limestone and scrap iron. State the function of each of the following in this process:

a) Coke (1mk)

b) Limestone (1mk)

c) Scrap Iron (1mk)

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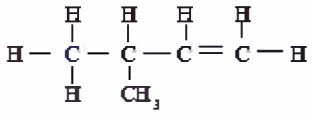
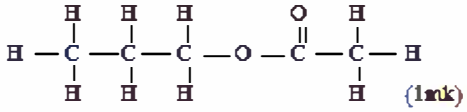
5. a) Candle wax is mainly a hydrocarbon. What is a hydrocarbon? (1mk)

b) Name the following compounds.

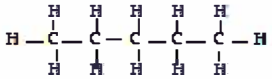
i)





(1mk)

ii)

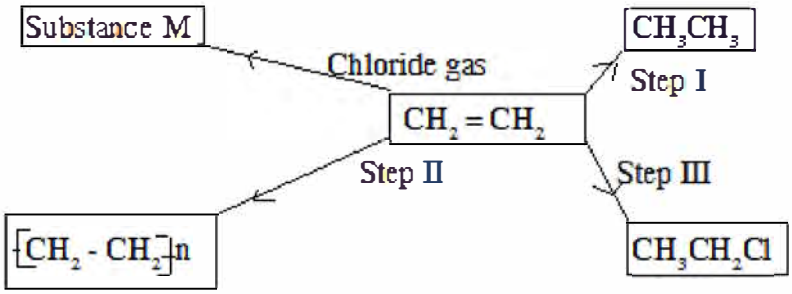


c) Castor oil extracted from castor seeds is found to change the colour of acidified potassium managanate (VII) .

i) State the colour change. (1mk)

ii) Explain why castor oil reacts with acidified Potassium mangate (VII) to cause the colour change. (1mk

d) Study the reaction scheme below and use it to answer the questions that follow.



ii) Name the process in;

Step I (1mk)

Step II (1mk)

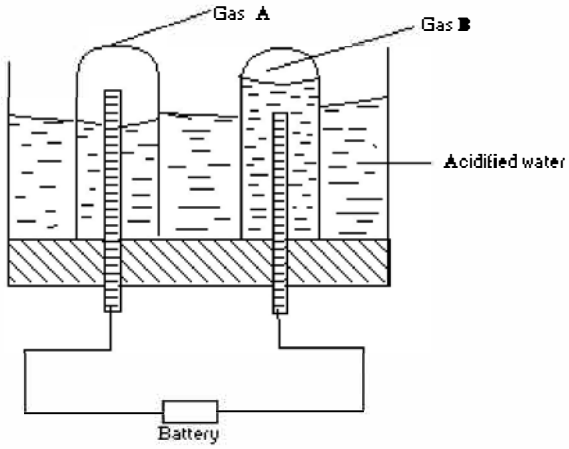
ii) State the reagent necessary for the process in

Step II (1mk)

Step III (1mk)

iii) Name the type of reaction taking place in step III (1mk)

6. The set up below was used during the electrolysis of acidified water using inert electrodes.



a) Why is the water acidified (1mk)

b) What material are the electrodes made of? (1mk)

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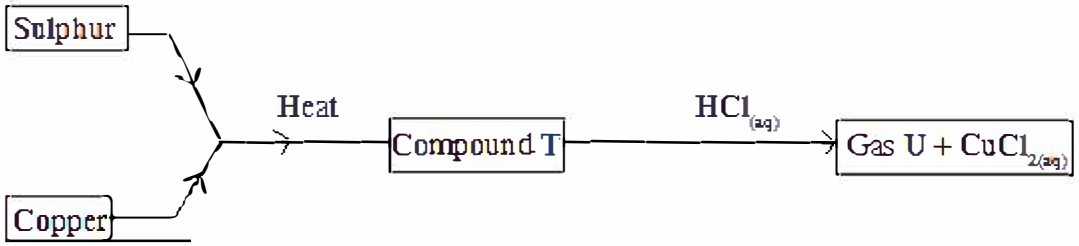
c) Identify: Gas A (1mk)
Gas B (1mk)

d) On the diagram label;
The Anode:(1mk)
The cathode (1mk)

e) During the electrolysis a current of 2 amperes was passed through the acidified water for $2\frac{1}{2}$ hours. Calculate the volume of gas B produced at rtp.
(1 Faraday = 96500C, Molar gas volume at r.t.p = 24000cm^3) (3 mks)

7. a) Rhombic sulphur and monoclinic sulphur are allotropes of sulphur. Define Allotropy. (1mk)
b)Give two other elements that exhibit allotropy. (1mk)
c) Study the flow chart below and answer the questions that follow.



c) Name (i) Compound T (1mk)
ii) Gas U (1mk)

d) The equation below shows the reaction between sulphur (IV) oxide gas and oxygen gas to produce sulphur (VI) oxide in contact process.
$2\ SO_{2(g)} + O_{2(g)} \rightarrow 2SO_3$ D = -197 kJ/mol

i) State two conditions that are necessary for maximum production of SO_3. (2mks)

ii) Name the catalyst used for this reaction. (1mk)

e) State one use of sulphuric (IV) acid. (1mk)

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