Name ..... Adm No..... Class ..... No.....Sign .....

NYABURURU GIRLS' NATIONAL SCHOOL

OUR LADY OF LOURDES

Date done	
Invigilator	
Date returned	
Date revised	

FORM 3 CHEMISTRY

CAT 1 TERM 2 2016

TIME: 2 HOURS

Instructions

Answer all the questions in the spaces provided.

FOR EXAMINER'S USE ONLY

QUESTION	MAX. SCORE	CANDIDATE'S SCORE
1 - 20	80	

This paper has 10 printed pages

1. Give one effect of tobacco smoking. (1mk)

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2. The equations below show the reactions of zinc with dilute sulphuric (VI) acid and with concentrated sulphuric (VI) acid respectively.

   (a) $H_2SO_{4(aq)} + Zn_{(s)} \longrightarrow$ Gas H

   (b) $H_2SO_{4(l)} + Zn_{(s)} \longrightarrow$ Gas S

   Identify gases H and S (2mks)

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3. (a) Which flame is represented by the following diagram? (1mk)

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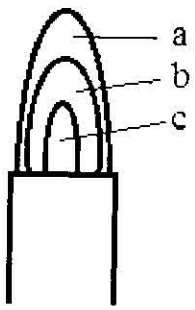

   (b) Name the regions labeled a, b and c. ($1\frac{1}{2}$mks)

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4. Classify the following changes as physical or chemical. (2mks)

   (a) Boiling.....

   (b) Evaporation.....

   (c) Burning a candle.....

   (d) Dissolving sodium chloride.....

5. What is the purpose of a fractionating column in fractional distillation? (1mk)

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6. What will be the volume of a given mass of oxygen at 25°C if it occupies 100cm^3 at 15°C? (Pressure remains constant). (3mks)

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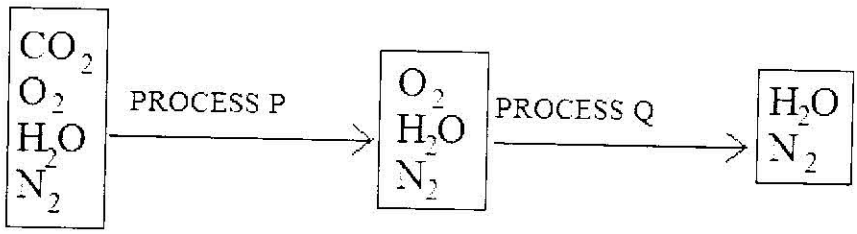
7. The chart below shows the process of obtaining nitrogen by fractional distillation.



(a) What is the purpose of processes P and Q. (2mks)

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(b) Identify the reagents used in processes P and Q. (2mks)

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(c) Write an equation for the chemical processes in P and Q. (2mks)

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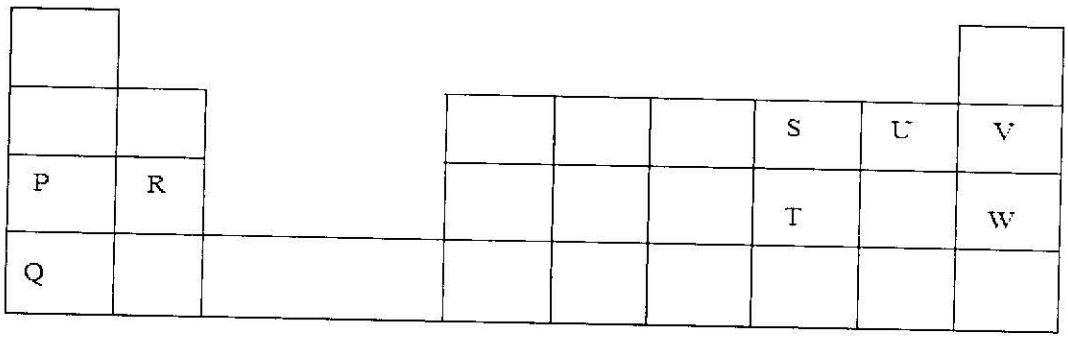
8. The grid below sows part of the periodic table. Use it to answer the questions that follow. (The letters do not represent actual symbols)



(a) Which of the elements has the highest atomic radius? Explain. (2mks)

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(b) Identify the most reactive non-metal. Explain. (2mks)

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(c) Give the electron configuration of elements S and Q (2mks)

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(d) Compare the atomic radius of P and R. Explain. (2mks)

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(e) Give the formula of one stable ion with an electron arrangement of 2.8 which is:-

i) Negatively charged (1mk)

.....

ii) Positively charged (1mk)

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(f) Given that the atomic mass of W is 40, write down the composition of its nucleus. (1mks)

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(g) Write the formula of the compounds formed between:

(i) Element P and S (2mks)

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(ii) Element R and T

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9. (a) Define the terms: (1mks)

(i) Electrolyte

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(ii) Electrolysis (1mk)

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(b)Explain the difference in conductivity between magnesium and molten magnesium chloride. (1mk)

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10. Element X (not the actual symbol) has atomic number 19 and mass number 39.

(a) State the number of neutrons in element X (1mk)

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(b) Give the oxidation number of element X. (1mk)

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11. In terms of structures and bonding, explain why metals are good conductors of electricity. (2mks)

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12. Explain why hydrogen can be placed in group 1 and group VII. (1mk)

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13. Using dots (.) and crosses (x), draw the electronic structures of the following showing only the outer energy levels. (C = 6, O = 8, Ca = 20, N = 7, H = 1) (3mks)

(a) Carbon (II) oxide

(b) Ammonium ion

14. (a) (i) What is meant by the term allotropy? (1mk)

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(ii) Name the allotropes of carbon. (1mk)

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(iii) Explain why graphite is used as a lubricant whereas diamond is used as an abrasive. (1mk)

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(iv) Explain why graphite is a better lubricant than oil. (1mk)

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(c) (i) Name the three starting materials used in the manufacture of sodium carbonate by Solvay process. ($1^1/_2$mk)

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(ii) Name two uses of carbon (IV) oxide. ($1^1/_2$mk)

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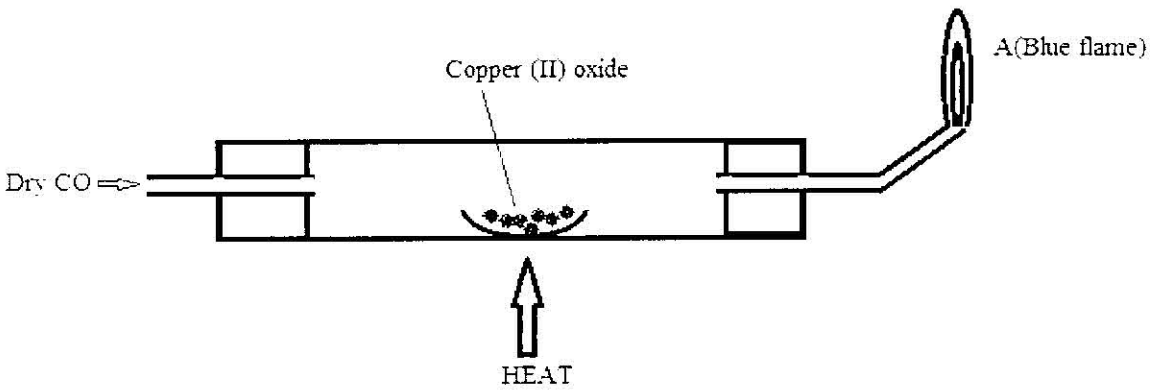
15. Excess carbon (II) oxide was passed over heated copper (II) oxide as shown in the following figure.



(a) (i) What observation is made in the combustion tube? (1mk)

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(ii) Write an equation for the reaction that takes place in the combustion tube. (1mk)

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(b) (i) Explain briefly why carbon (II) oxide is poisonous. (2mks)

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(ii) Name two gases apart from carbon (II) oxide which can be used in this experiment. (2mks)

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16. (a) State Charles' law. (1mk)

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(b) Sketch a graph to show how volume (y-axis) varies with temperature x-axis) at a constant pressure. (2mks)

17. Ammonia is made in industry by Haber process.

(a) Write an equation for the reading. (1mk)

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(b) What are the sources of the nitrogen and hydrogen used in the process? (2mks)

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(c) State optimum conditions for the process. (3mks)

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(d) Why is ammonia not dried using concentrated sulphuric acid? Explain using an equation. (2mks)

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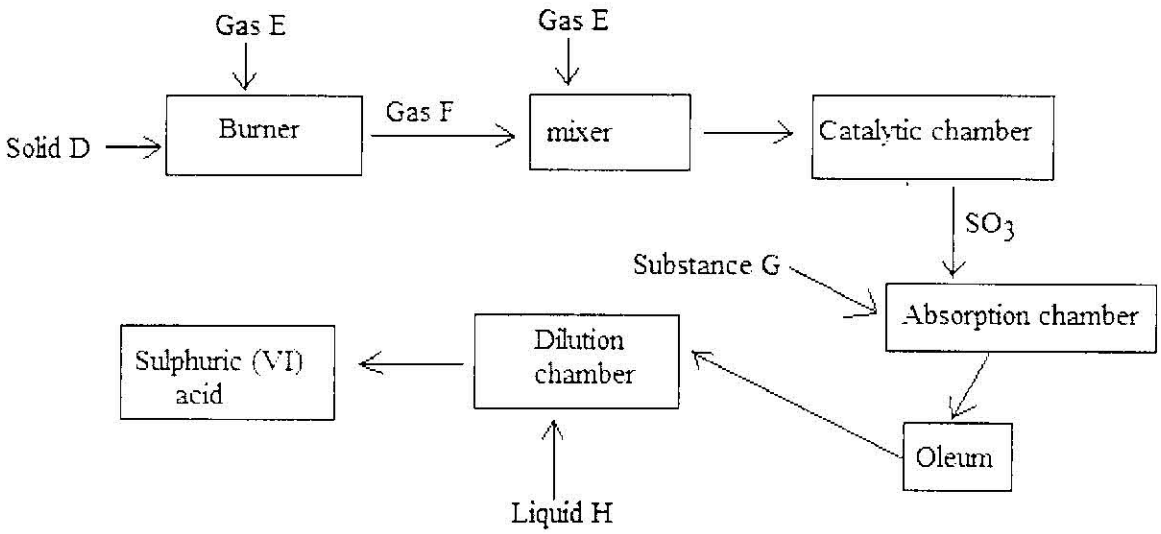
18. The flow chart below shows how sulphuric (VI) acid is produced on a large scale.



a) Identify: ($2^1/_2$mks)

i) Gas E.....

ii) Solid D.....

iii) Gas F.....

iv) Substance G.....

v) Liquid H.....

(b) (i) Name the catalyst used in the catalytic chamber. (1mk)

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(ii) Write an equation for the reaction taking place in the catalytic chamber. (1mk)

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(c) State and explain what you would observe if concentrated sulphuric (VI) acid is added to: (2mks)

(i) Cane sugar

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(ii) Copper sulphate crystals

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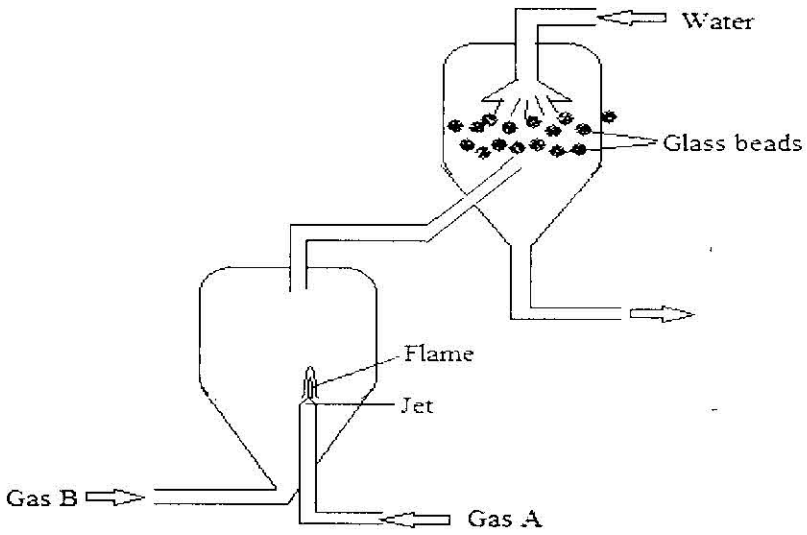
19. The following diagram represents a section of the plant for the large scale manufacture of hydrochloric acid.



(a) Name gases A and B. (2mks)

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(b) State the role of glass beads in the plant. (1mk)

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(c) Why is gas A introduced into the reaction chamber through the jet? (1mk)

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(d) Write the chemical equation for the reaction between the gaseous substances represented by A and B. (1mk)

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20. A volume of $120cm^3$ of nitrogen gas diffused through a membrane in 40 seconds, how long will $240cm^3$ of carbon (IV) oxide diffuse through the same membrane? (3mks)
(N = 14, C = 12, O = 16)

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