MATIGO EXAMINATIONS BOARD
UGANDA CERTIFICATE OF LOWER SECONDARY EDUCATION
END OF YEAR ASSESSMENT 2022
SENIOR TWO
CHEMISTRY: THEORY
Time allowed: 2 hour 15 minutes

Please write clearly in block capitals

Index Number:

Name:

Signature:

Materials

For this paper you must have:
- ✓ a ruler
- ✓ a scientific calculator

Instructions:
- ✓ Use black ink or black ball-point pen.
- ✓ Fill in the boxes at the top of this page.
- ✓ Answer all questions in the space provided in section A.
- ✓ Use separate answer sheets for section B
- ✓ In all calculations, show clearly how you work out your answer.

Information
- ✓ There are 100 marks available on this paper.
- ✓ The marks for questions are shown in brackets.
- ✓ You are reminded of the need for good English and clear presentation in your answers

For Examiner's Use	
Question	Mark
1	
2	
3	
4	
5	
6	
7	
8	
TOTAL	

SECTION A

*(Attempt **all** questions in this section)*

1. (a) Which piece of laboratory apparatus would be most suitable for each of the following activities? (06 marks)

   (i) Holding 50 cm^3 of boiling water. …….

   (ii) Melting a crystal over a Bunsen burner……

   (iii) Pouring 50 cm^3 of acid from one container to another……

   (iv) Measuring exactly 30 cm^3 of water……..

   (v) Removing substances from a reagent bottle……

   (vi) Weighing 100 grams of sodium chloride……

   (b) Provide appropriate advice to a student who accidentally spill water near an electrical equipment. (04 marks)

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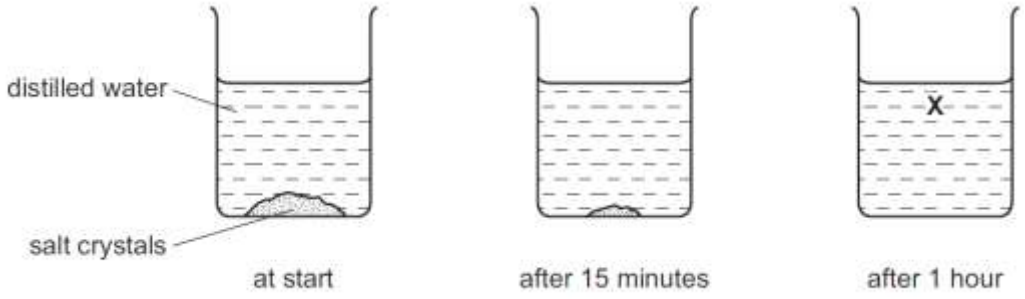
2. (a) Complete the following sentences about fractional distillation using words from the list below.

   Boiling, condenses, cooled, heated, higher, Lower, melting, mixture, pressure, vaporizes

   Petroleum is a ..... of hydrocarbons. This mixture is ..... and the hydrocarbons vaporize. The temperature in the fractionating column is ..... at the top than at the bottom. As the vapours move up the column, each hydrocarbon fraction ..... when the temperature in the column falls below the ..... point of the hydrocarbon fraction.

   (b) A student placed some crystals of salt at the bottom of a beaker of distilled water. She left the contents of the beaker to stand for one hour.

   The diagram below shows her observations. (05 marks)



   After one hour, all the salt had disappeared but the solution at point X tasted salty.

   (i) Use the kinetic particle theory to explain these observations. (03 marks)

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(c) Salt is sodium chloride, NaCl.
Which one of the following statements about bond formation in sodium chloride is
True?
Tick **one** box. (01 mark)

A sodium atom shares one electron with a chlorine atom. ☐

A sodium atom loses its outermost electron and a chlorine atom gains an electron. ☐

A sodium atom shares two electrons with a chlorine atom. ☐

A sodium atom gains an electron and a chlorine atom loses its outermost electrons. ☐

Explain why solid sodium chloride does not conduct electricity but molten sodium chloride does conduct. (03 marks)

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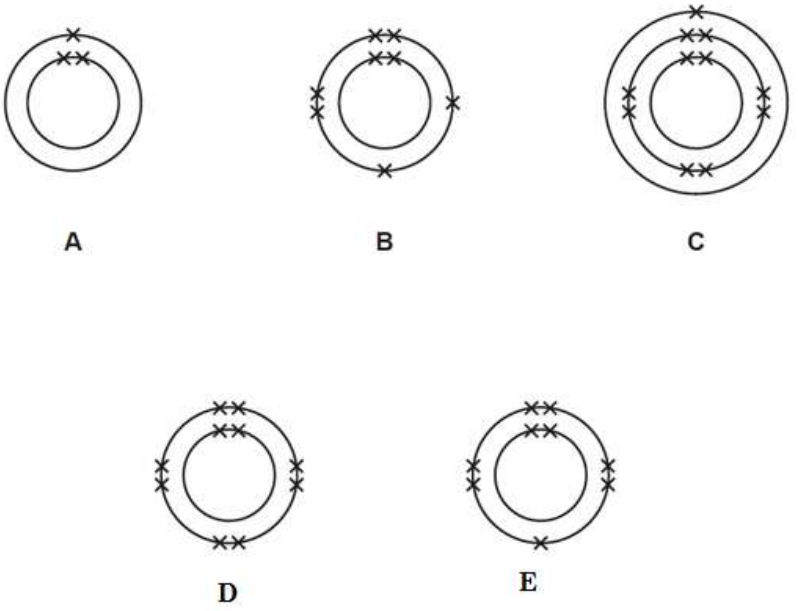
What is the name of the negative electrode? Put a ring around the correct answer.
An ion, anode,cation, cathode, electrolyte (01 mark)

3. (a) The electronic structures of various atoms are shown below



(i) (i) Which one of these structures A to E represents a noble gas? (01 mark)

……

(ii) Which two of these structures represent atoms from the same Group of the Periodic Table? (02 marks)

……

……

(iii) Which one of these structures represents an atom with an atomic number of 8?

……

(iv) Which one of these structures forms a stable ion by gaining one electron?

……

(v) Which one of these structures is in Period 3 of the Periodic Table?

……

(b) Complete the following sentences using words from the list.

Chlorine, diamond, high, low, sharing, sodium, strong, transfer, weak

Covalent bonds are formed by the…… of pairs of electrons.

Simple covalent molecules such as …… and bromine

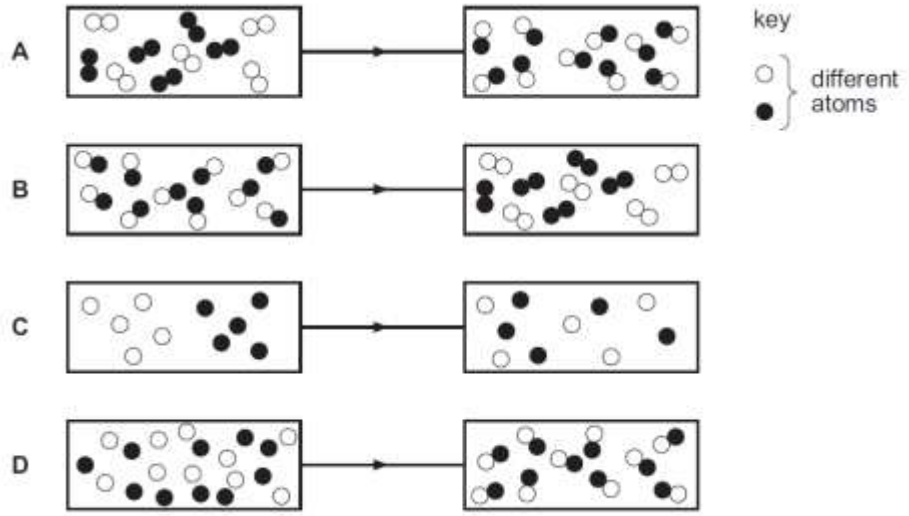
have…….. melting points. Giant covalent

structures such as ……have many……..bonds and have high melting points. (05 marks)

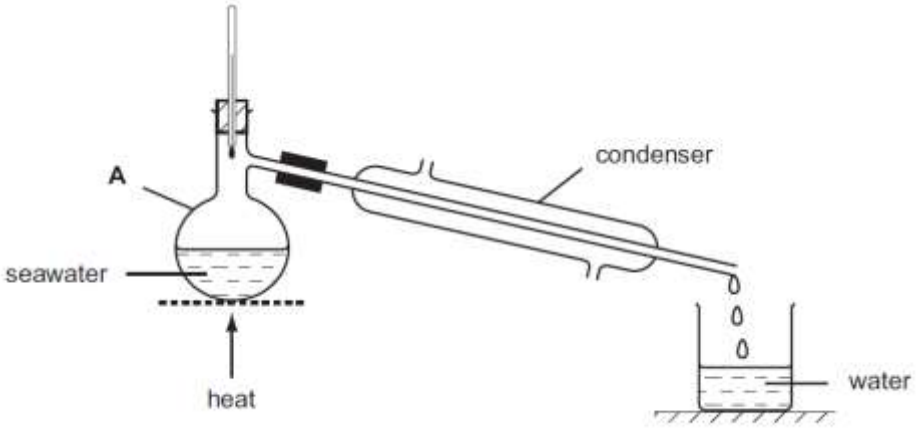
(c) The simplest covalent molecule is hydrogen. (02 marks)

(i) Draw a diagram to show how the electrons are arranged in a hydrogen molecule.

4. (a) Which diagram shows the process of diffusion? (01 mark)



(b) A student took a sample of seawater and heated it using the apparatus shown below.



(i) What is the name given to the process shown in the diagram? (01 mark)

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(ii) State the name of the piece of apparatus labelled A. (01 mark)

……..

(iii) Explain the function of the condenser. (02 marks)

……

……..

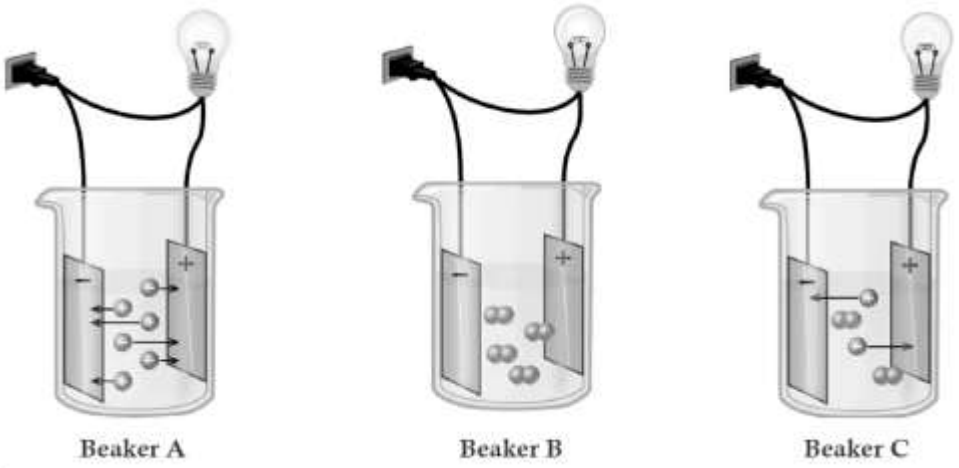
(iv) Pure water collects in the beaker, State the pH of pure water.(01 mark)

……..

(v) State the boiling point of pure water. (01 mark)

……

5. (a) Look at the figures and answer the following questions.



Put a ring around the best alternative (05 marks)

- Which of the beakers contains non-electrolyte?

(a) Beaker A (b) Beaker B (c) Beaker C (d) All of these

- Which beaker contains solution of weak electrolyte?

(a) Beaker A (b) Beaker B (c) Beaker C (d) All of these

- Which beaker contains solution of strong electrolyte?

(a) Beaker A (b) Beaker B (c) Beaker C (d) All of these

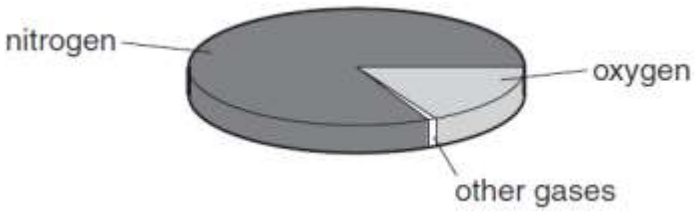
- Which beaker contains solution of organic acid?

(a) Beaker A (b) Beaker B (c) Beaker C (d) None of these

- The beaker B may contain

(a) Pure water (b) Glucose solution (c) Urea solution (d) All of these

(b) The pie chart shows the composition of air.



(i) What is the percentage of nitrogen in the air? (01 mark)

……

(ii) Apart from nitrogen and oxygen, state the names of two gases present in unpolluted air. (02 marks)

……

SECTION B

(*Attempt any **three** questions*)

6. (a) Read the passage below and answer the questions that follow.

Almost all the industries produce poisonous chemicals as their waste products. These are called chemical waste or industrial wastes. These wastes are discharged untreated in nearby water bodies. In this way, the water bodies get polluted with chemicals. The chemicals present are the compounds of harmful metals such as mercury, cadmium, lead, arsenic and nickel. These may also include detergents and polychlorinated biphenyls (PCBs). These chemicals can kill aquatic animals and plants. They also cause severe disorders in humans such as cancer and nervous disorders.

(i) Give a suitable title to the passage above. (01 mark)

……

(ii) What does it mean by chemical waste? (01 mark)

……

(iii) Chemical waste can cause …… And…… in humans. (02 marks)

(iv) Compounds of which elements are present in chemical waste? (03 marks)

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.....

(v) In which area could the photograph have been taken from in Uganda?

(01 mark)

.....

(b) Explain briefly Why polythene should be banned in Uganda? (02 marks)

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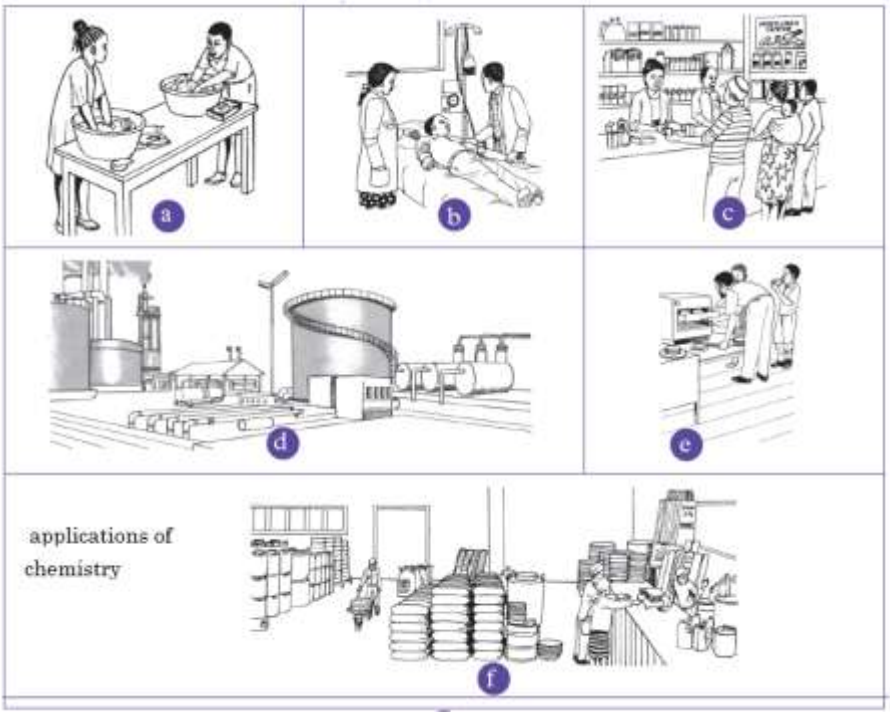
7. (a) Look at the pictures below and answer questions that follow.



(i) How are the events in the pictures relevant in our lives? (04 marks)

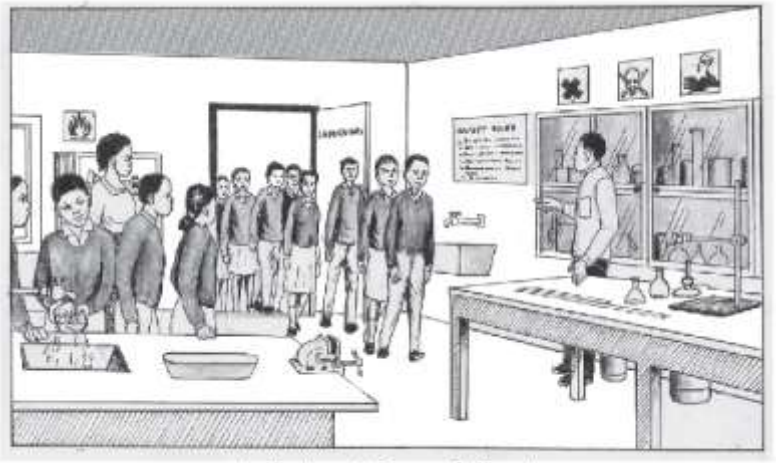
(ii) What would happen if the events in the pictures didn't happen? (03marks)

(iii) Write short notes on the importance of Chemistry in our lives. (03marks)

8. *Read the information below and answer the questions that follow*

Chemistry as a subject is sometimes learnt through practical activities known as experiments done in the laboratory. In the laboratory, you will find equipment, materials and chemicals which are used when performing these experiments. Chemical substances used in an experiment are known as reactant substances. Students need to conduct themselves with care and in an orderly manner while in the laboratory so as to avoid injuries and accidents that could occur. Safety rules and

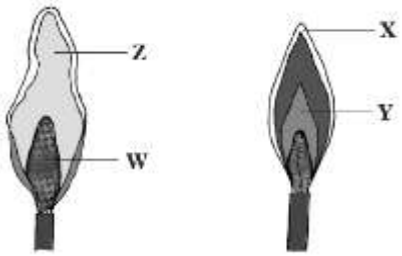
regulations have been put in place to guide you as a student when using the laboratory.



students entering a laboratory

(i) Write short notes on each of the work areas in a chemistry laboratory
a) Preparation room
b) Storage room
c) Student working area
d) Fume chamber
e) Teacher's working counter
f) Safety exit (10 marks)

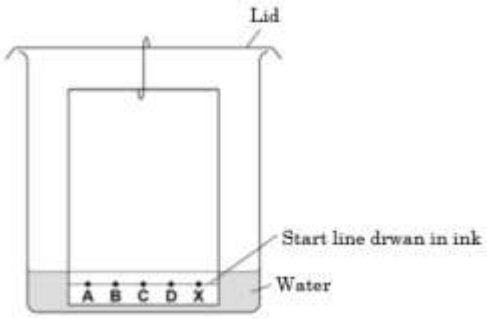
9. (a) Identify the flames shown in the diagrams below, (i) Name the parts labelled X and Y, Z and W. (04 marks)



(ii) Suggest the appropriate apparatus for holding test tubes when heating liquids. (01 mark)
(iii) Explain your answer in (ii) above. (02 marks)
(b) Explain why most laboratory apparatus are made of glass. (03 marks)

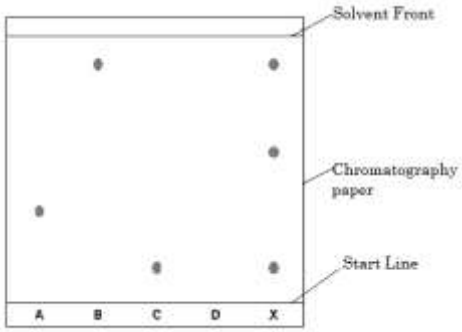
10. (a) A student investigated food dyes using paper chromatography.
This is the method used
1. Put a spot of food colouring X on the start line.
2. Put spots of four separate dyes, A, B, C and D, on the start line.
3. Place the bottom of the paper in water and leave it for several minutes.

Figure shows the apparatus the student used.



(ii) Write down one mistakes the student made in setting up the experiment and explain what problems one of the mistakes would cause. (01 mark)

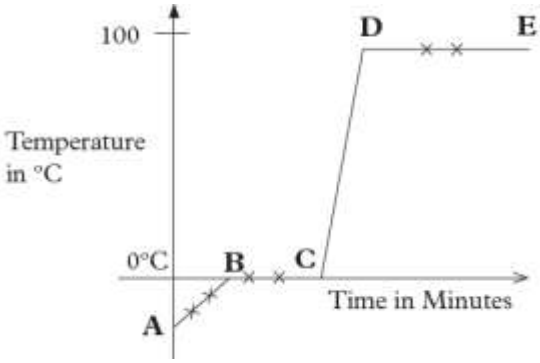
(b) Another student set up the apparatus correctly, Figure below shows the student's results. The result for dye D is not shown



(iii) Calculate the Rf value of dye A Give your answer to two significant figures. (02marks)

(iv) Explain how the different dyes in X are separated by paper chromatography (03 marks)

(b) The graph below shows heating of ice until boiling starts.



(i) Briefly state what happens in regions: (04 marks)

- AB
- BC
- CD
- DE

END