SOUTH WEST REGIONAL MOCK EXAMINATION
GENERAL EDUCATION

The Teachers' Resource Unit (TRU) in collaboration with the South West Chemistry Teachers' Association (SOWECTA)	Subject Code 0515	Paper Number 2
CANDIDATE NAME ..... CANDIDATE NUMBER ..... CENTRE NUMBER	Subject title Chemistry	
Ordinary Level	DATE Thursday 27/03/2025: Afternoon	

Time Allowed: Two and half hour.....

INSTRUCTIONS TO CANDIDATES

Enter the information required in the boxes above.

This paper is arranged in three sections, A, B and C.

Section A: ANSWER **ALL 5 questions.** You will be graded for the best 4 answers

Section B: ANSWER **ALL 2 question in this section**

Section C: ANSWER **2 questions OUT OF 3.** If you attempt more than 2 questions, only the first two will be considered.

In calculations you are advised to show all the steps in your working, giving your answer at each stage.

You are allowed to use calculators.

However, phones ARE NOT ALLOWED.

You must use ONLY Blue or Black ink. No answer in Pencil will be marked.

You are reminded of the necessity for good English and orderly presentation in your answers.

Mark allocation is indicated for each question.

USEFUL DATA: You may use the following figures in any questions where you need them.

Relative atomic masses: Copper (Cu) = 64.0; Oxygen (O) =16.0; Carbon (C) =12.0; Hydrogen (H) =1.0; Sulphur (S) =32.0; 1F = 96000 coulombs; Molar volume of gas at r.t.p = 24000 cm^3; Avogadro number = 6.02×10^{23}; 0°C = 273K

SECTION A: Answer 4 questions in this section.

1. The table below gives some information about 4 elements A, B, C and D.

Elements	Atomic number	Mass number
A	6	12
B	9	19
C	11	23
D	13	27

(a) How many electrons and neutrons are found in the element C?
Electrons
.....
Neutrons
.....
(2 marks)

(b) Which of the elements is a halogen?
.....(1 mark)

(c) Write the electronic configuration of D.
.....(1 mark)

(d) Using electronic dot and cross diagram show how the bond between C and B is formed.
.....
.....
.....
.....
(3marks)

(e)
(i) Write the formula of the oxide of
C.....

(ii) Write a balanced equation to show the reaction of the oxide with water.
.....
(3 marks)
(Total = 10 marks)

2. The following represent different homologous series of organic compounds.
A. C_nH_{2n} B. $C_nH_{2n+1}OH$ C. $C_nH_{2n+1}COOH$ D. C_nH_{2n+2}

(a) i)Define a homologous series

(ii) Give the general name of the homologous series A and B.
A.....B.....
(4 marks)

b)
(i) Write the formula of the first member of the homologous series
A.....

(ii) State the reagent used to distinguish between members of the homologous series A and D.

(2 marks)

c) Members of the homologous series B and C react.

i) Give the name of the reaction. ----------

ii) Write an equation for the reaction between the second members of the homologous series B and C.....

iii) How is the major product formed in C (ii) above recognized

(3 marks)

d) State one domestic use of the fourth member of the homologous series D.

..... (1 mark)

(Total: 10 marks)

3. Matter is made up of 3 states. Name the state of matter which:

a) i) is easily compressible _____

ii) has particles held by strongest forces of attraction. _____

iii) Complete the table below- (2 marks)

Component of air	Percentage composition
	0.03%
Oxygen	
	78%
Rare gases	

(2 marks)

b) State the major components of;

(i) Active air

.....

(ii) Inactive air

.....

(2 marks)

c) The following reaction occurs when iron is exposed to air.

$4Fe(s) + 3O_2(g) + 6H_2O(l) \longrightarrow 4Fe(OH)_3(s)$

(i) Name the chemical process represented by the equation

.....

(ii) State one way by which the process in d(i) can be prevented

.....

(2 marks)

d) (i) Define sublimation

.....

.....

(ii) Give an example of a substance that sublimes

.....

(2 marks)

(Total: 10 marks)

4 (a) What is electrolysis?

.....

.....

(1 mark)

(b) Sodium chloride does not conduct electricity in the solid state but does in the molten state. Give a reason for this

.....

.....

(1mark)

(c) During the electrolysis of copper (II) sulphate using inert electrodes, a current of 2A was passed through the solution for 30 minutes.
Calculate the quantity of electricity in coulombs

.....

.....

.....

(d) i) Give two observations in the electrolyte (2 marks)

(ii) What is observed at the anode?

.....

(iii) Write the equation for the reaction at the cathode.

.....

(4 marks)

(e) Calculate the percentage composition by mass of oxygen in copper (II)sulphate pentahydrate ($CuSO_4.5H_2O$)

.....

.....

.....

.....

(2 marks)

(Total: 10 marks)

(5) Nitric acid is manufactured from starting materials.

(a) i) Name the starting materials and state their sources

Starting materials: 1) ---------- 2) ----------

Sources: 1) ----------

2) ----------

ii) Name the catalyst used ----------

(5 marks)

b) Iron is extracted by thermal reduction.

i) Name the main ore from which iron is extracted. ----------

ii) State the use of each of the following in the extraction process.

Coke ----------

Limestone----------

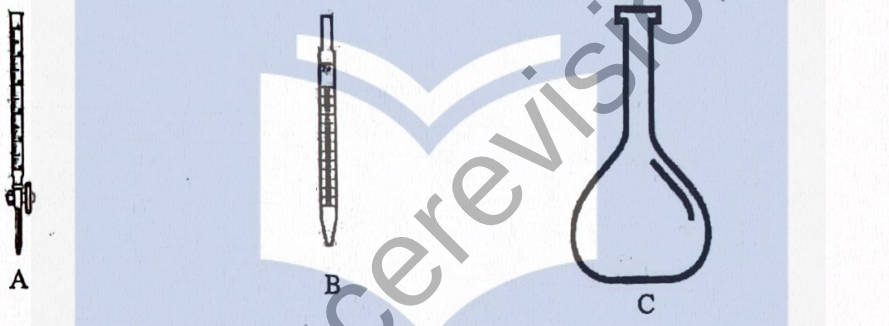
iii) Write the final equation for the extraction process

(5 marks)

(Total: 10 marks)

SECTION B: ANSWER BOTH QUESTIONS

6) (a) You are given the following apparatus. Give the name and use of each apparatus



	Name	Use
A		
B		
C		

(6 marks)

(b) A student placed a drop of ink on a filter paper and the filter paper was placed in a beaker containing a solvent. The filter paper was placed vertically.

(i) Draw and label the experimental set up used by the student.

.....

.....

.....

.....

(ii) Name this separation technique

.....

(iii) Give the physical property of the components that enable the separation.

.....

(5 marks)

(c) In order to dilute an acid, a student added 500 cm^3 of distilled water to 13 cm^3 of concentrated sulphuric acid.

(i) State and justify what is wrong with this procedure.

State;

.....

Reason;

.....

(ii) What do you do if a solution accidentally spills on your hand in the laboratory?

.....

(3 marks)

(d) Complete the table involving the following gases;

Name	Method of collection	reason for using the method
Ammonia		
Oxygen		
Chlorine		

(6 marks)

(Total: 20 marks)

(7) Three chemicals; potassium carbonate, calcium sulphate and iron (II) chloride were presented in 3 identical bottles without labels. In order to identify the content of each bottle, a student was provided with the following reagents; dilute hydrochloric acid, aqueous silver nitrate, sodium hydroxide, barium chloride, lime water, concentrated ammonia and material for flame test. Complete the following table that show the procedure used by a student and the observations.

	Bottles	Procedure	Observation
(a)	Containing calcium sulphate	(i) (ii)	(i) (ii) (5 marks)
(b)	Containing potassium carbonate	(i) (ii)	(i) (ii) (5 marks)

(c)	Containing iron (II) chloride	(i) (ii)	(i) (ii) (4 marks)

(d) In an experiment to determine the formula of an oxide of copper, the following results were obtained;
- Mass of boat alone = 8.320 g
- Mass of boat and oxide = 10.870 g
- Mass of boat and copper = 10.368 g

Determine the empirical formula of the oxide of copper.

.....
.....
.....
.....
.....
.....
.....
.....

(4 marks)

(e) Ammonia is soluble in water. Draw the set up used to dissolve ammonia in water.

.....
.....
.....
.....
.....
.....
.....

(2 marks)
(Total: 20 marks)

SECTION C: ANSWER ONLY TWO QUESTIONS

8) (a) Describe an experiment you would carry out to determine the heat of combustion of ethanol. Your description should include requirements, procedure, assumptions if any, precautions and collection of data.

(20 marks)

9) (a) Giving the raw materials and stating the chemical principles involved, describe the manufacture of sulphuric acid in large scale.

(b) Give 2 laboratory uses and 2 industrial uses of sulphuric acid.

(16, 4)

(Total: 20 marks)

10) With suitable examples in each case, w rite short notes on each of the following:

(a) Allotropy
(b) Isomerism
(c) Addition polymerization
(d) isotopy
(e) Thermal decomposition

(4, 4, 4, 4, 4,)

(Total: 20 marks)