



Index Number: .....

# NATIONAL CERTIFICATE OF EDUCATION

2021-2022

## CHEMISTRY (N530)

TIME: 45 MINUTES

Candidates answer on the Question Paper.

Additional Material: Ruler, Calculator

### READ THESE INSTRUCTIONS FIRST

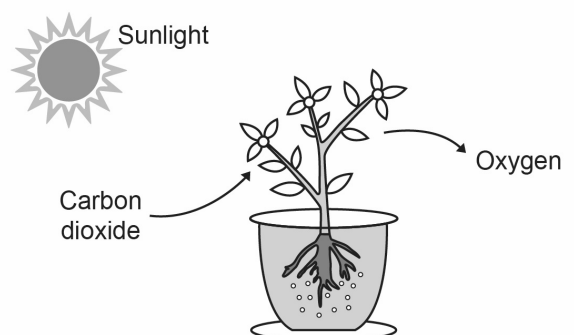
1. Write your index number in the space provided above.
2. Write in dark blue or black ink. Do not use correction fluid.
3. You may use a soft pencil for any diagram, graph or rough working.
4. Diagrams are not drawn to scale unless otherwise specified.
5. Any rough working should be done in this booklet.
6. Answer **ALL** questions.
7. This document consists of **5** questions printed on **9** pages, numbered **2** to **10**.
8. A copy of the Periodic Table is provided on page **11**.
9. The total number of marks for this paper is **50**.

For Examiners' use							
Question No.	1	2	3	4	5	Total	Signature
Examiner							
Team Leader							
Quality Controller							
CE/ACE							

**Question 1 (10 marks)**

Circle the correct answer. Each item carries one mark.

1. **Fig. 1.1** illustrates the process by which plants manufacture food.



**Fig. 1.1:** Process by which plants manufacture food

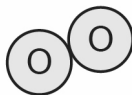
How is this process called?

- |                         |                         |
|-------------------------|-------------------------|
| <b>A</b> Combustion     | <b>B</b> Eutrophication |
| <b>C</b> Photosynthesis | <b>D</b> Respiration    |
2. What is the name of the element with symbol **Cu**?
- |                   |                 |
|-------------------|-----------------|
| <b>A</b> Calcium  | <b>B</b> Carbon |
| <b>C</b> Chromium | <b>D</b> Copper |
3. What is the valency of the element zinc?
- |            |            |
|------------|------------|
| <b>A</b> 1 | <b>B</b> 2 |
| <b>C</b> 3 | <b>D</b> 4 |

4. Which of the following represents a carbon dioxide molecule?



**A**



**B**



**C**



**D**

5. What is the formula of iron (II) chloride?

**A** FeCl

**B** FeCl<sub>2</sub>

**C** Fe<sub>2</sub>Cl

**D** Fe<sub>2</sub>Cl<sub>2</sub>

6. Which chemical equation is balanced?

**A**  $\text{H}_2 + \text{Cl}_2 \longrightarrow \text{HCl}$

**B**  $\text{H}_2 + \text{Cl}_2 \longrightarrow 2\text{HCl}$

**C**  $\text{H}_2 + \text{Cl}_2 \longrightarrow 3\text{HCl}$

**D**  $\text{H}_2 + \text{Cl}_2 \longrightarrow 4\text{HCl}$

7. Which metal reacts readily with cold water?

**A** Calcium

**B** Copper

**C** Gold

**D** Silver

8. Which separation technique is used to separate different dyes present in ink?
- A Chromatography
  - B Distillation
  - C Filtration
  - D Crystallisation
9. Which salt is **insoluble** in water?
- A Barium nitrate
  - B Potassium carbonate
  - C Silver chloride
  - D Zinc sulfate
10. Which salt is used in baking?
- A Ammonium nitrate
  - B Calcium sulfate
  - C Magnesium sulfate
  - D Sodium bicarbonate

E

TL

QC

CE

**Question 2 (8 marks)**

- (a) Match each air pollutant to its corresponding main source of pollution.

An example is given.

Air pollutant	Source of pollution
Sulfur dioxide	Propellants in aerosol sprays
Methane	Oil spill from ships
Nitrogen dioxide	Decay of vegetation and animals
CFCs	Lightning
Carbon monoxide	Volcanic eruptions
	Incomplete combustion of fossil fuels

[4]

- (b) Carbon dioxide is a greenhouse gas.

- (i) Name another greenhouse gas.

\_\_\_\_\_

[1]

- (ii) High levels of greenhouse gases in the atmosphere cause global warming.

Give two consequences of global warming on the environment.

1. \_\_\_\_\_

2. \_\_\_\_\_ [2]

- (c) Sulfur dioxide causes acid rain.

Give one harmful effect of acid rain on the environment.

\_\_\_\_\_

\_\_\_\_\_ [1]

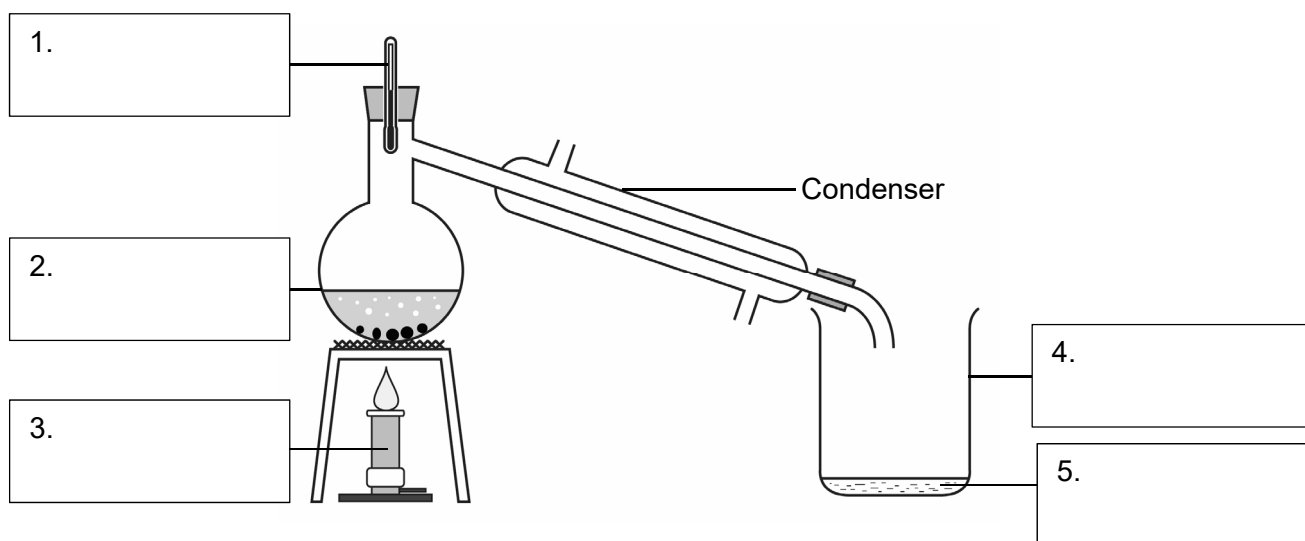
### Question 3 (11 marks)

**Fig. 3.1** shows a set-up for distillation.

(a) Label **Fig. 3.1** by filling the empty boxes with the appropriate word(s) from the given list.

[5]

Beaker	Distillation flask	Thermometer
Distillate	Filtrate	Conical flask
	Bunsen burner	



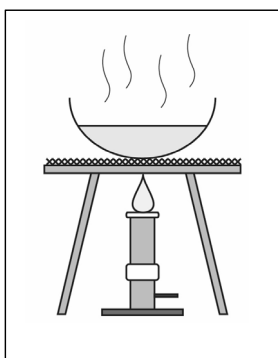
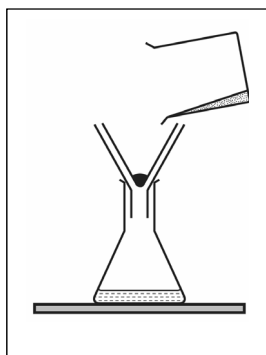
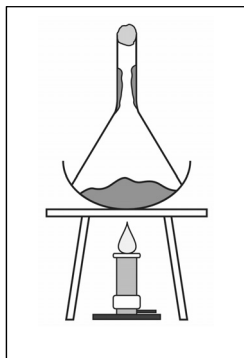
**Fig. 3.1:** Distillation set-up

(b) Using an arrow, show on **Fig. 3.1** where water enters the condenser.

[1]

(c) Match each separation technique illustrated in Column **A** to its correct name in Column **B**.

**Column A**



**Column B**

Filtration

Sublimation

Crystallisation

Chromatography

[3]

(d) Name the separation technique used to separate a mixture of

(i) sand and water: \_\_\_\_\_

(ii) iodine and sand: \_\_\_\_\_

[2]

**Question 4 (10 marks)**

(a) Classify the following as symbols or formulae:



Symbol	Formula

[5]

(b) Name the two elements which form the compound with the formula NaBr.

1. \_\_\_\_\_

2. \_\_\_\_\_

[2]

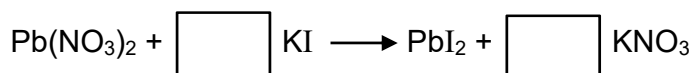
(c) Write down the formula of each compound below.

(i) Calcium hydroxide : \_\_\_\_\_

(ii) Aluminium sulfate : \_\_\_\_\_

[2]

(d) Fill in the boxes below to balance the chemical equation.



[1]

E

TL

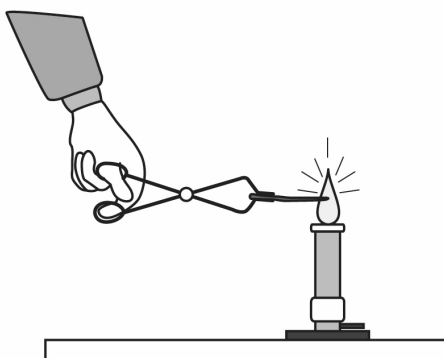
QC

CE



**Question 5 (11 marks)**

- (a) **Fig. 5.1** illustrates the burning of magnesium in oxygen present in air.



**Fig. 5.1:** Burning of magnesium

- (i) What is the colour of the flame when magnesium burns in oxygen?

\_\_\_\_\_

[1]

- (ii) Give one safety precaution that needs to be taken when magnesium is being burnt in oxygen present in air.

\_\_\_\_\_

\_\_\_\_\_

[1]

- (b) Metal oxides react with hydrochloric acid to form salt and water.

- (i) How is this type of reaction called?

\_\_\_\_\_

[1]

- (ii) Write a word equation for the reaction between magnesium oxide and hydrochloric acid.

\_\_\_\_\_

[1]

- (c) **Table 5.1** shows four different metals in decreasing order of reactivity.

**Table 5.1: Metal in decreasing order of reactivity**

Decreasing order of reactivity ↓	Metal
	Magnesium
	Zinc
	X
	Copper

- (i) Which metal could X be?

\_\_\_\_\_ [1]

- (ii) Tick ( ✓ ) the correct box to indicate whether a displacement reaction takes place for the reaction between

	Yes	No
1. X and magnesium sulfate solution :	<input type="checkbox"/>	<input type="checkbox"/>
2. Zinc and copper (II) nitrate solution :	<input type="checkbox"/>	<input type="checkbox"/>

[2]

- (d) (i) Write a balanced chemical equation for the reaction between magnesium and copper (II) sulfate.

\_\_\_\_\_ [2]

- (ii) For the reaction in (d)(i), give two observations that can be made.

1. \_\_\_\_\_
2. \_\_\_\_\_ [2]

E

TL

QC

CE

The Periodic Table of Elements

Group																						
I	II	H hydrogen										III	IV	V	VI	VII	VIII					
Li lithium	Be beryllium													B boron	C carbon	N nitrogen	O oxygen	F fluorine	He helium			
														Ne neon								
Na sodium	Mg magnesium													Al aluminium	Si silicon	P phosphorus	S sulfur	Cl chlorine	Ar argon			
K potassium	Ca calcium																					
Rb rubidium	Sr strontium																					
Cs caesium	Ba barium																					
Fr francium	Ra radium																					

**BLANK PAGE**