

# GENERAL CERTIFICATE OF EDUCATION BOARD

General Certificate Of Education Examination

0515 CHEMISTRY 1

JUNE 2022

ORDINARY LEVEL

Centre Number	
Centre Name	
Candidate Identification Number	
Candidate Name	

**Mobile phones are NOT allowed in the examination room.**

## MULTIPLE CHOICE QUESTION PAPER

One and a half hours

### INSTRUCTIONS TO CANDIDATES

Read the following instructions carefully before you start answering the questions in this paper. Make sure you have a soft HB pencil and an eraser for this examination.

1. USE A SOFT HB PENCIL THROUGHOUT THE EXAMINATION.
2. DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO.

*Before the examination begins:*

3. Check that this question booklet is headed "Ordinary Level – 0515 Chemistry 1"
4. Fill in the information required in the spaces above.
5. Fill in the information required in the spaces provided on the answer sheet using your HB pencil: **Candidate Name, Exam Session, Subject Code and Candidate Identification Number.** Take care that you do not crease or fold the answer sheet or make any marks on it other than those asked for in these instructions.

*How to answer the questions in this examination*

6. Answer ALL the 50 questions in this Examination. All questions carry equal marks.
7. Non-programmable Calculators are allowed.
8. Each question has FOUR suggested answers: **A, B, C** and **D**. Decide which answer is appropriate. Find the number of the question on the Answer Sheet and draw a horizontal line across the letter to join the square brackets for the answer you have chosen.

For example, if **C** is your correct answer, mark **C** as shown below:

[A] [B] [~~C~~] [D]

9. Mark only one answer for each question. If you mark more than one answer, you will score a zero for that question. If you change your mind about an answer, erase the first mark carefully, then mark your new answer.
10. Avoid spending too much time on any one question. If you find a question difficult, move on to the next question. You can come back to this question later.
11. Do all your rough work in this booklet using the blank spaces in the question booklet.
12. **At the end of the examination, the invigilator shall collect the answer sheet first and then the question booklet. DO NOT ATTEMPT TO LEAVE THE EXAMINATION HALL WITH IT.**

Relative Atomic masses

Carbon (C) = 12.0

Nitrogen (N) = 14.0

Copper (Cu) = 64

Hydrogen (H) = 1.0

Oxygen (O) =

Turn Over

1. Which of the following is **NOT** a sub-atomic particle?  
 A Proton  
 B Neutron  
 C Nucleon  
 D Electron
- 
2. Which of the following relights a glowing splint?  
 A  $\text{CO}_2$   
 B  $\text{NO}_2$   
 C  $\text{O}_2$   
 D  $\text{SO}_2$
- 
3. Why is ammonia described as an alkaline gas?  
 A It turns damp red Litmus paper blue  
 B It forms white fumes with conc.  $\text{HCl}_{(\text{aq})}$   
 C It has no effect on litmus paper  
 D It contains a hydroxide ion
- 
4. Identify a fertilizer made from Sulphuric acid  
 A Potassium Chloride  
 B Ammonium sulphate  
 C Ammonium Nitrate  
 D Ammonium Sulphite.
- 
5. Which of the following substances causes hardness in water?  
 A  $\text{NaHCO}_3$   
 B  $\text{Na}_2\text{CO}_3$   
 C  $\text{MgSO}_4$   
 D  $\text{K}_2\text{SO}_4$
- 
6. Determine the number of neutrons in the atom with a mass number of 35 and an atomic number of 17.  
 A 37  
 B 17  
 C 18  
 D 52
- 
7. What is the function of Chlorine in the treatment of water?  
 A To remove odour  
 B To remove taste  
 C To remove solid particles  
 D To kill germs

**Questions 8-9:**

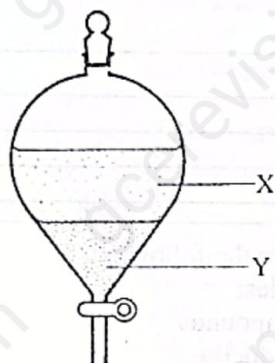
A current of 1.5 A is passed for 1 hour 30 minutes during the purification of copper by electrolysis

8. Which of the following reactions takes place at the anode?  
 A  $\text{Cu}_{(\text{s})} \rightarrow \text{Cu}^{2+} + 2\text{e}^-$   
 B  $\text{Cu}^{2+} + 2\text{e}^- \rightarrow \text{Cu}_{(\text{s})}$   
 C  $\text{Cu}^{2+} - 2\text{e}^- \rightarrow \text{Cu}_{(\text{s})}^{2-}$   
 D  $\text{Cu}_{(\text{s})} + 2\text{e}^- \rightarrow \text{Cu}^{2-}$
- 
9. Calculate the mass of pure copper deposited at the Anode?  
 A 0.045g  
 B 2.70g  
 C 0.00075g  
 D 0.039g
- 
10. Given the equation  
 $2\text{CH}_3\text{COOH} + \text{Na}_2\text{CO}_3 \rightarrow 2\text{X} + \text{CO}_2 + \text{H}_2\text{O}$   
 Identify the organic compound, X.  
 A Sodium ethoxide  
 B Sodium methanoate  
 C Sodium hydroxide  
 D Sodium ethanoate
- 
11. Two elements M and P have atomic number 12 and 7 respectively. Give the formula of the compound formed between M and P  
 A  $\text{M}_2\text{P}_3$   
 B  $\text{MP}_2$   
 C  $\text{M}_3\text{P}_2$   
 D  $\text{M}_5\text{P}_2$
- 
12. A soil sample has a pH of 4. The soil sample is  
 A Basic  
 B Acidic  
 C Neutral  
 D Alkaline
- 
13. A hydrocarbon contains 85.7% C and 14.3% H. Determine the empirical formula of the hydrocarbon.  
 A  $\text{CH}_2$   
 B CH  
 C  $\text{CH}_3$   
 D  $\text{C}_2\text{H}_4$
- 
14. When a few drops of aqueous silver nitrate is added to a salt solution, a yellow precipitate is formed. Identify the anion in the salt.  
 A Fluoride ion  
 B Chloride ion  
 C Bromide ion  
 D Iodide ion

15. State the function of Super-heated water in the extraction of sulphur.
- To separate the sulphur
  - To dissolve sulphur
  - To melt sulphur
  - To pull up the sulphur
- 
16. Given the equation
- $$\text{CuO}_{(s)} + \text{H}_2_{(g)} \longrightarrow \text{Cu}_{(s)} + \text{H}_2\text{O}_{(g)}$$
- Select from the equation, the oxidizing agent.
- $\text{H}_2$
  - $\text{CuO}$
  - $\text{Cu}$
  - $\text{H}_2\text{O}$

### Questions 17-18

The following diagram represents a separation technique used to separate a mixture of X and Y



17. Identify a pair of substances that could be X and Y respectively.
- ethanol and petrol
  - Petrol and water
  - Petrol and kerosene
  - Water and petrol
- 
18. State the property of X and Y that makes it suitable for separation by this method.
- Difference in volatility
  - Difference in melting points
  - Difference in boiling points
  - Difference in density
- 
19. Arrange the elements; Calcium, Iron, Sodium and Zinc in order of increasing reactivity, starting from the least reactive.
- Sodium, Zinc, Iron, Calcium
  - Zinc, Iron, Calcium, Sodium
  - Iron, Zinc, Sodium, Calcium
  - Iron, Zinc, Calcium, Sodium

### Questions 20-22

#### Instructions:

Each of the following questions consists of a statement in the left-hand column followed by a second statement in the right-hand column.

Decide whether each of the statements is **TRUE OR FALSE**. Then on

your answer sheet mark

- if both statements are **true** and the second statement is a correct explanation of the first statement
- if both statements are **true** but the second statement is not a correct explanation of the first statement.
- if the first statement is **true** but the second statement is **false**.
- if the first statement is **false** but the second statement is **true**.

#### Instructions Summarized

	First Statement	Second Statement
A	TRUE	TRUE and the second statement is a correct explanation of the first
B	TRUE	TRUE and the second statement is NOT a correct explanation of the first
C	TRUE	FALSE
D	FALSE	TRUE

	First statement	Second statement
20	Alkali metals are very good reducing agents	The alkali metals are easily oxidized
21	$\text{C}_2\text{H}_2$ and $\text{C}_6\text{H}_6$ have the same chemical and physical properties	$\text{C}_2\text{H}_2$ and $\text{C}_6\text{H}_6$ have the same percentage by mass of hydrogen
22	Acid/base indicators are dyes	Indicators develop colour only in the presence of a strong acid or strong base.

23. Which of the following carbonates is stable on heating?
- Lithium carbonate
  - Sodium carbonate
  - Ammonium carbonate
  - Calcium carbonate

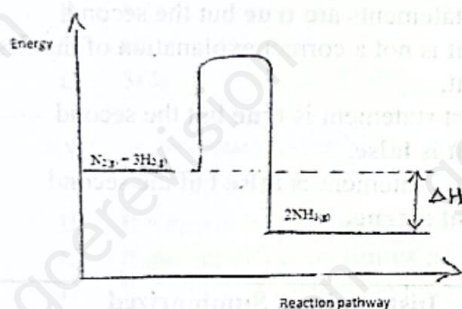
Turn Over

24. Which of the following will decolourise bromine water?

- A Ethene
- B Ethane
- C Butane
- D Ethanol

### Questions 25-26

Consider the energy level diagram below for a reversible reaction:



25. What heat change occurs in the reaction?

- A Heat is absorbed during the reaction
- B Endothermic reaction occurs
- C Heat is released
- D Activation energy increases

26. What is the effect of an increase in pressure on the equilibrium position?

- A Equilibrium shifts to the right
- B Equilibrium shifts to the left
- C Equilibrium position is unaffected
- D Equilibrium position shifts both to the right and left

27. What is the percentage composition of oxygen in air

- A 78%
- B 21%
- C 0.03%
- D 1%

28. Calculate the percentage composition by mass of Nitrogen in Ammonium phosphate  $(\text{NH}_4)_3\text{PO}_4$ . (RMM = 149)

- A 28.2%
- B 9.4%
- C 16.1%
- D 20.8%

### Questions 29-31

For each of the questions,

ONE or MORE of the response(s) given is (are) correct.

Decide which of the response(s) is (are) correct. Then choose

- A. If 1, 2 and 3 are correct
- B. If 1 and 3 are correct
- C. If 2 and 4 are correct
- D. If 4 only is correct

### INSTRUCTIONS SUMMARISED

A	B	C	D
1,2,3	1,3	2,4	4
Only	Only	Only	Only

29. Which of the following substances is(are) allotropic?

1. Carbon
2. Sulphur
3. Phosphorus
4. Calcium Carbonate

A	
B	
C	
D	

30. Transition metals have the following characteristic properties:

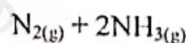
1. Form coloured compounds
2. Are malleable and ductile
3. Have variable oxidation states
4. Conduct electricity

A	
B	
C	
D	

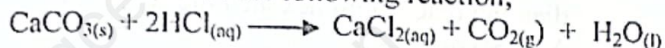
31. Substance X reacts with dilute  $\text{H}_2\text{SO}_4$  producing copper(II)sulphate salt. Identify X

1. Copper metal
2. Copper oxide
3. Copper hydroxide
4. Copper carbonate

A	
B	
C	
D	



32. Why does powdering marble chips increase the rate of the following reaction;



- A The total surface area reduces
- B Collision frequency increases
- C The number of effective collision decreases
- D The rate increases with less contact of marble and acid

33. Which of the following is a reduction reaction?

- A  $\text{Cu}(\text{s}) \longrightarrow \text{Cu}^{2+}(\text{aq}) + 2\text{e}$
- B  $4\text{OH}^-(\text{aq}) \longrightarrow 2\text{H}_2\text{O}(\text{l}) + \text{O}_2(\text{g}) + 4\text{e}$
- C  $2\text{Cl}^-(\text{aq}) \longrightarrow \text{Cl}_2(\text{g}) + 2\text{e}$
- D  $\text{Cu}^{2+}(\text{aq}) + 2\text{e} \longrightarrow \text{Cu}(\text{s})$

34. How is chlorine collected in the laboratory?

- A Downward delivery
- B Over water
- C Upward delivery
- D Downward displacement of air

35.  $25\text{cm}^3$  of  $0.1\text{MNaOH}$  neutralizes  $20\text{cm}^3$  of  $\text{H}_2\text{SO}_4$  solution. Calculate the concentration of  $\text{H}_2\text{SO}_4$

- A 0.125M
- B 0.04M
- C 0.08M
- D 0.0625M

36. Identify the oxidizing agent from the equation;



- A  $\text{H}_2\text{S}$
- B  $\text{SO}_2$
- C  $\text{H}_2\text{O}$
- D S

37. A mixture is:

- A A substance that contains two or more substances not chemically combined
- B A substance formed when two or more substances combine chemically through bond formation.
- C A substance that cannot be broken down into simpler units
- D A substance that has weight and occupies space.

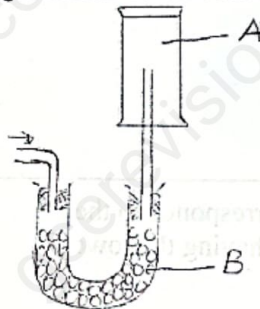
38. Elements A and B have atomic numbers 12 and 16 respectively. Identify the type of bonding formed between them

- A Covalent bonding
- B Metallic bonding
- C Covalent bonding
- D Ionic bonding

39. From the electronic configurations, which of the following belong to the same period?

- A 2,8,8,6 and 2,8,8
- B 2,8 and 2,8,3
- C 2,8,1 and 2,8,3
- D 2,8,1 and 2,8,8,1

Questions 40-41 concern the following diagram:



40. Identify the gas, A, that can be dried and collected in this way.

- A  $\text{CO}_2$
- B  $\text{NH}_3$
- C  $\text{Cl}_2$
- D  $\text{SO}_2$

41. Identify the drying agent 'B'

- A Quicklime
- B Slaked lime
- C Calcium chloride
- D Sulphuric acid

42. Which of the following chemical equations is balanced?

- A  $\text{Na}_2\text{CO}_3(\text{aq}) + \text{HCl}(\text{aq}) \longrightarrow 2\text{NaCl}(\text{aq}) + \text{H}_2\text{O}(\text{l}) + \text{CO}_2(\text{g})$
- B  $3\text{Fe}(\text{s}) + 4\text{H}_2\text{O}(\text{l}) \longrightarrow \text{Fe}_3\text{O}_4(\text{s}) + \text{H}_2\text{O}(\text{l})$
- C  $\text{NO}(\text{g}) + \text{O}_2(\text{g}) \longrightarrow \text{NO}_2(\text{g})$
- D  $\text{Mg}(\text{s}) + 2\text{HNO}_3(\text{aq}) \longrightarrow \text{Mg}(\text{NO}_3)_2(\text{aq}) + \text{H}_2(\text{g})$

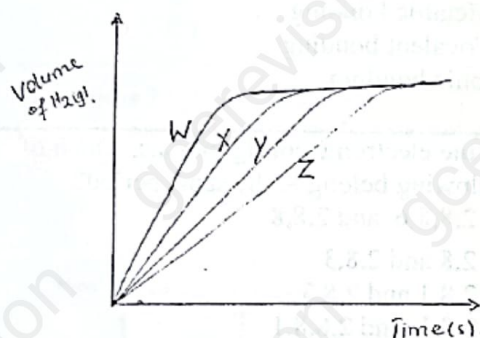
43. A salt which when exposed to air forms a solution is referred to as:

- A Deliquescent
- B Efflorescent
- C Hygroscopic
- D Hydrated

Turn Over

## Questions 44-45

The diagram shows the rate of a reaction at different concentrations.



44. Which of the curves shows the fastest reaction rate?

- A Y
- B X
- C W
- D Z

45. Which of the curves corresponds to the reaction with reactants having the lowest concentration?

- A X
- B W
- C Z
- D Y

46. Identify the product formed when hexan-1,6-diamine reacts with hexanedioic acid

- A Styrene
- B Terylene
- C Perspex
- D Nylon6,6

47. Which gas is always given off when a metal nitrate is heated?

- A  $O_2$
- B  $NO_2$
- C NO
- D  $NH_3$

48. A current of 2A was passed for 90 minutes through an electrolytic cell. Calculate the quantity of electricity in coulombs.

- A 180C
- B 7200C
- C 3600C
- D 10800C

49. What is the charge on a proton?

- A Negative
- B Neutral
- C Positive
- D No charge

50. The change of state from solid to liquid is known as

- A Condensation
- B Melting
- C Freezing
- D Sublimation

**GO BACK AND CHECK YOUR WORK**