

GENERAL CERTIFICATE OF EDUCATION BOARD

General Certificate of Education Examination

0515 CHEMISTRY 1

JUNE 2023

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.**

Useful Data: Molar volume of gas at rtp = 24000cm^3
Avogadro number = 6.02×10^{23}
1 Faraday = 96000c

Turn Over

1. A change of state from solid to liquid is called
 A Melting
 B Freezing
 C Condensation
 D Evaporation
-
2. What is the effect of acid falling into streams?
 A The water is treated
 B The water is neutralised
 C The water becomes too acidic for aquatic life
 D The PH of the water does not change much
-
3. The electronic configuration of an element, M, is 2,8,4. To which group of the Modern Periodic Table is the element found?
 A IV
 B III
 C II
 D VIII
-
4. Identify a common gas produced when nitrates of groups I and II are strongly heated.
 A NO
 B N₂O
 C O₂
 D NO₂
-
5. Which general molecular formula below represents a family of organic compounds that will decolourize aqueous bromine?
 A C_nH_{2n}
 B C_nH_{2n+2}O
 C C_nH_{2n+2}
 D C_nH_{2n}O₂
-
6. Which of the following ions doesn't have a noble gas electronic structure?
 A ¹³Al³⁺
 B ¹¹Na⁺
 C ¹²Mg⁺
 D ¹⁶S²⁻
-
7. Consider the following organic reaction.
 $\text{CH}_3\text{COOH} + \text{C}_2\text{H}_5\text{OH} \rightleftharpoons \text{CH}_3\text{COOC}_2\text{H}_5 + \text{H}_2\text{O}$
 Name the reaction type.
 A Dehydration
 B Condensation
 C Hydration
 D Esterification
-
8. Identify an element which is soft and can be cut with a knife.
 A Ca
 B Mg
 C Na
 D Cu
-
9. State the reagent and reaction condition that are needed to convert ethene to ethane
 A H₂/Fe Catalyst
 B H₂/Ni Catalyst
 C O₂/Fe Catalyst
 D O₂/Ni Catalyst
-
10. Which of the following metals will liberate hydrogen gas from hydrochloric acid?
 A Sodium
 B Copper
 C Silver
 D Gold
-
11. The PH of a solution is 8.6. This implies that the solution is
 A Amphoteric
 B Neutral
 C Acidic
 D Basic
-
12. Which of the elements below exist as diatomic molecule?
 A Chlorine
 B Lithium
 C Sodium
 D Magnesium
-
13. 12g of a salt dissolves in 40g of water at 10°C. What will happen to the solubility when the temperature increases to 20°C.
 A It decreases
 B It remains constant
 C It increases then decreases
 D It increases
-
- Questions 14 – 15** concerns the following information on a gas Z. A gas Z is usually collected in a laboratory by downward delivery
14. Identify a gas which could be Z
 A CO
 B SO₂
 C H₂
 D NH₃
-
15. What property of gas Z makes it to be collected as stated?
 A Gas Z is soluble in water
 B Gas Z is less denser than water
 C Gas Z is denser than air
 D Gas Z is lighter than air
-

16. Select a component of air whose percentage composition by volume is 21%.
- Carbondioxide
 - Oxygen
 - Nitrogen
 - Argon
-
17. Identify a suitable method that can be used to obtain pure salt sample from a salt solution.
- Fractional distillation
 - Decantation
 - Filtration
 - Evaporation to dryness
-
18. Which of the following gases is used in fire extinguishers?
- Chlorine gas
 - Carbon dioxide
 - Hydrogen gas
 - Carbon monoxide
-
19. Give an element that is usually stored under paraffin oil.
- Zinc
 - Magnesium
 - Calcium
 - Potassium
-
20. Select a statement that is **TRUE** of the halogens?
- They have high boiling points
 - They exist as single atoms at room temperature
 - They are good conductors of electricity
 - Their ions form precipitates with AgNO_3
-
21. Which of the following is **NOT** true of the Group I elements?
- They burn to give basic oxides
 - They react with dilute acid evolving oxygen gas
 - Reactivity increases down the group
 - They show a +1 oxidation state in their compounds
-
22. Which of the following from air is not separated by fractional distillation.
- N_2
 - O_2
 - CO_2
 - H_2
-
23. Why is phosphorus stored under water?
- It is insoluble in water
 - It is poisonous
 - To prevent it from catching fire in air
 - It dissolves in water
-
24. Which of the following reaction does NOT occur?
- $\text{Br}_{2(l)} + 2\text{KCl}_{(aq)} \rightarrow 2\text{KBr} + \text{Cl}_{2(l)}$
 - $\text{Cl}_{2(l)} + 2\text{KBr}_{(aq)} \rightarrow 2\text{KCl} + \text{Br}_{2(l)}$
 - $\text{F}_{2(l)} + 2\text{NaCl}_{(aq)} \rightarrow 2\text{NaF} + \text{Cl}_{2(l)}$
 - $\text{Cl}_{2(l)} + 2\text{NaI}_{(aq)} \rightarrow 2\text{NaCl} + \text{I}_{2(l)}$
-
25. Name one natural source of clean water?
- Lakes
 - Oceans
 - Springs
 - Streams
-
26. Select a compound below that when heated, produces a brown gas.
- NaNO_2
 - NaNO_3
 - $\text{Ca}(\text{NO}_3)_2$
 - KNO_3
-
27. List the main elements found in fertilizers
- Na, K, Ca
 - K, N, Mg
 - K, N, P
 - Na, N, K
-
28. What is the mass of 0.3 moles of ammonia (RMM = 17)?
- 5.1g
 - 0.018g
 - 17.3g
 - 56.67g
-
29. Give one bi-product in the electrolysis of brine which is used as rocket fuel.
- Chlorine gas
 - Oxygen gas
 - Hydrogen gas
 - Nitrogen gas
-
30. What is the empirical formula of a compound that contains 80% carbon and 20% hydrogen?
- CH
 - C_2H_6
 - C_2H_4
 - CH_3
-
31. A carbonate of an element, X, on heating produces the oxide of X and CO_2 . The element X is most likely to be
- Na
 - Ca
 - K
 - Al

Turn Over

32. The formula which expresses the actual number of each kind of atom present in the molecule of a compound is called
 A Empirical formula
 B Structural formula
 C Molecular formula
 D Atomic formula
-
33. Choose a substance that increases the rate of a chemical reaction and remain chemically unchanged.
 A An oxidizing agent
 B A reducing agent
 C An inhibitor
 D A catalyst
-
34. 24000C of electricity is equivalent to
 A 0.25F
 B 0.5F
 C 1F
 D 4F
-
35. How many electrons are in the ion $^{56}_{26}\text{Fe}^{2+}$?
 A 26
 B 30
 C 24
 D 29
-
38. Electrolysis is mostly applied in
 1) Electroplating of metals
 2) Extraction of metals
 3) Purification of metals during their extraction
 4) Manufacture of alcohol
-
39. Elements X and Y have a valency of 2 each. The compound formed between X and Y is
 A 2XY
 B X_2Y_4
 C XY
 D $(\text{XY})_2$
-
40. What type of reaction is represented by the equation:
 $\text{CaCO}_3 \xrightarrow{\Delta} \text{CaO} + \text{CO}_2; \Delta H = +1002\text{KJ mol}^{-1}$
 A Exothermic reaction
 B Oxidation reaction
 C Endothermic reaction
 D Redox reaction
-
41. How many grams of $\text{Ca}(\text{OH})_2$ are contained in 250cm^3 of 0.0250M $\text{Ca}(\text{OH})_2$ solution (RMM = 74)
 A 0.24g
 B 0.46g
 C 7.4g
 D 46.25g
-
42. Which of the following contains the same number of particles
 A 0.5mol of CO_2 and 16g of Oxygen
 B 0.5mol of CO_2 and 8g of Oxygen
 C 22g of CO_2 and 16g of Oxygen
 D 44g of CO_2 and 0.5g of Oxygen

QUESTIONS 36-38.

INSTRUCTIONS: For each of the questions, one or more of the response(s) given is (are) correct. Decide which 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 only 4 is correct.

Instructions Summarized			
A	B	C	D
1,2,3 only	1,3 only	2,4 only	4 only

36. Reduction can be defined as
 A Gain of electrons
 B Increase in Oxidation Number
 C Gain of Hydrogen
 D Loss in electrons
-
37. Considering the reaction
 $\text{CaCO}_{3(s)} + 2\text{HCl} \rightarrow \text{CaCl}_2 + \text{H}_2\text{O} + \text{CO}_2$
 Which factor(s) can affect the rate of the reaction?
 A Light
 B Catalyst
 C Pressure
 D Surface area
-
43. 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, choose.
 A. If both statements are **True** and the second statement is a correct explanation of the first.
 B. If both statements are **True** but the second statement is not the correct explanation of the first.
 C. If the first statement is **True** but the second statement is **False**.
 D. If the first statement is **False** but the second statement is **True**

Instructions summarised		
First statement		Second statement
A	True	True and the second statement is the correct explanation of the first
B	True	True and the second statement is not the correct explanation of the first
C	True	False
D	False	True

	First statement	Second statement
43.	The thermal decomposition of potassium nitrate produces potassium nitrite and oxygen.	Bond breaking involves the absorption of heat from the surrounding
44.	Water molecule has a linear shape with a bond angle of 180°	The water molecules are linked by a hydrogen bond.
45.	Boyle's law states that the volume of a fixed mass of gas is directly proportional to temperature provided pressure is constant.	Mathematically Boyle's law is expressed as $PV=K$

46. Identify a chemical used at home that is acidic
- A Kerosene
 - B Vinegar
 - C Soap
 - D Common salt

47. How many moles of water are contained in 9g of water?
- A 9mol
 - B 0.5mol
 - C 1mol
 - D 18mol

48. Calculate the percentage composition by mass of nitrogen in ammonium carbonate $((\text{NH}_4)_2\text{CO}_3)$ (RMM = 96)
- A 50
 - B 12.5
 - C 29.2
 - D 8.3

49. Name the catalyst used in the Contact process
- A Finely divided iron
 - B Vanadium (V) oxide
 - C Platinum/Nickle catalyst
 - D Platinum

50. Which of the following is a greenhouse gas
- A Carbon dioxide
 - B Carbon monoxide
 - C Ozone
 - D Oxygen

STOP
GO BACK AND CHECK YOUR WORK