EXAMINATION NUMBER _____

CENTRAL EAST EDUCATION DIVISION

2023 JUNIOR CERTIFICATE OF EDUCATION MOCK EXAMINATION

CHEMISTRY

(100 marks)

Wednesday, 29 March

Subject Number: J038

Time allowed: 2 Hours

8:00 am – 10:00 am

Instructions

1. This paper contains **12 printed** pages. Please check.
2. Write your name in the spaces provided on top of every page of the question paper.
3. Answer all **thirty-three (33)** questions.
4. This paper contains three sections **A, B** and **C**. For section A, encircle the letter representing the right answer to each question. Sections B and C should be answered in the spaces provided.
5. In the table provided on this page, **tick** against the question number you have answered.
6. Hand in your paper to the invigilator when time is called to stop writing.

Question Number	Tick if answered	Do not write in these columns	
1 – 20			
21			
22			
23			
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27			
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31			
32			
33			
Total			

EXAMINATION NUMBER _____

SECTION A (20 marks)

There are **twenty** questions in this section. Encircle the letter of your choice representing the right answer.

1. Which of the following substances is a compound?
A. Oxygen gas
B. Water
C. Iron metal
D. Chlorine gas

2. Which of the following acids is contained in fizzy drinks?
A. Lactic acid
B. Ethanoic acid
C. Carbonic acid
D. Tartaric acid

3. How many hydrogen atoms are in three molecules of ethanol, C_2H_5OH.?
A. 6
B. 10
C. 15
D. 18

4. Why do isotopes have similar chemical properties?
A. They have more protons than electrons
B. They have same number of electrons in their outermost shell
C. They have same number of protons
D. They exist in the same state

5. Which of the following are halogens?
A. Li and F
B. Be and Cl
C. Cl and I
D. Mg and Br

6. The process where by a substance changes from solid to gas is called _____
A. Evaporation
B. Boiling
C. Sublimation
D. Condensation

7. What is the effect of impurities on boiling point of substances?
A. Boiling point decreases
B. Boiling point increases
C. Boiling point reduces by half
D. Boiling point remains constant

8. A rectangular piece of wood is 9.0cm long, 7.0cm wide and 3.0cm deep. Calculate the volume of the brass block.
A. $63cm^3$
B. $27cm^3$
C. $21cm^3$
D. $189cm^3$

9. Which of the following is a cause of soil pollution in Malawi?
A. Application of chemical fertilizers
B. Fumigation of crops
C. Use of forests for toilets
D. Use of plastic papers

10. The following points are true about group II elements

i. All are metals
ii. Have one energy level
iii. Have two electrons in their outermost shells
iv. Have two energy levels with electrons

A. i and ii
B. ii and iv
C. i and iii
D. ii and iv

11. **Figure 1** is a diagram of a hazard symbol. What does the symbol mean?

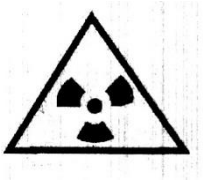


Figure 1

A. Danger
B. Explosive
C. Radioactive
D. Oxidising

12. Which of the following substances are organic compounds?

i. C_2H_3OH
ii. CH_3COOH
iii. H_2CO_3
iv. C_4H_8

A. i, iii and iv
B. ii, iii and iv
C. i, ii and iii
D. i, ii and iv

13. How do non-metal atoms react together to form compounds?

A. By attracting and accepting electrons.
B. By donating their outer electrons.
C. By sharing some of their outer electrons.
D. By gaining and sharing electrons

14. Express the value of 0.00507 in standard form.

A. 507×10^{5}
B. 50.7×10^{-4}
C. 5.07×10^{-3}
D. 5.07×10^{3}

15. What is the relative formula mass of $CaCO_3$? (RAM: Ca=40, C=12, O =16)

A. 68
B. 84
C. 88
D. 100

Mtsinje tested solutions **P**, **Q**, **R** and **S** using universal indicator. The results were recorded as follows.

Solution	**Colour when mixed with universal indicator**
P	Green
Q	Orange
R	Violet
S	Red

16. Which solution is neutral?

A. P
B. Q
C. R
D. S

17. Which solution has the highest pH value?

A. P
B. Q
C. R
D. S

18. The products for the reaction between R and S are
- **A.** Carbon dioxide and water
- **B.** Oxygen and water
- **C.** Salt and water
- **D.** Carbon dioxide and hydrogen gas

19. Why are alkenes called unsaturated hydrocarbons?
- **A.** They are very reactive
- **B.** They have a double bond
- **C.** They have a functional group
- **D.** They react with halogens to form haloalkanes

20. The balanced chemical equation for the reaction between sodium and water is
- **A.** $Na_{(s)} + H_2O_{(l)} \rightarrow NaOH_{(aq)} + H_{2(g)}$
- **B.** $Na_{(s)} + H_2O_{(l)} \rightarrow Na(OH)_{(aq)} + H_{2(g)}$
- **C.** $2Na(s)+2H_2O_{(l)} \rightarrow 2NaOH_{(aq)}+H_{2(g)}$
- **D.** $Na_{(s)} + 2H_2O_{(l)} \rightarrow NaOH_{(aq)} + H_{2(g)}$

SECTION B (50 marks)

21. **Table 2** shows the atomic number, melting points and atomic radii of some halogens. Use it to answer the questions that follows:

Table 2

Name of elements	Atomic number	Melting points	Boiling points	Atomic radius
Fluorine	9	-220	-188	o.071
Chlorine	17	-101	-34	0.099
Bromine	35	-7	59	0.114
Iodine	53	114	184	0.133

a. Which element is a liquid at 25^0C?

_____ **(1 mark)**

b. Why does iodine have the biggest radius?

_____

_____ **(1 mark)**

c. Mention any **two** chemical properties of halogens.

_____

_____ (**2 marks**)

22. Table 3 shows results recorded by a form 2 student at CEED CDSS during an experiment. It shows temperature against time for the change of a substance from solid to liquid. Use it to answer questions below.

Table 3

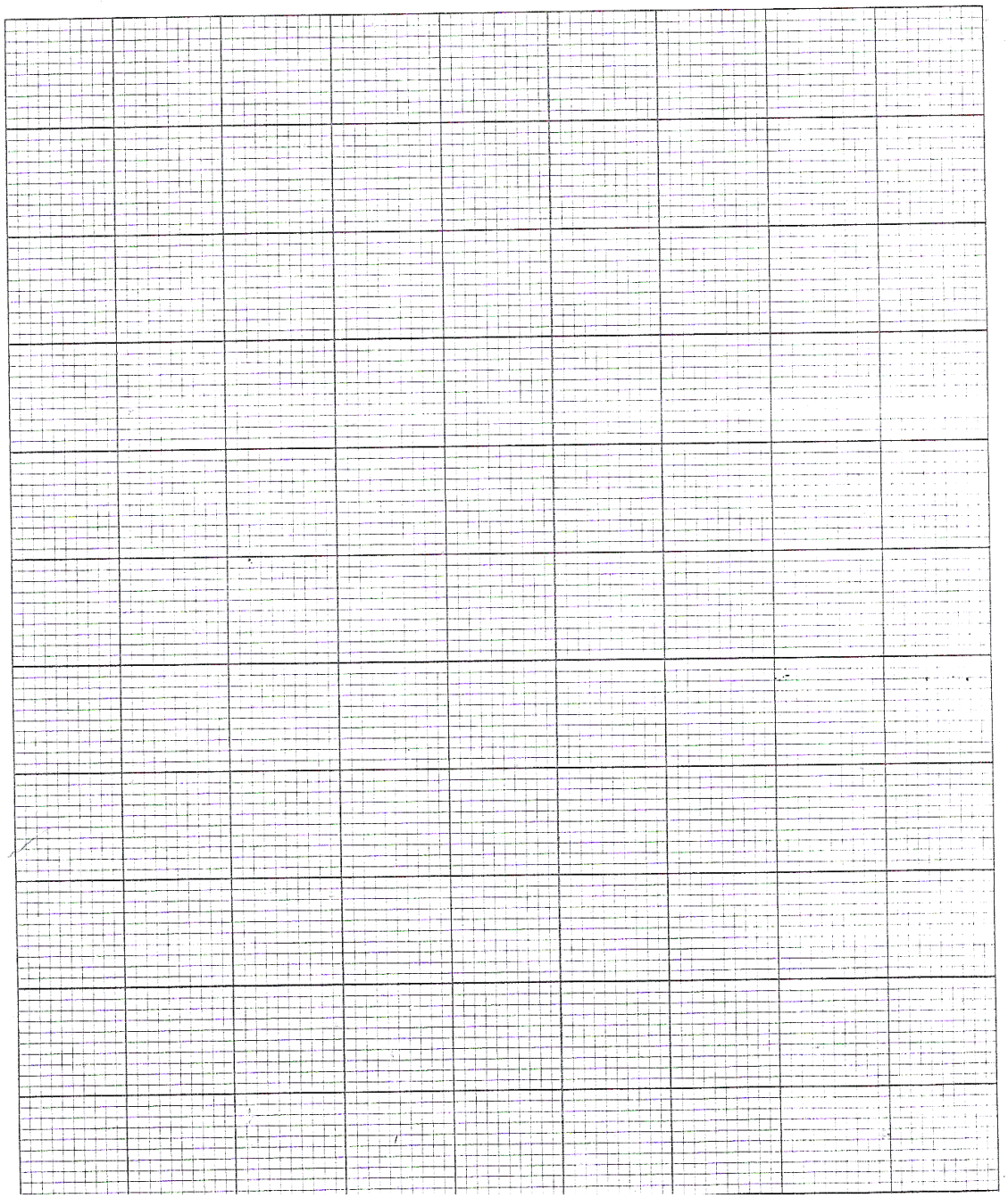
Temperature (^{0}C)	10	20	30	40	50
Time (min)	1	2	3	4	5

a. Identify the dependent and independent variables from the experimental results presented in **Table 3.**

i. dependent: _____ (**1mark)**

ii. independent: _____ **(1mark)**

b. Plot a graph of Temperature against time.



(4 marks)

c. Draw a conclusion of the experiment.

_____

_____ **(1 mark)**

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23a. What are hydrocarbons?

_____

_____ **(1 mark)**

b. State any **two** examples of alkanes and write their molecular formulae.

Alkane	**Molecular formula**

(4 marks)

c. i) Draw the structure formula of pentane, C_5H_{10}.

(2 marks)

(ii) Give any **two** chemical properties of alkenes.

_____

_____**(2 marks)**

24a. Define isotopes.

_____

_____ **(1 mark)**

b. An element **Y** consists of isotopes of masses 10 and 11 with a percentage of 18.7% and 81.3% respectively. Calculate the relative atomic mass of **Y.** **(5 marks)**

25. a. What is the **main** difference between ionic bonding and covalent bonding?

_____

_____ **(1 mark)**

b. Give any **two** examples of ionic compounds.

_____

_____ **(2 marks)**

c. Draw electronic diagram for carbon dioxide (CO_2). Use dot (**.**) and cross (**x**). Show only the outer most energy level electrons.

(3 marks)

26. a. What is a laboratory?

_____

_____ **(1 mark)**

b. **Figure 2** below shows a laboratory hazard symbol

i. What is the meaning of the symbol?

_____ **(1 mark)**

ii. Explain any two safety measures that need to observed when handling such substances.

_____

_____ **(2 marks)**

27. **Figure 3** is a laboratory apparatus.

a. Name the apparatus.

_____ **(1 mark)**

b. What is the function of the apparatus?

_____ (**1 mark)**

28a. Balance the chemical equation

$Fe_2O_3(s) + HCl(aq) \rightarrow FeCl_3(aq) + H_2O(l)$

_____ (**3 marks)**

b. Explain how a mixture of sand and iron fillings can be separated.

_____

_____ **(2 marks)**

c. Which physical property is used in distillation as a method of separating a mixture of miscible liquids?

_____ **(1 mark)**

29. The nuclear notation of an atom **M** is given as $^{14}_{7}M$

a What do the numbers 14 and 7 stand for?

14 _____

7 _____ **(2 marks)**

b. In which group does the element belong?

_____ (**1 mark)**

30a. State any **one** use of argon gas.

_____ **(1 mark)**

b. Explain the trend of reactivity of group 7 elements.

_____

_____

_____ **(2 marks)**

SECTION C (30 MARKS)

31a.Describe an experiment that could be done to investigate the effect of temperature on solubility.

_____

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_____ (**6 marks**)

b. Explain **two** applications of neutralization reaction?

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_____ (**4 marks**)

32. Describe an experiment that would be carried out to show that matter is made of small particles using coffee grains.

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_____ **(10marks)**

33a. Explain any **three** ways of preventing soil pollution?

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_____ **(6 marks)**

b. With an aid of well-balanced chemical equations, describe the combustion of methane in sufficient oxygen.

_____

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_____ **(4 marks)**

END OF QUESTION PAPER

NB: This paper contains 12 pages.