GOVERNMENT OF SAMOA

STUDENT EDUCATION NUMBER									

Samoa National Junior Secondary Certificate

CHEMISTRY

2023

QUESTION and ANSWER BOOKLET

Time allowed: 3 Hours & 10 minutes

INSTRUCTIONS

1. You have 10 minutes to read **before** you start the exam.
2. Write your **Student Education Number (SEN)** in the space provided on the top right-hand corner of this page.
3. **Answer ALL QUESTIONS.** Write your answers in the spaces provided in this booklet.
4. If you need more space, ask the Supervisor for extra paper. Write your SEN on all extra sheets used and clearly number the questions. Attach the extra sheets to the appropriate places in this booklet.

Note: Periodic Table on page 23 of the Question Paper.

STRANDS		Pages	Time (min)	Weighting
STRAND 1	THE WAYS MATERIALS ARE STRUCTURED	2 - 6	62	34
STRAND 2	THE PROPERTIES AND USES OF SUBSTANCES	7 - 15	56	32
STRAND 3	THE WAYS MATERIALS ARE CHANGED	16 - 22	62	34
TOTAL			**180**	**100**

Check that this booklet contains pages 2-24 in the correct order and that none of these pages are blank.

HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.

STRAND 1: **THE WAYS MATERIALS ARE STRUCTURED** **WEIGHTING 34**

For Questions 1 to 5, choose and write the LETTER of the correct answer in the box provided.

1. Atoms are defined as the:

   A. biggest particle of an element.
   B. biggest neutrons in an element.
   C. smallest particle of an element.
   D. smallest neutrons in an element.

	SL 1

2. Electron is a:

   A. positively charged particle.
   B. negatively charged particle.
   C. does not have any charge.
   D. negatively and positively charged particle.

	SL 1

3. Proton is a:

   A. positively charged particle.
   B. negatively charged particle.
   C. does not have any charge.
   D. negatively and positively charged particle.

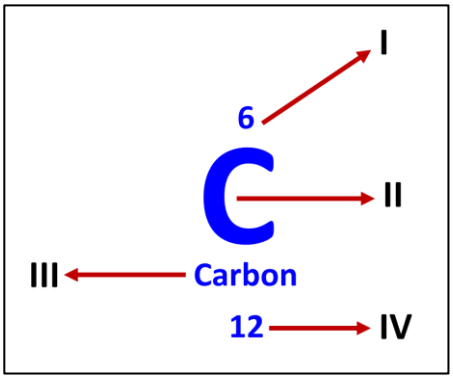
	SL 1

4. An element is:

   A. made up of more than three kinds of atoms.
   B. made up of more than two kinds of atoms.
   C. made up of more than one kind of atom.
   D. made up of only one kind of atom.

	SL 1

5. The atomic number for the element below is labeled:



A. I
B. II
C. III
D. IV

SL 1

6. Using ONE example describe what **ionic bonding** is:

_____
_____
_____
_____

SL 2

7. List any TWO **physical properties** of metals.

_____
_____
_____

SL 2

8. Define the term **isotope** and give an example.

_____
_____
_____
_____

SL 2

9. Classify the following as a **compound** or a **mixture**.

H_2O - _____

Glass - _____

SL 2

10. Write the equation using chemical symbols for the reaction below.

Calcium + Oxygen ⟶ Calcium oxide

SL 2

_____

11. List any **TWO** glassware used to prepare a sodium chloride (NaCl) solution.

SL 2

_____

12. Calculate the number of moles of carbon dioxide (CO_2) given a mass of 88g.

Given: M(C) = 12 g/mol M(O) = 16 g/mol

SL 3

13. Calculate the percentage of hydrogen in water.

Given: **M(H) = 1 g/mol** **M(O) = 16 g/mol**

SL 3

14. Write the electron arrangement for a chlorine atom.

SL 3

_____

15. Discuss the main differences between cations and anions in terms of their formation and charges.

_____

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SL 4

16. Discuss an observation when copper metal is put into a beaker of water.

SL 4

For Questions 17 and 18, choose and write the LETTER of the correct answer in the box provided.

17. What is the meaning of the following safety symbol?

A. Hazardous
B. Corrosive
C. Flammable
D. Reactive

	SL 1

18. The following symbol indicates that a chemical is _____ to humans.

A. reactive
B. corrosive
C. toxic
D. radiation

	SL 1

19. Write **TRUE** if you think the statement is **true**, or **FALSE** if you think the statement is **false**.

- A corrosive chemical can destroy tissues such as skin and eyes. _____

SL 1

20. Name ONE household substance found in your school laboratory.

_____

SL 1

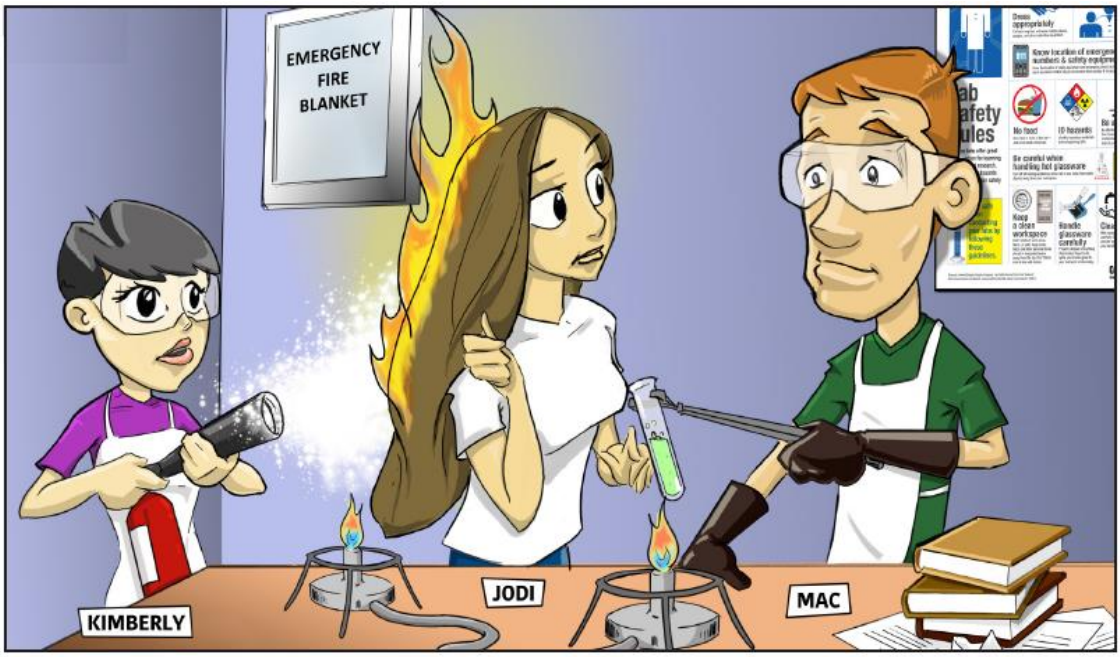
Use the image below to answer Question 21.

21. How many hazardous household items can you identify in the image above?

_____

SL 2

Use the diagram below to answer Questions 22 and 23.



22. Describe any **TWO** unsafe activities depicted in this illustration.

_____

_____

_____

_____

_____

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_____

SL 2

23. State how your **TWO** unsafe activities identified in Question 22 can be altered to make them safe.

_____

_____

_____

_____

_____

_____

_____

SL 2

24. Read the information in the box and identify what is the **potential accident** and what **preventive action** should be taken.

"While measuring chemicals for a solution, you accidentally spill a large amount."

Accident:

_____

SL 2

Preventive action: _____

_____

25. Explain why pesticides are harmful and cause pollution to the environment.

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SL 3

26. Select any group of substances below and explain their uses and how to store them safely.

Laundry detergents	**Dishwashing detergents**
Motor oil	**Cleaning detergents**

SL 3

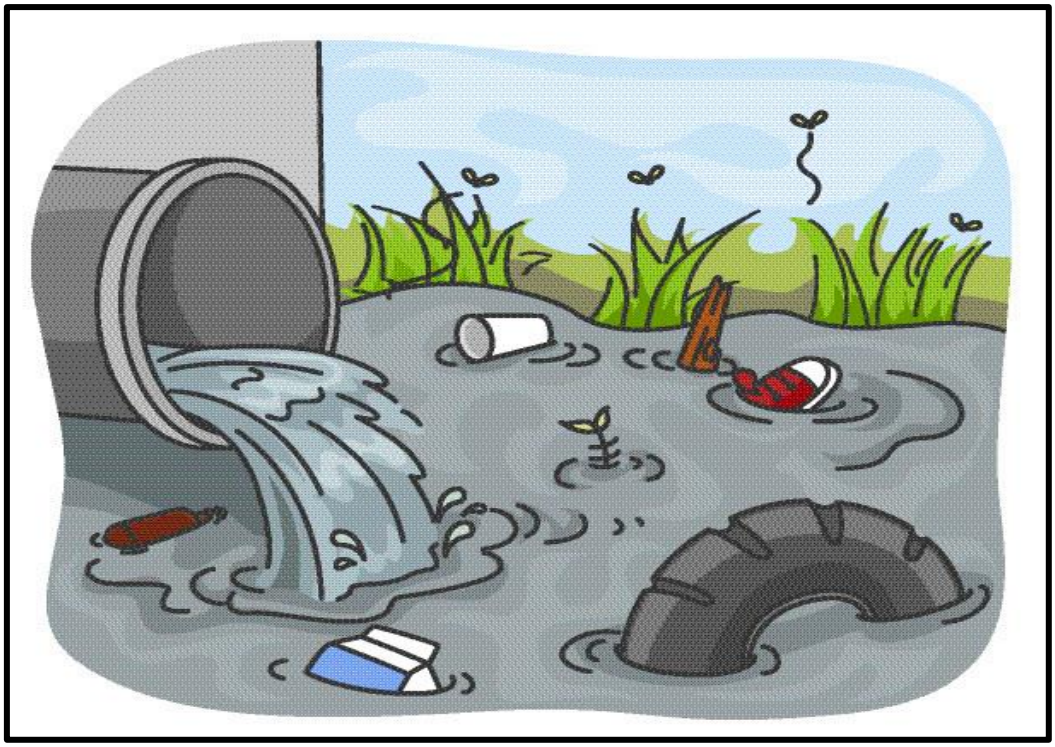
Use the diagram below to answer Question 27.

27. Describe the safety procedures that are violated in the illustration above.

SL 3

28. Explain how household substances should be stored in your home or in your school laboratory.

SL 3



29. Discuss the impact of household substances on the environment as shown in the figure above.

SL 4

30. Identify which of the items below are **dangerous** and **poisonous**. **CIRCLE the LETTER only.**

 A	 B	 C
 D	 E	 F
 G	 H	 I
 J	 K	 L

SL 4

STRAND 3: THE WAYS MATERIALS ARE CHANGED WEIGHTING 34

31. Identify the following as **CHEMICAL (C)** or **PHYSICAL (P)** change.

SL 1

An apple is cut. _____

32. Write **TRUE** if you think the statement is **true**, or **FALSE** if you think the statement is **false**.

SL 1

- A bicycle changes colour as it rusts. _____

For Question 33, choose and write the LETTER of the correct answer in the box provided.

33. Which of the following is a sign that a reaction you are observing is a chemical reaction?

A. No temperature change.
B. Bubbles produced.
C. Reactants remain the same.
D. No solid formed.

	SL 1

34. Balance the following chemical equation.

SL 2

$$\_\_\_\_\_H_2 + \_\_\_\_\_O_2 \longrightarrow \_\_\_\_\_H_2O$$

35. State the law of conservation of mass in chemical reactions.

_____
_____
_____
_____
_____
_____
_____

SL 2

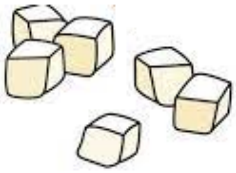
36. Describe what a precipitation reaction is in connection to the solubility of ionic compounds.

SL 2

37. Describe what neutralization is with reference to the reaction of acids, bases and pH.

SL 2

38. Compare the two given situations and identify the factor that affected the rate of reaction.

SITUATION A	SITUATION B	FACTOR AFFECTING THE RATE OF REACTION
1 g sugar (cubes) 	**1 g sugar (grains)** 	
50°C 	**0°C** 	
Low number of particles = fewer collisions 	**High number of particles = more collisions** 	

SL 3

39. Determine whether each ionic compound is **SOLUBLE** or **INSOLUBLE**.
If **soluble**, write the **formula of the ions** present in a solution of the compound.
If **insoluble** write the **formula of the solid**.

(i) Sodium chloride _____

_____

SL 4

(ii) Magnesium hydroxide _____

_____

40. Discuss some applications of the **rate of reaction** in real-life situations.

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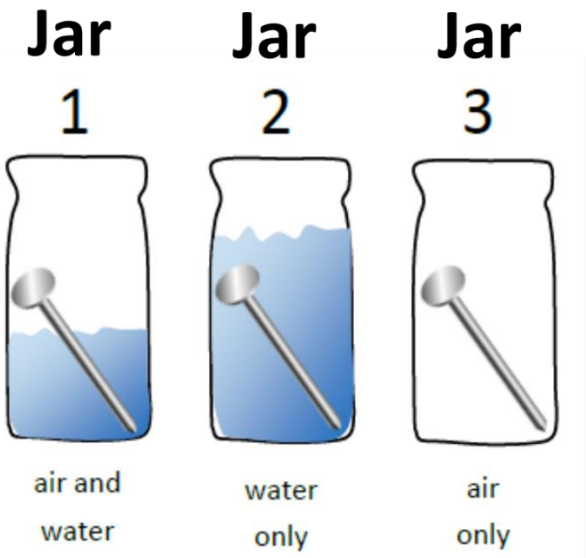
SL 4

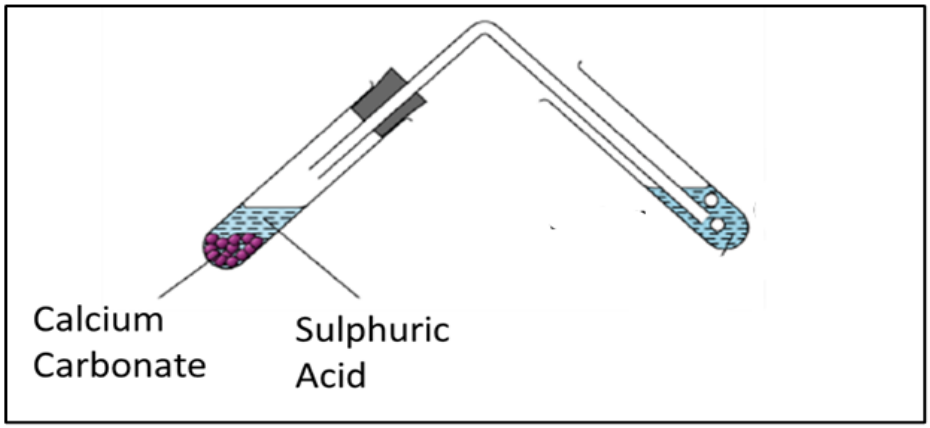
41. Iron has many properties, and one example is that it can rust.
For iron to rust it needs certain conditions.



Discuss any observation of the result based on the conditions shown in the diagram.

SL 4

42. Most carbonates usually do not dissolve in water (insoluble) as shown in the illustration below.



Describe the result of the chemical reaction shown above. *[Hint: products of the reaction above]*

SL 4

43. In biological reactions, catalysts are usually protein molecules called **enzymes**.

Discuss how catalysts can increase the rate of a reaction.

SL 4

Periodic Table of the Elements

1												13	14	15	16	17	18
1 H Hydrogen 1.008	2																2 He Helium 4.003
3 Li Lithium 6.941	4 Be Beryllium 9.012											5 B Boron 10.811	6 C Carbon 12.011	7 N Nitrogen 14.007	8 O Oxygen 15.999	9 F Fluorine 18.998	10 Ne Neon 20.180
11 Na Sodium 22.990	12 Mg Magnesium 24.305	3	4	5	6	7	8	9	10	11	12	13 Al Aluminum 26.982	14 Si Silicon 28.086	15 P Phosphorus 30.974	16 S Sulfur 32.066	17 Cl Chlorine 35.453	18 Ar Argon 39.948
19 K Potassium 39.098	20 Ca Calcium 40.078	21 Sc Scandium 44.956	22 Ti Titanium 47.88	23 V Vanadium 50.942	24 Cr Chromium 51.996	25 Mn Manganese 54.938	26 Fe Iron 55.933	27 Co Cobalt 58.933	28 Ni Nickel 58.693	29 Cu Copper 63.546	30 Zn Zinc 65.39	31 Ga Gallium 69.732	32 Ge Germanium 72.61	33 As Arsenic 74.922	34 Se Selenium 78.09	35 Br Bromine 79.904	36 Kr Krypton 84.80
37 Rb Rubidium 84.468	38 Sr Strontium 87.62	39 Y Yttrium 88.906	40 Zr Zirconium 91.224	41 Nb Niobium 92.906	42 Mo Molibdenum 95.94	43 Tc Technetium 98.907	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.906	46 Pd Palladium 106.42	47 Ag Silver 107.868	48 Cd Cadmium 112.411	49 In Indium 114.818	50 Sn Tin 118.71	51 Sb Antimony 121.760	52 Te Tellurium 127.6	53 I Iodine 126.904	54 Xe Xenon 131.29
55 Cs Cesium 132.905	56 Ba Barium 137.327	57-71 Lanthanides	72 Hf Hafnium 178.49	73 Ta Tantalum 180.948	74 W Tungsten 183.85	75 Re Rhenium 186.207	76 Os Osmium 190.23	77 Ir Iridium 192.22	78 Pt Platinum 195.08	79 Au Gold 196.967	80 Hg Mercury 200.59	81 Tl Thallium 204.383	82 Pb Lead 207.2	83 Bi Bismuth 208.980	84 Po Polonium [208.982]	85 At Astatine 209.987	86 Rn Radon 222.018
87 Fr Francium 223.020	88 Ra Radium 226.025	89-103 Actinides	104 Rf Rutherfordium [261]	105 Db Dubnium [262]	106 Sg Seaborgium [266]	107 Bh Bohrium [264]	108 Hs Hassium [269]	109 Mt Meitnerium [268]	110 Ds Darmstadtium [269]	111 Rg Roentgenium [272]	112 Cn Copernicium [277]	113 Uut Ununtrium unknown	114 Fl Flerovium [289]	115 Uup Ununpentium unknown	116 Lv Livermorium [298]	117 Uus Ununseptium unknown	118 Uuo Ununoctium unknown

57 La Lanthanum 138.906	58 Ce Cerium 140.115	59 Pr Praseodymium 140.908	60 Nd Neodymium 144.24	61 Pm Promethium 144.913	62 Sm Samarium 150.36	63 Eu Europium 151.966	64 Gd Gadolinium 157.25	65 Tb Terbium 158.925	66 Dy Dysprosium 162.50	67 Ho Holmium 164.930	68 Er Erbium 167.26	69 Tm Thulium 168.934	70 Yb Ytterbium 173.04	71 Lu Lutetium 174.967
89 Ac Actinium 227.028	90 Th Thorium 232.038	91 Pa Protactinium 231.036	92 U Uranium 238.029	93 Np Neptunium 237.048	94 Pu Plutonium 244.064	95 Am Americium 243.061	96 Cm Curium 247.070	97 Bk Berkelium 247.070	98 Cf Californium 251.080	99 Es Einsteinium [254]	100 Fm Fermium 257.095	101 Md Mendelevium 258.1	102 No Nobelium 259.101	103 Lr Lawrencium [262]

STUDENT EDUCATION NUMBER									

SNJSC CHEMISTRY

2023

(For Scorers only)

STRANDS		Weighting	Scores	Check Scorer	AED Check
STRAND 1	THE WAYS MATERIALS ARE STRUCTURED	34			
STRAND 2	THE PROPERTIES AND USES OF MATERIALS	32			
STRAND 3	THE WAY MATERIALS CHANGED	34			
	TOTAL	**100**			