GOVERNMENT OF SAMOA

STUDENT EDUCATION NUMBER									

Samoa National Junior School Certificate

GENERAL SCIENCE

2024

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.

STRANDS		Pages	Time (min)	Weighting
STRAND 1	**BIOLOGY** Variety of Life Cell Biology Plant Biology Environment	2-8	60	34
STRAND 2	**CHEMISTRY** The ways materials are structured. The properties and uses of groups of substances. The ways materials changed.	9-15	60	32
STRAND 3	**PHYSICS** Energy Electricity Magnetism Forces & Motion	16-22	60	34
TOTAL			**180**	**100**

Check that this booklet contains pages 2-23 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: **BIOLOGY** **Weighting 34**

Sub-strand 1: Variety of Life **(6 marks)**

For Question 1, write the LETTER of the correct answer in the box provided.

1. Which of the following **BEST** defines disinfectant?

   A. A chemical agent that kills or inhibits the growth of microorganisms on living tissue, such as skin.

   B. A chemical substance used to remove dirt and grime from surfaces.

   C. A chemical agent that destroys or inactivates harmful microorganisms on inanimate objects and surfaces.

   D. A natural substance used to clean surfaces and is safe for consumption.

	SL 1

2. Briefly describe the process of binary fission.

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SL 2

3. Explain how compost benefit soil and plant health.

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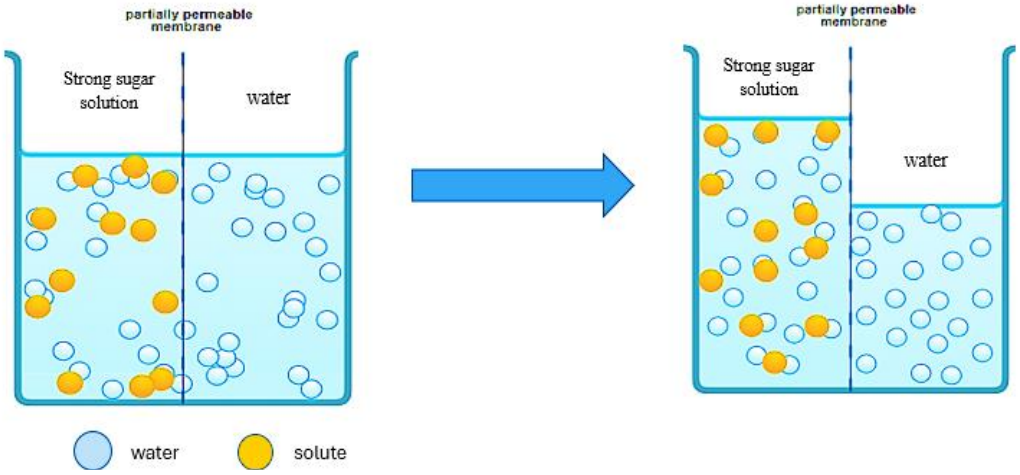
SL 3

Sub-strand 2: Cell Biology **(7 marks)**

4. Describe the process shown below AND its importance in plant cells.



SL 2

5. Define **complete dominance**.

SL 1

6. ***In a certain species of flowers, the allele for red flower colour (R) is dominant over the allele for white flower colour (r).***

(a) A homozygous, red-flowered plant (RR) is crossed with a homozygous, white-flowered plant (rr). Using a Punnett square, determine the genotypes and phenotypes of the F1 generation.

(b) Two plants from the F1 generation are then crossed with each other. Using a Punnett square, determine the genotypes and phenotypes of the F2 generation.

SL 4

<u>Sub-strand 3</u>: <u>Animal Biology</u> **(7 marks)**

For Questions 7 and 8, write the LETTER of the correct answer in the box provided.

7. The **FOUR** processes carried out by the digestive system include:

A. Ingestion, digestion, absorption, and egestion.
B. Ingestion, physical digestion, chemical digestion, and movement.
C. Esophagus, stomach, small intestine, and large intestine.
D. Esophagus, stomach, liver, and pancreas.

	SL 1

8. What is the primary function of the excretory system in humans?

A. To transport oxygen to the body's cells.
B. To break down nutrients and absorb them.
C. To remove waste products from the bloodstream.
D. To regulate body temperature.

SL 1

9. Describe **ONE** process represented by 'R' in MRSCGREN.

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SL 2

10. Explain how materials are exchanged between the mother and the embryo.

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SL 3

Sub-strand 4: **Plant Biology** **(7 marks)**

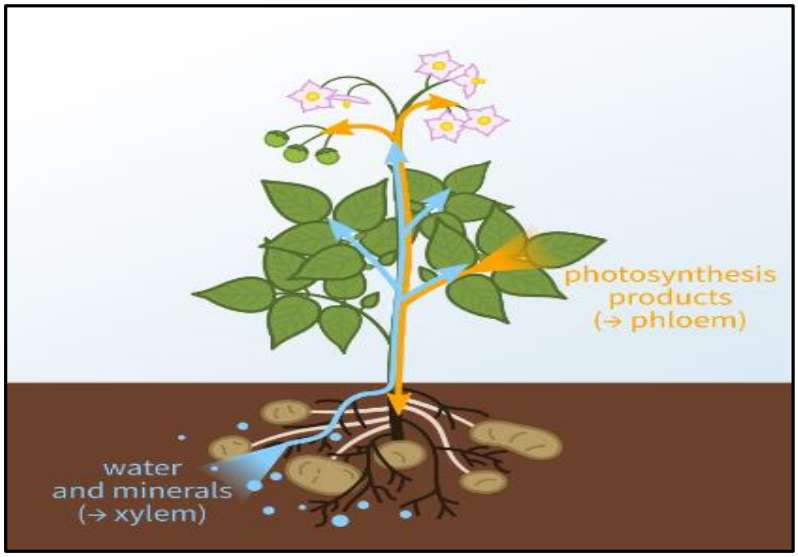
For Question 11, write the LETTER of the correct answer in the box provided.

11. Which of the following factors does **NOT** affect the rate of transpiration in plants?

A. Light
B. Humidity
C. Soil water
D. Atmospheric oxygen

SL 1

The diagram below shows a cross-section of a plant with the roots, stem, and leaves. Arrows indicate the movement of water and nutrients from the roots through the phloem and xylem to the leaves.



12. Explain how the rate of translocation can affect the overall growth of the plant, considering both the speed and efficiency of nutrient distribution.

SL 3

13. Explain the role of chlorophyll in photosynthesis. Include where chlorophyll is found in plants in your answer.

SL 3

Sub-strand 5: Environment **(7 marks)**

14. State **ONE** abiotic factor that can influence the growth of a plant.

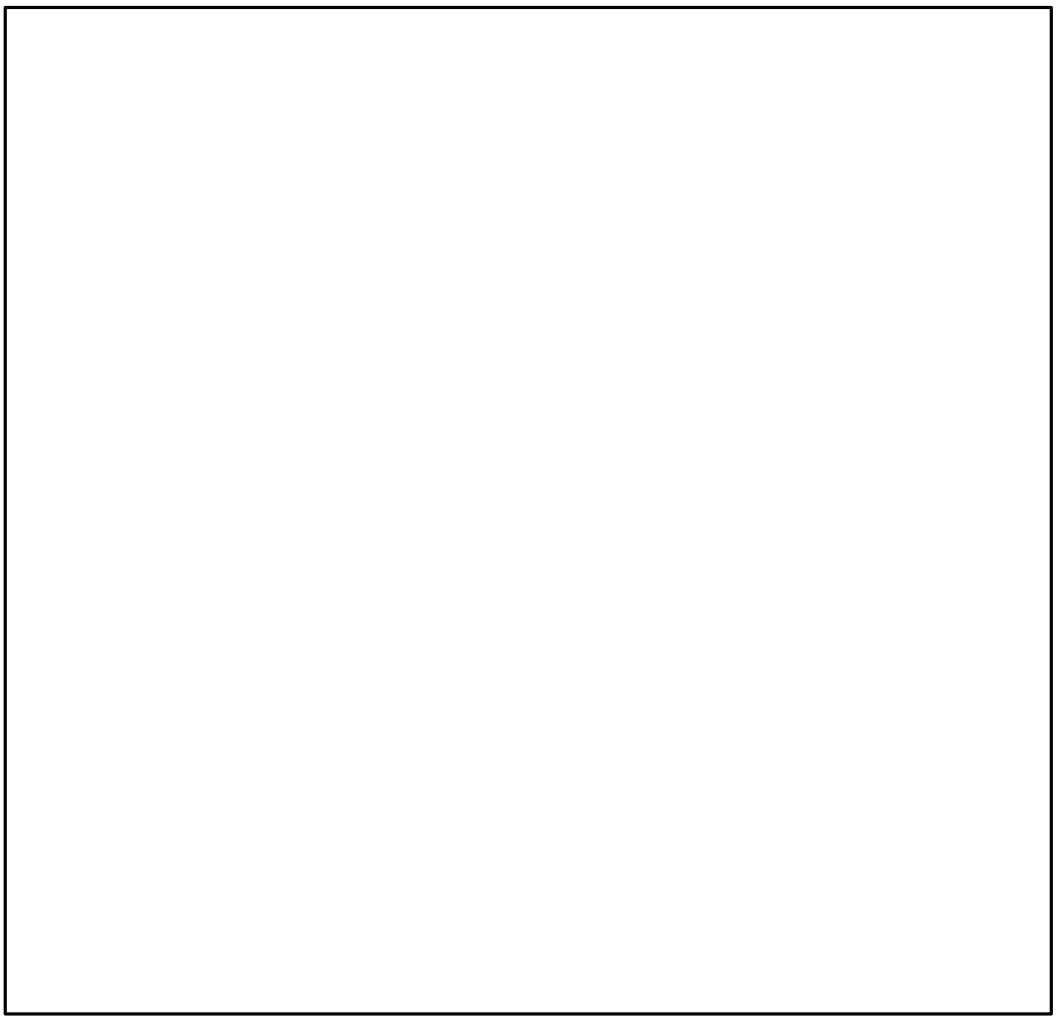
SL 1

15. *Deforestation, or cutting down trees for infrastructure, people's settlement, is a problem in Samoa. It causes soil erosion, loss of habitats, flooding, and more carbon dioxide in the air.*

Describe **TWO** contributing factors to deforestation.

SL 2

16. Draw a food chain to show the flow of energy using the following organisms: cow, myna bird, grass, human. Under each organism, identify the trophic level it represents.



SL 4

STRAND 2: CHEMISTRY Weighting 32

Sub-strand 1: The ways materials are structured. (11 marks)

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

17. What is covalent bonding?

A. The transfer of electrons from one atom to another.
B. The sharing of electron pairs between atoms.
C. The attraction between oppositely charged ions.
D. The attraction between a metal cation and a sea of delocalized electrons.

	SL 1

18. Which element has an atomic number of 6 and a mass number of 12?

A. Carbon
B. Oxygen
C. Nitrogen
D. Boron

	SL 1

19. Explain how an atom becomes an ion. Include in your answer, the electron transfer, the resulting charge, and provide an example.

SL 3

20. Describe one main difference between atoms and elements.

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SL 2

21. Name the element with an atomic number of 17 and draw its electron structure along with its corresponding ion.

SL 4

Strand 2: **The properties and uses of groups of substances.** **(10 marks)**

For Question 22, write the LETTER of the correct answer in the box provided.

22. Which of the following is a common household substance used for deodorizing and neutralizing odors in the refrigerator?

A. Vinegar
B. Bleach
C. Baking Soda
D. Pepper

SL 1

23. Explain the uses of baking soda and vinegar as household substances commonly found in home.

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SL 2

24. Identify the chemical names and formulas of the following common household substances.

Washing powder:

Chemical name _____Formula_____

Bleach:

Chemical name_____ Formula_____

SL 2

25. Describe the safety and appropriate use of the following cleaning reagent as a household substance.

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SL 2

26. Describe any prevention measures to protect against the harmful impacts of household fertilizers, such as plant and lawn fertilizers.

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SL 3

Strand 3: The ways materials changed. (11 marks)

For Questions 27 and 28, write the LETTER of the correct answer in the box provided.

27. Which of the following is a chemical change?

A. Dissolving salt in water.
B. Burning a candle.
C. Melting ice.
D. Cutting a piece of paper.

	SL 1

28. Which of the following is an indication of a chemical reaction?

A. Freezing water
B. Boiling water
C. Rusting iron
D. Melting ice

	SL 1

29. Briefly describe the concept of reaction rate or reaction speed with reference to Collision Theory. *(You can use an example for illustration*).

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SL 2

30. Explain how **THREE** different factors impact the speed at which chemical reactions occur.

SL 3

31. Choose **ONE** of the following: ***Production of Samoan oil, Production of fine mats, or Production of Samoan local chips***. Describe the changes that occur in the steps of the chosen process.

Production of Samoan oil

Production of fine mats

Production of banana chips

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SL 4

STRAND 3: **PHYSICS** **Weighting 34**

Sub-strand 1: Energy (Waves) **(9 marks)**

For Questions 32 and 33, write the LETTER of the correct answer in the box provided.

32. Which of the following is an example of heat transfer through convection?

A. The energy emitted from the filament of an electric bulb.
B. The energy coming from the sun.
C. A pan on a hot burner.
D. Water boiling in a pot.

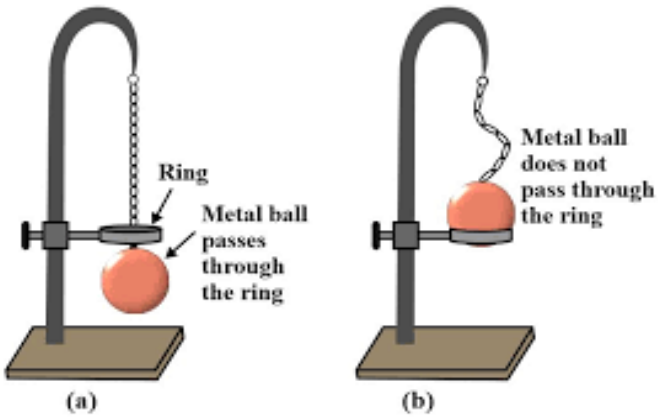
	SL 1

33. Temperature is a measure of _____ average kinetic energy per molecule in a substance.

A. warmth
B. sound
C. heat
D. coldness

	SL 1

34. The following diagram illustrates the different sizes of the metal ball before and after heating.



Describe the movement of particles in the expansion of the metal ball after heating.

	SL 2

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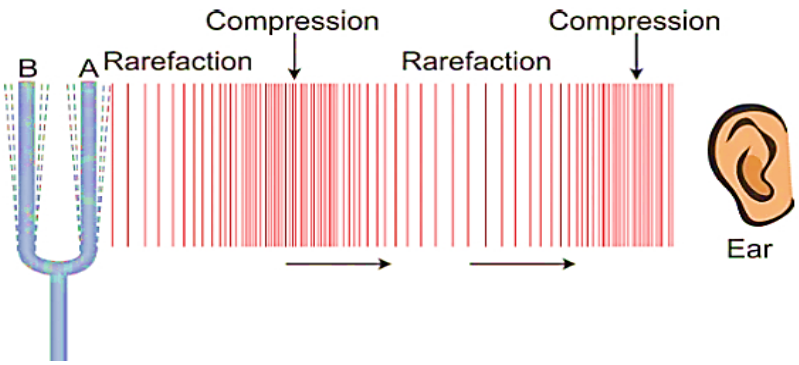
35. Describe how the speed and frequency of a sound wave change as it moves from air into water.

SL 2

36. Explain how the tuning fork shown below generates sound and transmits it through the air to reach the ear.



SL 3

Sub-strand 2: Electricity **(8 marks)**

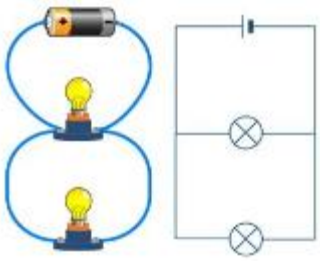
For Questions 37 and 38, write the LETTER of the correct answer in the box provided.

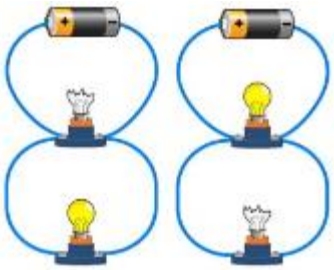
37. Electrical lights will not come on unless their electrical circuit is a:

A. short circuit.
B. closed circuit.
C. parallel circuit.
D. series circuit.

SL 1

38. Explain what happens to the current in other bulb if one of the bulbs in a parallel circuit burns out.





SL 3

39. Discuss why all metals are considered good conductors of electric current or electricity.

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SL 4

Sub-strand 3: Magnetism **(8 marks)**

40. Draw magnetic field lines around the bar magnet.

SL 2

41. Explain why an iron core creates a stronger magnetic field and produces stronger electric fields or electricity.

SL 3

42. Describe any uses or applications of electromagnets in hospitals or in household appliances.

SL 3

Sub-strand 4: Forces and Motion **(9 marks)**

For Questions 43, write the LETTER of the correct answer in the box provided.

43. Which of the following is a physical quantity that has both magnitude and direction?

A. Distance
B. Scalar
C. Frame of reference
D. Vector

SL 1

44. Define linear motion.

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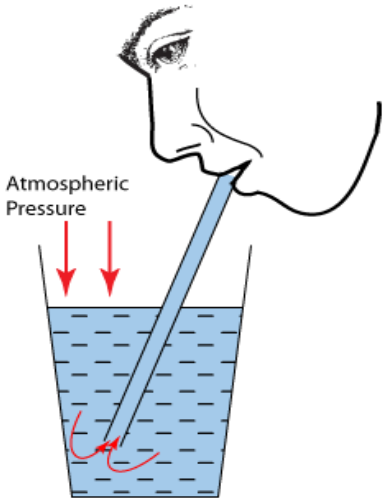
SL 1

45. A truck travels 60 kilometres in the first hour and 80 kilometres in the second hour. Calculate the average speed of the truck's journey.

SL 3

46. Discuss how does atmospheric pressure play a role in everyday situations such as drinking from a straw.



SL 4

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(For Scorers only)

SECTIONS		Weighting	Scores	Check Scorer	AED Check
SECTION A	BIOLOGY	34			
SECTION B	CHEMISTRY	32			
SECTION C	PHYSICS	34			
TOTAL		**100**			