



STUDENT EDUCATION NUMBER									

# Samoa National Junior School Certificate

# GENERAL SCIENCE

# 2022

## 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 at the appropriate places in this booklet.

SECTIONS		Pages	Time (min)	Weighting
SECTION A	BIOLOGY	2-8	60	34
SECTION B	CHEMISTRY	9-15	60	32
SECTION C	PHYSICS	16-23	60	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: Variety of Life**

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

1. Any microorganisms that cause diseases is called a:

- A. parasite
- B. pathogen
- C. prey
- D. predator

SL 1

2. Bacteria reproduce by binary fission. State the THREE steps of binary fission.

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SL 2

3. Recycling food and other organic waste into compost provide a range of environmental benefits. Explain THREE of such environmental benefits.

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SL 3

**Strand 2: Cell Biology**

For Question 4, choose and write the LETTER of the correct answer in the box provided.

4. Osmosis is defined as:
- A. movement of water molecules from a solution with a high concentration of water molecules to a solution with a lower concentration through a cell's semi-permeable membrane.
  - B. the process of diffusion of water molecules across a non-permeable membrane.
  - C. movement of water molecules from a solution with a low concentration of water molecules to a solution with a higher concentration through a cell's semi-permeable membrane.
  - D. the process of absorption of water by a cell's semi-permeable membrane.

SL 1

5. Mataio wrote the following instructions for viewing a slide on the microscope, but he got them mixed up. Correct the mix-up by writing the letters of the steps in the right order from the first step to the last.
- a. Use the coarse focus to lower the lens until it is close to the slide.
  - b. Focus using the fine focus knob.
  - c. Look down the eyepiece.
  - d. Move the slide so that the object is in the middle.
  - e. Open the diaphragm.
  - f. Put the slide on the stage.
  - g. Select a higher power objective.
  - h. Select the low power objective

SL 2

**Right Order:**

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6. Use the space below to draw and clearly label the shape and parts of skin cell of an onion.



SL 4

**Strand 3: Animal Biology**

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

7. Which of the following is a process carried out by the digestive system?

- A. Ingestion
- B. Digestion
- C. Egestion
- D. All of the above

SL 1

8. Movement is caused by the muscles of the skeleton. These muscles are called:

- A. flexible muscles.
- B. cardiac muscles.
- C. involuntary muscles.
- D. skeletal muscles.

SL 1

9. MRS GREN is an acronym often used to help remember all the necessary features of living organisms. Extend what it stands for.

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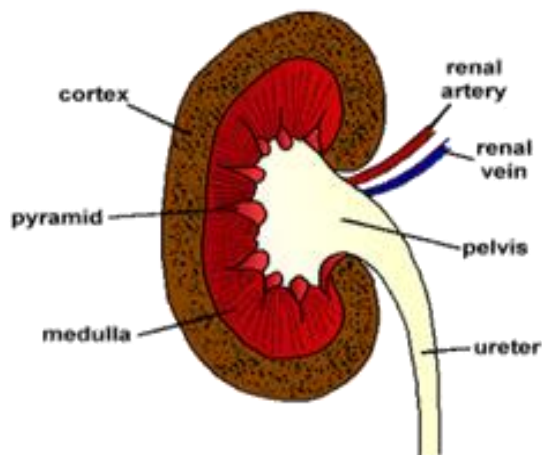
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SL 2

10. Name the human organ shown in the diagram below and explain its function.



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SL 3

**Strand 4: Plant Biology**

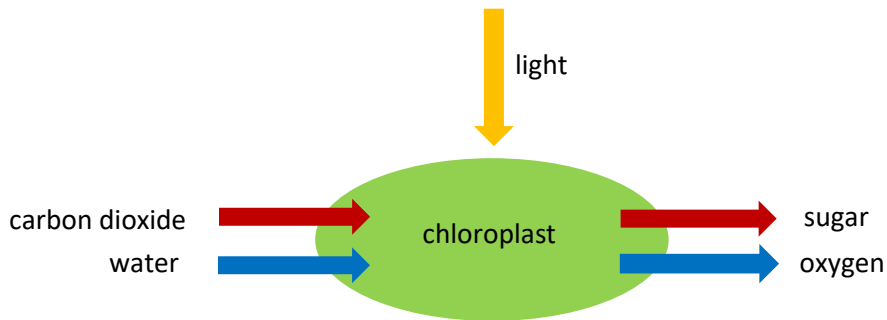
For Question 11, choose and write the LETTER of the correct answer in the box provided.

11. Which of the following has no effect on the rate of transpiration?

- A. The opening of the stomata.
- B. The length of the stem.
- C. Windy conditions.
- D. Humidity.

SL 1

12. Photosynthesis is an important cell process carried out by green leaf and stem plant cells. The following diagram shows this cellular process.



Explain how water and carbon dioxide can affect the rate of photosynthesis.

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SL 3

13. Explain the importance of chlorophyll in the process of photosynthesis.

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<b>SL 3</b>

**Strand 5: Environment**

For Question 14, choose and write the **LETTER** of the correct answer in the box provided.

14. An ecosystem contains abiotic factors and biotic factors. Minerals and the sun are examples of:
- A. abiotic factors.
  - B. biotic factors.
  - C. both abiotic and biotic factors.
  - D. foreign factors.

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<b>SL 1</b>

15. One of the environmental issues Samoa face is deforestation. Describe TWO contributing factors (causes) to this environmental issue.

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<b>SL 2</b>

16. The following species are linked through a food chain. Arrange them in a food chain, showing clearly the arrows of flow of energy.

**Plant plankton, small fish, large fish, seagulls, shrimps**



SL 4



**Strand 1:    The ways materials are structured.**

For Questions 17 – 19, choose and write the LETTER of the correct answer in the box provided.

17. If an element has atomic number 13 and a mass number 27, how many neutrons and electrons does it have?

- A. 13 neutrons and 14 electrons
- B. 14 neutrons and 13 electrons
- C. 13 neutrons and 13 electrons
- D. 27 neutrons and 27 electrons

SL 1

18. An element is a substance made up of:

- A. two types of atoms.
- B. any types of atoms.
- C. one type of atom.
- D. three types of atoms.

SL 1

19. The chemical symbol for sodium element is:

- A. NA
- B. So
- C. S
- D. Na

SL 1

20. The sodium element is located at Group 1 of the Periodic Table. State the name of this group and state ONE common property of elements in this group.

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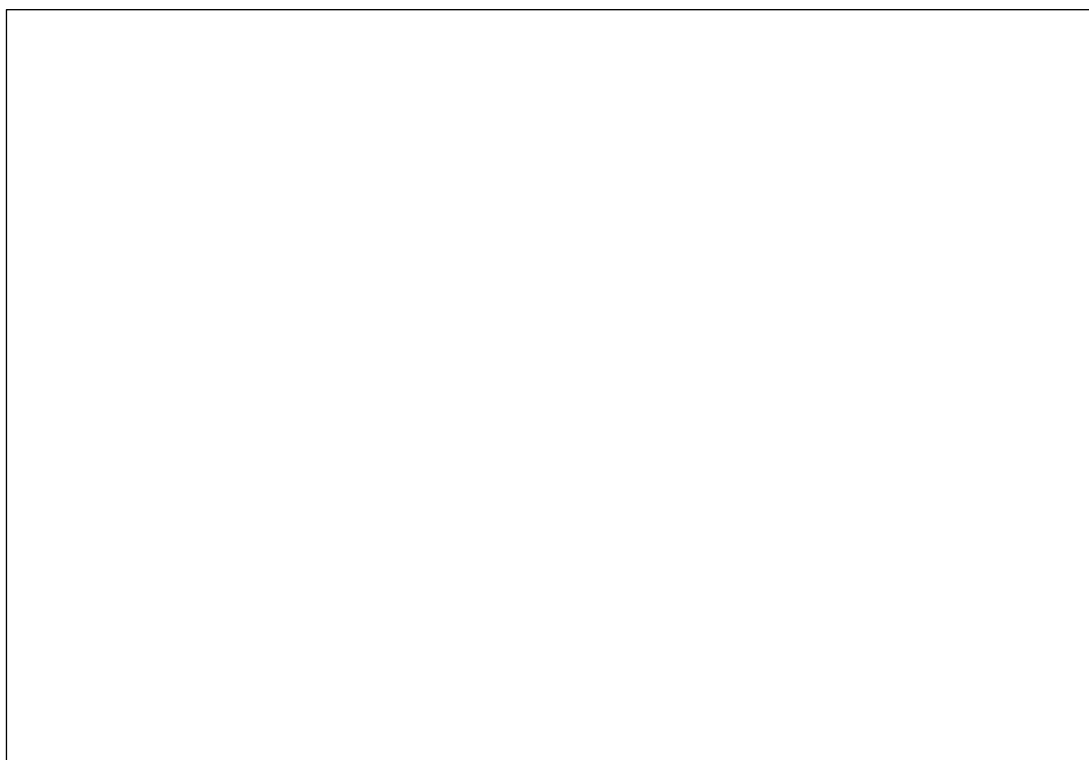
SL 2

21. Use the space provided to draw and clearly label the atomic structure of sodium.



SL 2

22. Describe with illustrations the formation of the sodium ion.



SL 3

**Strand 2:     The properties and uses of groups of substances.**

23. Baking soda is a common household substance used in baking. State the chemical name of baking soda and its chemical formula.



SL 2

Chemical Name: \_\_\_\_\_

Chemical formula: \_\_\_\_\_

24. Name TWO other uses of baking soda as a household substance.

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SL 2

25. Ammonia is found in most bathroom and household surface cleaners. Describe one harmful impact of ammonia on humans and how to protect from the harm.

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SL 3

26. Plastics are used widely across every sector including construction, packaging and manufacturing. Discuss how plastic are harmful to the environment.



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SL 4

**Strand 3:     The ways materials changed.**

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

27. Which of the following is NOT a chemical change?

- A. Rotting ripe banana
- B. Burning wood
- C. Melting ice
- D. Making beer

SL 1

28. The most certain indication that a chemical reaction has occurred is when:

- A. a new substance forms.
- B. fizzing occurs.
- C. no colour change occurs.
- D. no heat is produced.

SL 1

29. Combustion reaction is an example of chemical reactions. Consider the example of combustion of magnesium metal. Write the balanced chemical equation for this reaction showing all reactants and products.

SL 2

30. One of the factors that affects the rate of a chemical reaction is temperature. Explain with reference to Collision theory, how temperature affects the rate of a chemical reaction.

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SL 3

31. Banana chips are a popular product small businesses these days are making and selling. List four basic steps for production of banana chips and describe the physical and/or chemical changes that occur in the steps identified.



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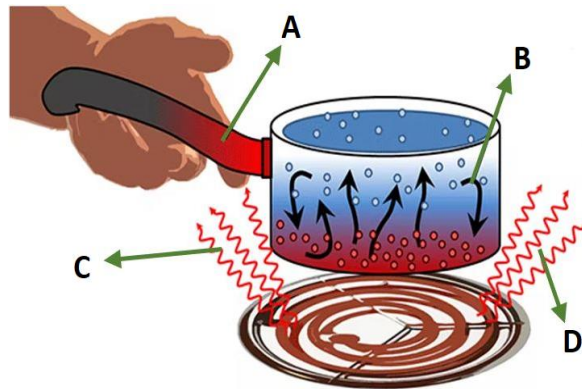
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SL 4

**Strand 1: Energy (Waves)**

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

32. Which letter in the diagram below best defines the Conduction process?



- A. A
- B. B
- C. C
- D. D

	SL 1

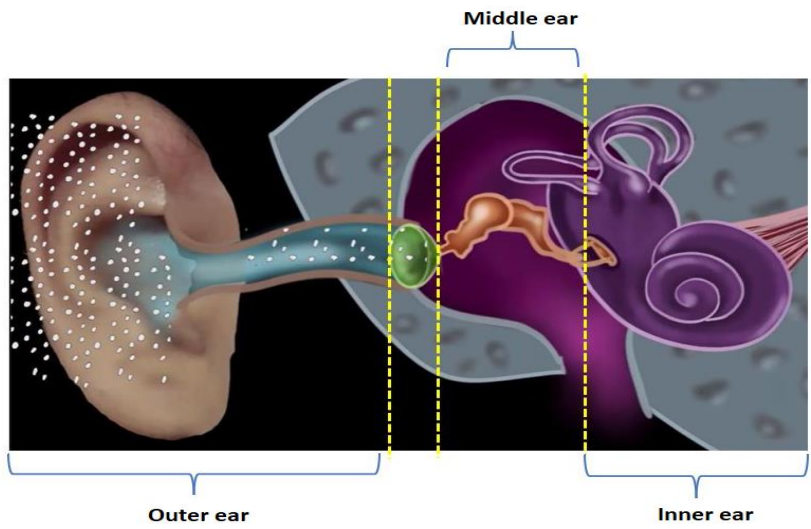
33.  $41^{\circ}\text{C}$  is equivalent to \_\_\_\_\_ K

- A. 287.15
- B. -232.15
- C. 314.15
- D. 232.15

	SL 1



34. Human ear can be divided into 3 different parts, the outer ear, the middle ear, and the inner ear. Describe why the middle ear needs to increase or amplify the pressure of the sound waves when it reaches the inner ear?



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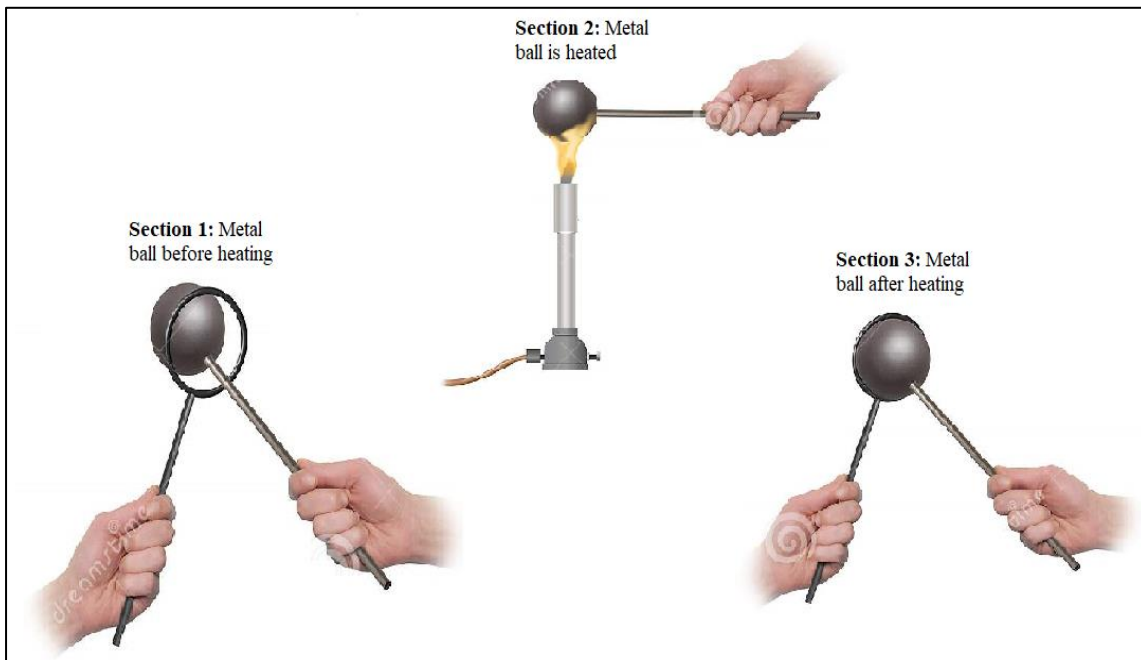
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SL 3

35. The diagram below shows 3 different sections of an experiment done by Joshy to investigate the expansion of metals.



Discuss the results and observations of the experiment above.

SL 4

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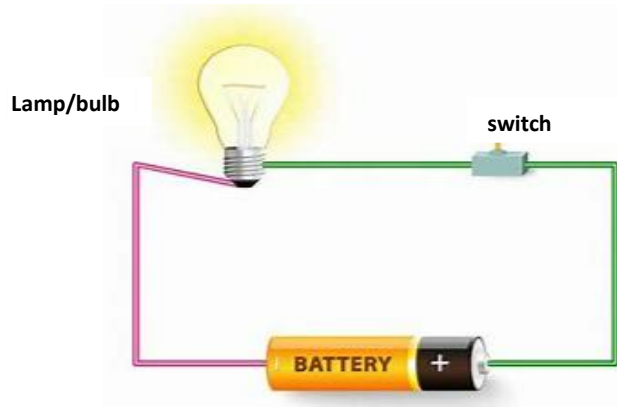
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


**Strand 2: Electricity**

For Questions 36, choose and write the LETTER of the correct answer in the box provided.

Use the diagram below to answer Question 36.

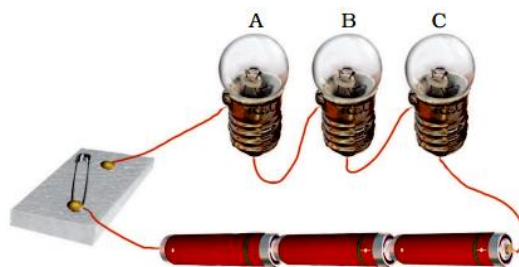


36. Identify the symbol for the lamp/bulb component in the circuit above.

- A. 
- B. 
- C. 
- D. 
- E. 

	SL 1

37. Explain what will happen to the bulbs of the series circuit below, and what would happen if bulb B is removed from the circuit?




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SL 3

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38. Explain the main difference between **'closed circuit'** and **'open circuit'**.

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SL 2

39. State 2 factors that affect the resistance of a conductor.

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SL 2

**Strand 3: Magnetism**

40.. Draw the magnetic field lines around the two-bar magnet placing next to each other below and comment whether the two bar magnets repel or attract from/to each other.



SL 2

Comment: \_\_\_\_\_

41. With your understanding of the magnetic fields, explain why like-poles repel and unlike poles attract.

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SL 3

42. Stroking method is known as one of the best ways of making magnets. Describe this method with examples.

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SL 3

**Strand 4:     Forces and Motion**

43. Answer TRUE or FALSE.

*Newton's First law of motion states that the force on an object is equal to its mass times its acceleration;  $F = ma$*

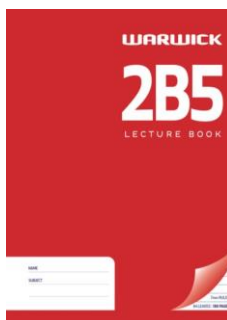
Answer: \_\_\_\_\_

SL 1

**For Question 44, choose and write the LETTER of the correct answer in the box provided.**

44. What is the best SI unit to measure the width of the exercise book below? (Diagram not in scale).

- A. Centimetre
- B. Metres
- C. Litres
- D. Kilometres



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SL 1

45. In 2009, Usain Bolt runs a 100m race within 9.58s and set a new world record. Calculate Bolt's average speed during that race.

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SL 3

46. Use the list of words below to complete the following extract on how the football spike shoes provide a better advantage for a player that wear it, compared to a player that does not wear any.

top, pressure, bottom, ground, reduce



SL 4

The \_\_\_\_\_ of the football shoes consists of spikes. These sharp spikes \_\_\_\_\_ the area of contact and increase \_\_\_\_\_ on the ground. This will provide a football player a better grip on the \_\_\_\_\_ and a better advantage than a player that does not have one.

STUDENT EDUCATION NUMBER									

## GENERAL SCIENCE

2022

*(For Scorers only)*

SECTIONS		Weighting	Scores	Check Scorer	AED Check
<b>SECTION A</b>	BIOLOGY	34			
<b>SECTION B</b>	CHEMISTRY	32			
<b>SECTION C</b>	PHYSICS	34			
<b>TOTAL</b>		<b>100</b>			