| STUDENT EDUCATION NUMBER | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
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GOVERNMENT OF SAMOA
MINISTRY OF EDUCATION, SPORTS AND CULTURE

# Samoa Secondary Leaving Certificate

# BIOLOGY

# 2019

## 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 left 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.

| CURRICULUM STRANDS | | Page | Time (min) | Weighting |
|---|---|---|---|---|
| **STRAND 1**: | VARIETY OF LIFE | 2 | 18 | 15 |
| **STRAND 2:** | CELL BIOLOGY | 4 | 32 | 20 |
| **STRAND 3:** | GENETICS | 7 | 44 | 15 |
| **STRAND 4**: | PLANTS | 9 | 50 | 15 |
| **STRAND 5:** | ANIMALS | 12 | 18 | 20 |
| **STRAND 6:** | ENVIRONMENT | 15 | 18 | 15 |
| **TOTAL** | | | **180** | **100** |

Check that this booklet contains pages 2-18 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** **Weighting 15**

**Define the terms:**

**1.** Unicellular organism.

_____

_____

| SL 1 |
|---|
| |

**2.** Fungi

_____

_____

| SL 1 |
|---|
| |

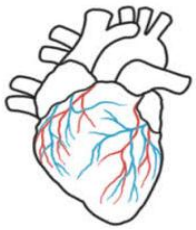
**3.** Identify the level of organisation for the following based on the given description.

| SL 1 |
|---|
| |

| **Description** | **Level of Organisation** |
|---|---|
| This component makes up a cell, e.g. mitochondrion | |

**Identify the levels of organisation for the following:**

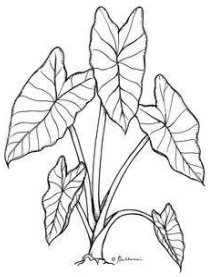
**4.**



_____

| SL 1 |
|---|
| |

**5.**



_____

| SL 1 |
|---|
| |

**The Phylum Chordata includes the following Classes: Fishes, Reptilia, Aves and Mammalia.**

**6.** Select ONE Class from the above list and give TWO local examples for it.
*(You may use the Samoan or English Common name for your local example).*

Local Example 1: _____

Local Example 2: _____

| SL 2 |
|---|
| |

**7.** Living things are abundant and diverse. Explain the diversity of Organisms.

_____

_____

_____

_____

_____

| SL 3 |
|---|
| |

**Use the following information to answer the question that follows.**


**8.** Design a Dichotomous key to identify the 4 organisms above. *(The first line has been done for you).*

| SL 3 |
|---|
| |

*1.* *Have Limbs……...Go to 2*
*Have No Limbs…….....Go to 3*

2. _____

_____

3. _____

_____

**The following are the main Plant Divisions. Use the information to answer the question that follows.**

| Plant Division | | | |
|---|---|---|---|
| Bryophytes | Pteridophytes | Angiosperms | Gymnosperms |

**9.** Select ONE division and list TWO of its main characteristics.

_____

_____

_____

_____

| SL 2 |
|---|
| |

## STRAND 2: CELL BIOLOGY Weighting 20

**10.** Define the term osmosis.

_____

_____

_____

| SL 1 |
|---|
| |

**11.** Define the term aerobic respiration.

_____

_____

_____

| SL 1 |
|---|
| |

**12.** Name the raw materials and products of aerobic respiration.

| SL 2 |
|---|
| |

Raw materials:_____

_____

Products: _____

_____

**13.** Write the balanced equation for aerobic respiration.

| SL 2 |
|---|
| |

**14.** Describe fermentation in yeast cells.

| SL 2 |
|---|
| |

_____

_____

_____

_____

**15.** Explain in FOUR steps how to prepare a wet mount of an onion cell. *(Assume that a small piece of thin onion tissue is already prepared for you with a clean slide and a coverslip is also provided).*

| SL 4 |
|---|
| |

1. _____
2. _____
3. _____
4. _____

The information below describes the results of a practical activity carried out by a Year 13 student on the effects of temperature on the digestion of starch by an enzyme.

| Temperature $^0$C | Amount of starch digested in 1 minute |
|---|---|
| 5 | 32 |
| 25 | 164 |
| 35 | 216 |
| 45 | 204 |
| 65 | 36 |

**16.** From this practical activity, report on the effect of temperature on an enzyme controlled reaction like starch digestion. *(Your answer should include what high, low and optimum temperature does to this enzyme and how these affect the rate of starch digestion).*

| SL 4 |
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**17.** Compare the processes of active transport and passive transport. *(Your answer should include energy requirements as well as concentration gradients).*

| SL 4 |
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**STRAND 3: GENETICS Weighting 15**

**18.** Describe the structure of DNA.

| SL 2 |
| --- |
| |

**19.** Describe TWO causes of mutations.

| SL 2 |
| --- |
| |

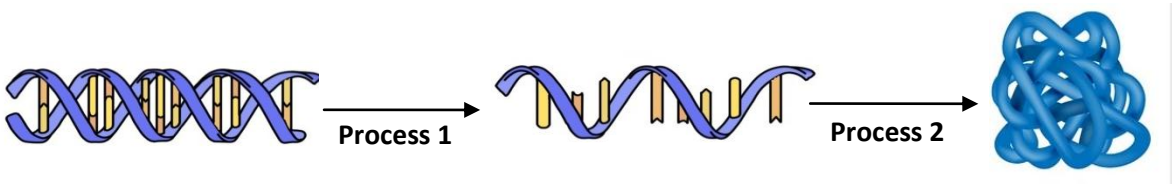
**20.** Distinguish between mitosis and meiosis.

| SL 3 |
| --- |
| |

**21.** Describe how sex is determined by the **X** and **Y** chromosomes.

| SL 2 |
| --- |
| |

**Use the following diagram for the question that follows:**




**22.** Explain the process of protein synthesis.

| SL 3 |
| --- |
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**Use the following to answer the question that follows:**

The allele for red roses (R) is dominant to the allele for white roses (r). A gardener suspected that the genotype of her red rose plant is heterozygous. She was advised to test-cross the plant to confirm this.

**23.** Use a Punnet square to explain how the offspring from a test-cross may indicate the genotype of the gardener's rose plant.

| SL 3 |
| --- |
| |

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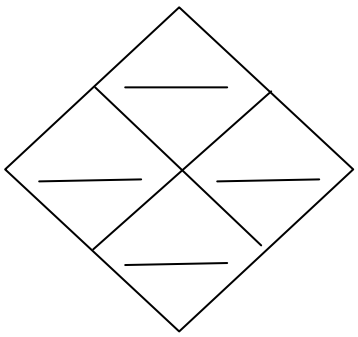


**STRAND 4: PLANTS Weighting 15**

**24.** Write a balanced chemical equation for photosynthesis.

| SL 2 |
| --- |
| |

**25.** Give a factor that affects the rate of photosynthesis.

| SL 1 |
| --- |
| |

**26.** Describe the effect of this factor on the process of photosynthesis.

| SL 2 |
| --- |
| |

**27.** Name the gas exchange organelle in plants.

| SL 1 |
| --- |
| |

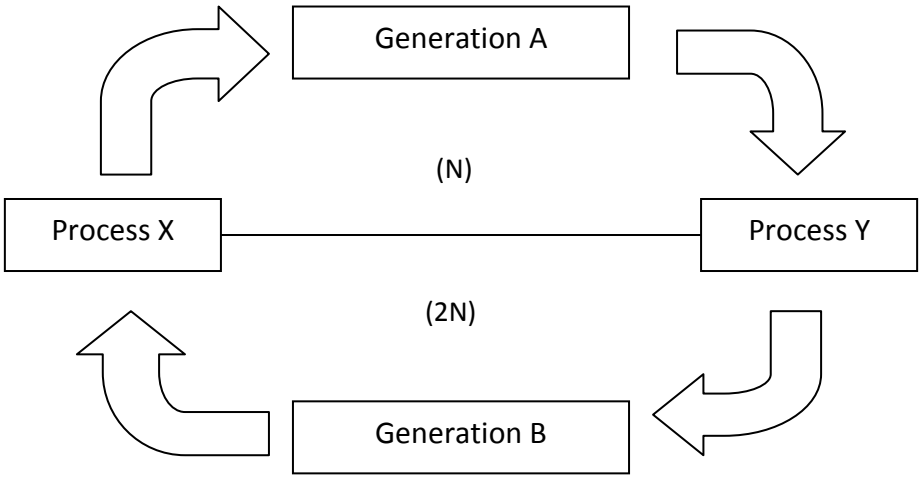
**28.** Draw and label the internal structure of a leaf cross-section in the box below. *(Your diagram should clearly show and label the following parts:* ***guard cells, palisade layer, spongy mesophyll layer****).*

| SL 3 |
| --- |
| |

**29.** Explain the role of transpiration in the cooling of the plant. *(Your answer should state the role of the gas exchange organelle in plants and evaporation).*

| SL 3 |
| --- |
| |

**Use the diagram below to answer the question that follows:**




**30.** Explain the alternation of sporophyte and gametophyte generations in ferns.

| SL 3 |
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**STRAND 5: ANIMALS Weighting 20**

**31.** Define the term excretion.

| SL 1 |
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| |

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**32.** Define the term homeostasis.

| SL 1 |
| --- |
| |

_____

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**33.** Explain how the human body is able to maintain homeostasis in terms of blood sugar levels. *(Your answer should state the role of insulin, glucagon, the hypothalamus and the pancreas in controlling blood sugar levels).*

| SL 4 |
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**34.** Describe the TWO main functions of the small intestine in the human digestive system.

| SL 2 |
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**35.** Explain the importance of carbohydrates (including fibre) in the human diet.

| SL 3 |
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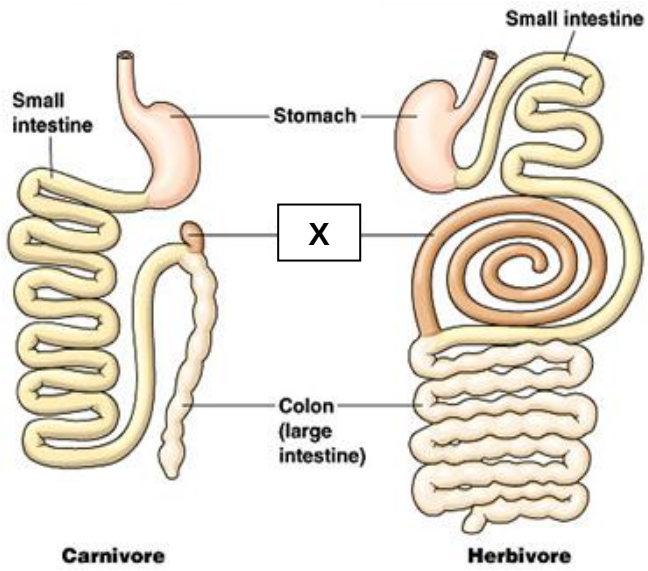
**The diagram below shows the gut structures of a carnivore and a herbivore.**




**36.** State the function of Organ **X** in the diet of these two animals.

| SL 1 |
|---|
| |

_____

_____

**37.** Compare the gut structures of humans with herbivores and carnivores. *(Give at least ONE difference and ONE similarity between Humans and Carnivores and between Humans and Herbivores).*

| SL 4 |
| --- |
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**The diagram below shows the gas exchange structures in mammals, fish and insects.**

A) Mammal B) Fish C) Insect

**38.** Compare the three structures and their functions in gas exchange for each of these organisms.

| SL 4 |
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**STRAND 6: ENVIRONMENT Weighting 15**

**39.** Define the term habitat.

| SL 1 |
| --- |
| |

**40.** Give TWO local examples of a habitat.

| SL 2 |
| --- |
| |

**41.** Define stratification.

| SL 1 |
| --- |
| |

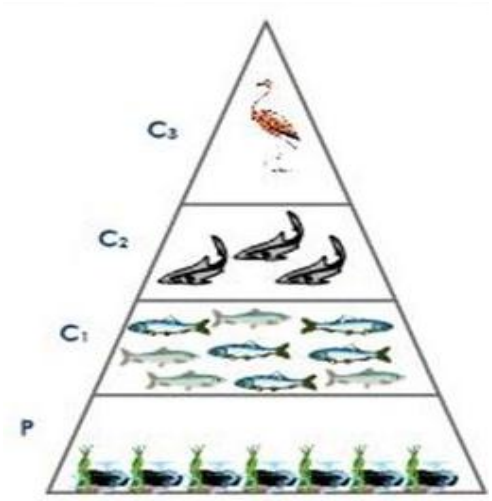
**42.** Explain how predation and parasitism regulate a population.

| SL 3 |
| --- |
| |

**43.** Define biotic factors.

| SL 1 |
| --- |
| |

**Use the following pyramid of numbers for the question that follows:**




*Note: Producers (P), First Consumers (C1), Secondary Consumers (C2), Tertiary Consumer (C3)*

**44.** Explain how energy flows through an ecosystem.

| SL 3 |
| --- |
| |

**45.** Report on a practical based research activity you carried out on a local environmental issue. *(Clearly stating the local environmental issue that was researched, giving ONE impact this has on the environment and ONE cause of the problem; plus ONE proposed solution to address it).*

| SL 4 |
| --- |
| |

Local Environmental Issue researched:

_____

_____

One Impact:

_____

_____

One Cause:

_____

_____

One Proposed Solution:

_____

_____

| STUDENT EDUCATION NUMBER | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |

# BIOLOGY

2019

(For Scorers only)

| CURRICULUM STRANDS | Weighting | Scores | Chief Scorer |
|---|---|---|---|
| **STRAND 1: VARIETY OF LIFE** | 15 | | |
| **STRAND 2: CELL BIOLOGY** | 20 | | |
| **STRAND 3: GENETICS** | 15 | | |
| **STRAND 4: PLANTS** | 15 | | |
| **STRAND 5: ANIMALS** | 20 | | |
| **STRAND 6: ENVIRONMENT** | 15 | | |
| **TOTAL** | **100** | | |