

MARKER CODE				



STUDENT ENROLMENT NUMBER (SEN)									

TONGA FORM SIX CERTIFICATE

2023

AGRICULTURAL SCIENCE

QUESTION AND ANSWER BOOKLET

Time allowed: 3 Hours

INSTRUCTIONS:

- Write your **Student Enrolment Number (SEN)** on the top right-hand corner of this page.
- This paper consists of **EIGHT SECTIONS** and is out of 70 weighted scores.

SECTION	STRANDS	TOTAL SKILL LEVEL
ONE	AGRICULTURAL ECOSYSTEM AND AGRICULTURAL ENVIRONMENT	7
TWO	SOILS	11
THREE	CROP PRODUCTION	11
FOUR	PLANT PROTECTION	5
FIVE	ANIMAL PRODUCTION	11
SIX	ANIMAL PROTECTION	7
SEVEN	AGRICULTURAL MANAGEMENT	14
EIGHT	AGRICULTURAL MARKETING	4
TOTAL		70

- Answer ALL QUESTIONS. Write your answers in the spaces provided in this booklet.
- Use a **BLUE** or **BLACK** ball point pen only for writing. Use a pencil for drawing if required.
- If you need more space for answers, ask the supervisor for extra paper. Write your **Student Enrolment Number (SEN)** on each additional sheet, number the questions clearly and insert them in the appropriate places in this booklet.
- Check that this booklet contain pages **2-19** in the correct order and that none of the pages is blank.

YOU MUST HAND IN THIS BOOKLET TO THE SUPERVISOR BEFORE YOU LEAVE THE EXAMINATION ROOM.

SECTION ONE: AGRICULTURAL ECOSYSTEM AND AGRICULTURAL ENVIRONMENT

Natural and Agricultural Ecosystem

The pictures below shows two different types of Ecosystem. Use them to answer the following questions.

Figure 1: Natural Ecosystem and Agricultural Ecosystem

Natural Ecosystem



Source: <https://www.theguardian.com>

Agricultural Ecosystem



Source: <https://themamareport.com>

1. Define the word 'Ecosystem'.

Skill level 1	
1	
0	
NR	

2. Identify **ONE (1)** of the characteristics of a Natural Ecosystem.

Skill level 1	
1	
0	
NR	

3. Describe the characteristics of an Agricultural Ecosystem.

Skill level 2	
2	
1	
0	
NR	

4. Compare the characteristics of a natural ecosystem and an agricultural ecosystem.

Skill level 3	
3	
2	
1	
0	
NR	

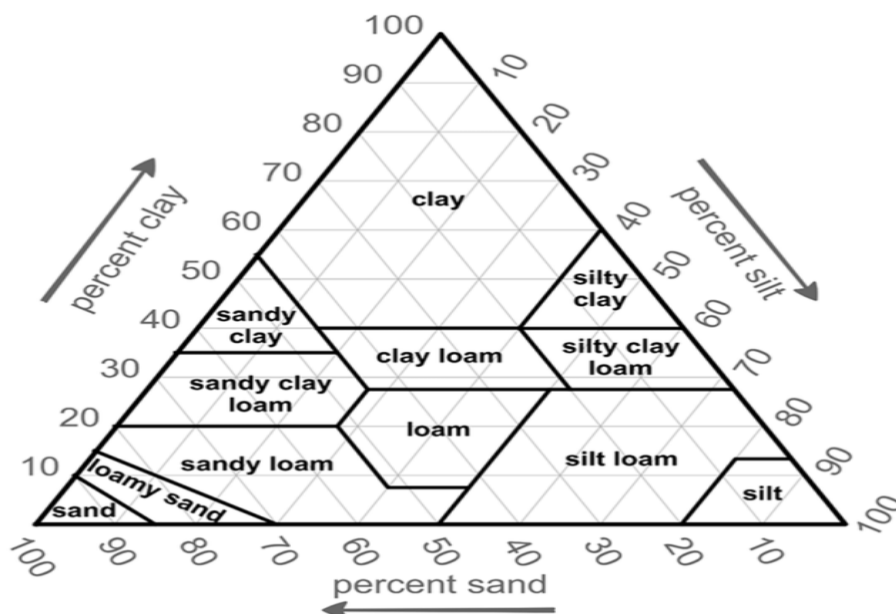
SECTION TWO:

SOILS

A. Physical Properties of the Soil

Study the diagram below and use it to answer the following questions.

Figure 2: Textural Triangle



Source: <https://passel2.unl.edu/view/lesson>

1. Identify the texture of a soil with 5% clay, 5% silt and 95% sand.

Skill level 1	
1	
0	
NR	

2. Identify another method that can be used to determine the texture of the soil.

Skill level 1	
1	
0	
NR	

3. Compare the properties of Sand and Clay Soil.

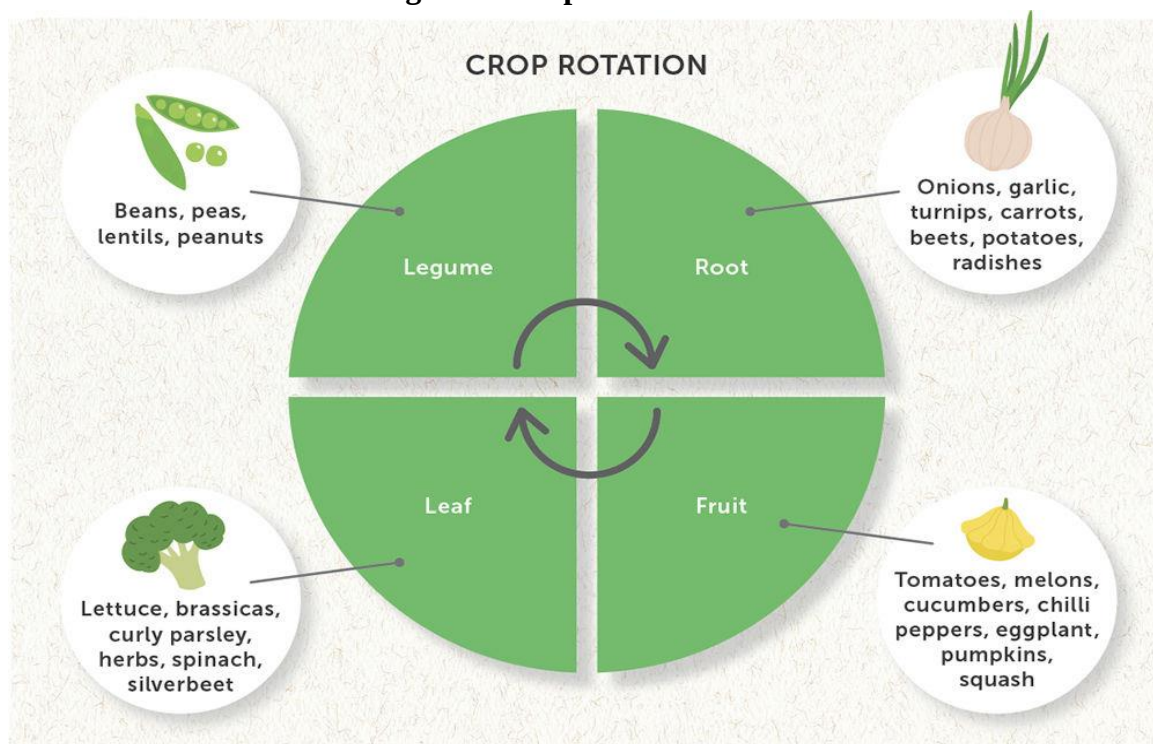
Skill level 3	
3	
2	
1	
0	
NR	

B. Management Practices

Crop Rotation is one of the common management practices used by farmers as a way of improving crop production.

Use the diagram below to answer the following questions.

Figure 3: Crop Rotation



Source: <https://www.shettlestongrowing.org.uk>

1. Define the term 'Crop Rotation'.

Skill level 1	
1	
0	
NR	

2. Describe the characteristics of Crop Rotation.

Skill level 2	
2	
1	
0	
NR	

3. Explain the effect of Crop Rotation on the nutrient status of the Soil.

Skill level 3	
3	
2	
1	
0	
NR	

SECTION THREE:

CROP PRODUCTION

A. Factors affecting growth and developments in plants.

The picture below shows one of the major nutrients that is deficient in the soil. Study the picture carefully, then use it to answer the following questions.

Figure 4: Nutrient Deficiency symptoms in Corn.



Source: <https://www.morningagclips.com>

1. Identify the nutrients that is deficient in the picture (**Figure 4**) above.

Skill level 1	
1	
0	
NR	

2. Describe the functions of the nutrient that is deficient in the picture (**Figure 4**) above.

Skill level 2	
2	
1	
0	
NR	

B. Factors influencing plants to produce quality products.

The picture below shows a corn plantation infested by weeds. Use it to answer the following questions.

Figure 5: Weed Infestation



Source: <https://www.greenlife.co.ke/weed-management/>

1. Define the word ‘weeds’.

Skill level 1	
1	
0	
NR	

2. Explain the effect of weeds on the nutrient status of the soil as it shown in the picture (Figure 5) above.

Skill level 3	
3	
2	
1	
0	
NR	

3. Apart from the effect of weeds shown in the picture (**Figure 5**) above, **discuss** the effect of weeds on the growth and development of plants.

Skill level 4	
4	
3	
2	
1	
0	
NR	

Main groups of Pests and Diseases

The picture below shows a grasshopper feeding on plant leaves. Use it to answer the following questions.

Figure 6: Insect Pests

Source: <https://www.freepik.com>

1. Define the word 'Pests'.

Skill level 1	
1	
0	
NR	

2. Identify the major group of insects where the grasshopper in the picture (**Figure 6**) above belongs to according to its mode of feeding.

Skill level 1	
1	
0	
NR	

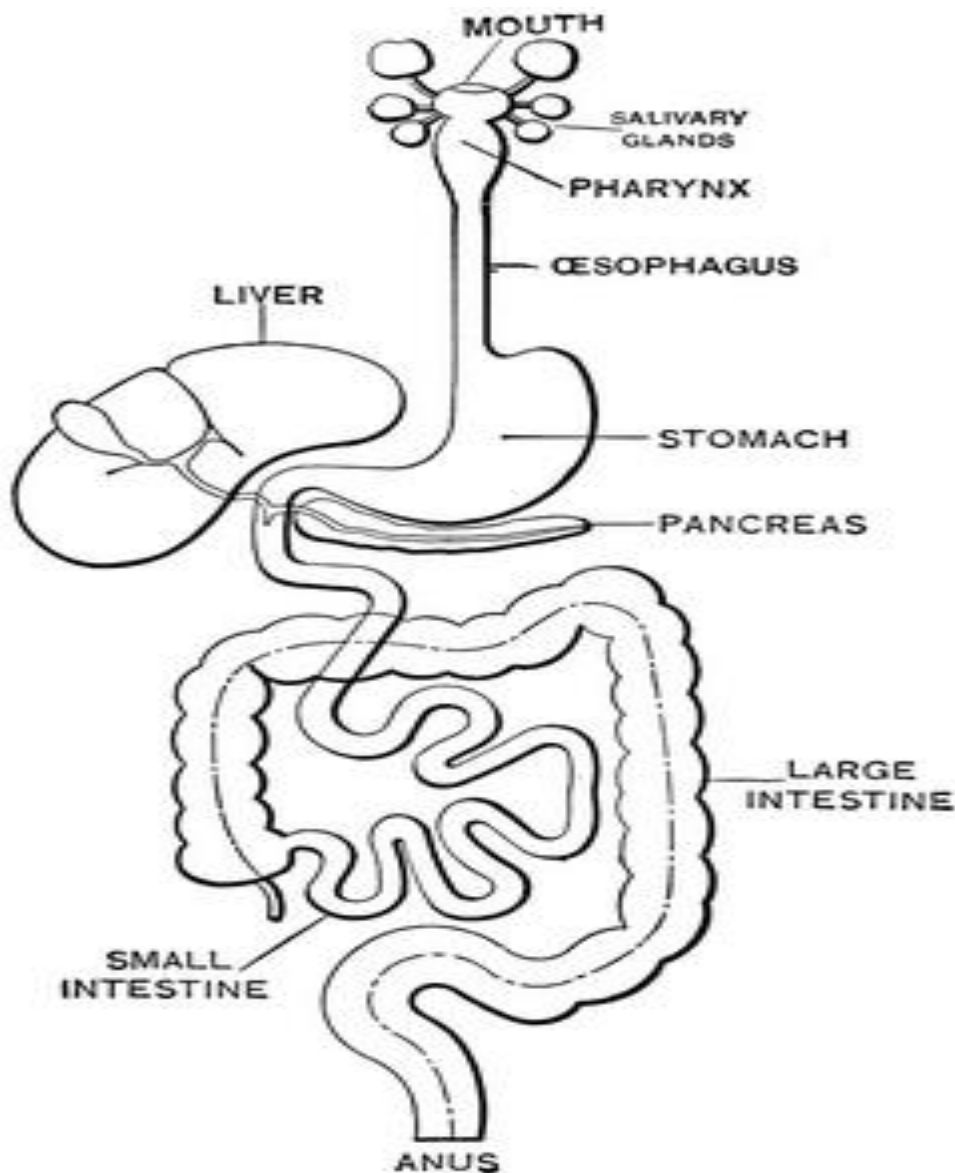
3. Explain the effect of the damage caused by the grasshopper on plants in the picture (**Figure 6**) above.

Skill level 3	
3	
2	
1	
0	
NR	

A. Characteristics of Local and Commercial Animal Breeds

The picture below shows a digestive system of a mono-gastric animal. Use it to answer the following questions.

Figure 7: Digestive System



Source: <https://etc.usf.edu>

1. Describe the functions of the small intestines.

Skill level 2	
2	
1	
0	
NR	

SECTION SIX:

ANIMAL PROTECTION

Main groups of pests and diseases, and disorders, and their effects on animals

The picture below shows a chicken suffering from Coccidiosis. Use the picture to answer the following questions.

Figure 9: Coccidiosis in chicken



Source: <https://www.researchgate.net>

1. Apart from the clinical sign of Coccidiosis shown in the picture (**Figure 9**) above, **identify** another clinical sign of Coccidiosis.

Skill level 1	
1	
0	
NR	

2. Identify a treatment that can be used to treat Coccidiosis.

Skill level 1	
1	
0	
NR	

3. Describe how a farmer will carry out a treatment for a chicken that suffers from Coccidiosis.

Skill level 2	
2	
1	
0	
NR	

SECTION SEVEN:

AGRICULTURAL MANAGEMENT

A. Regulations that affect management of Agricultural Enterprises

The picture below shows two Quarantine Officers checking cargo at an international airport. Use it to answer the following questions.

Figure 10: Quarantine Officers



Source: <https://www.graincentral.com>

1. Define the word 'Quarantine'.

Skill level 1	
1	
0	
NR	

2. Describe the roles of Quarantine in the Agricultural trade.

Skill level 2	
2	
1	
0	
NR	

3. Explain the effect of Quarantine in the Agricultural trade.

[illegible]

Skill level 3	
3	
2	
1	
0	
NR	

4. Discuss the role of bio-security in protecting the agricultural and natural environment.

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Skill level 4	
4	
3	
2	
1	
0	
NR	

B: Land Tenure System

Read the statement below, then answer the following questions.

The relationship, whether legally or customarily defined, among people, as individuals or groups, with respect to land and associated natural resources (including water, trees, minerals and wildlife). Rules of tenure define how property rights in land are allocated within societies and may determine who can use what resources, for how long, and under what conditions.

Types of Land Tenure System in Agriculture

“Communal land tenure system”: *by this system of tenure, the community gets the power of governing over the land.*

“Inheritance Tenure System”: *by this system of land tenure, at the death of the actual owner, the ownership of land is transferred to their next kin.*

“Leasehold Tenure System”: *by this system, tenants get land ownership for a certain period to hold the land from the landlord by some “form of title”.*

“Rent Tenure System”: *In this system, the tenants are found to pay some amount in order to use the land for a certain period of time.*

Source: <https://www.unescwa.org>

1. From the statement above, **identify** the type of land tenure system that is commonly used here in Tonga.

Skill level 1	
1	
0	
NR	

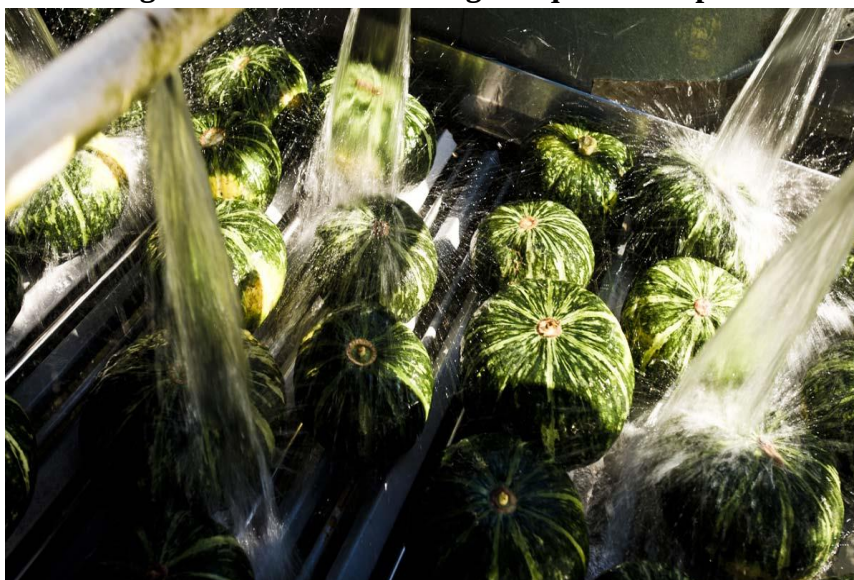
2. Explain the effect of the land tenure system commonly used in Tonga on Agricultural Enterprises.

Skill level 3	
3	
2	
1	
0	
NR	

Post Harvesting Handling Steps

The picture below shows one of the Post-Harvest Handling Steps carried out in Squash pumpkin production. Use it to answer the following questions.

Figure 11: Post-Harvesting in Squash Pumpkin



Source: <https://www.craigmore.com>

1. Name the Post Harvesting Steps shown in the picture (**Figure 11**) above.

Skill level 1	
1	
0	
NR	

2. Relate the importance of following the proper Post Harvest Steps in the picture (**Figure 11**) above to meet the Quarantine requirements.

Skill level 3	
3	
2	
1	
0	
NR	