MARKER CODE						



STUDENT ENROLMENT NUMBER (SEN)									

TONGA FORM SIX CERTIFICATE 2019 AGRICULTURAL SCIENCE

QUESTION AND ANSWER BOOKLET

Time allowed: 3 Hours

INSTRUCTIONS:

- 1. Write your **Student Enrolment Number (SEN**) on the top right-hand corner of this page.
- 2. This paper consists of **SIX SECTIONS** and is out of 70 Weighted Scores.

SECTIONS	TOPICS	SKILL
		LEVEL
A	NATURAL AND AGRICULTURAL SYSTEM	10
В	SOILS	10
C	FARM POWER AND AGRICULTURAL MACHINERY	7
D	CROP PRODUCTION AND CROP PROTECTION	16
E	ANIMAL PRODUCTION AND HEALTH	16
F	AGRICULTURAL MANAGEMENT AND MARKETING	11
	TOTAL	70

- 3. Answer ALL QUESTIONS. Write your answers in the spaces provided in this booklet.
- 4. Use a **BLUE** or **BLACK** ball point pen only for writing. Use a pencil for drawing if required.
- 5. If you need more spaces 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.
- 6. Check that this booklet contains pages 2-23 in the correct order and that page 23 has been deliberately left blank.

SECTION A: NATURAL AND AGRICULTURAL SYSTEM

Circle the letter of the **BEST** answer.

Study **Figure 1** and answer the following question.

Figure 1. Cassava Fiantation

Figure 1: Cassava Plantation

Source: flickr.com/photos/leogaggl/43410527841

- 1. Identify the major factor that can **limit the productivity** of cassava as seen in **Figure 1**.
 - A. Insects
 - B. Soils
 - C. Weeds
 - D. Pollution

Skill le	vel 1
1	
0	
NR	

Study **Figure 2** below and answer the following questions.



Figure 2: Pesticide Spraying

- 2. Identify how this agricultural activity **pollutes** the environment.
 - A. The use of pesticide may increase food production.
 - B. The use of pesticides may increase farmer's profits.
 - C. The pesticide may contaminate water, soil and foods

3.

D. The use of agricultural pesticides may prevent diseases.

Skill level 1					
1					
0					
NR					

NR

In Figure 2 above, explain the risks taken by the pesticide applicator .		
	Skill lev	vel 3
	3	
	2	
	1	
	0	

Study **Figure 3** and answer the following question.



Figure 3: Corn Plantation

Source: https://www.123rf.corn/photo

Describe the impact of climate change on corn farming in Figure 3.		
	_	
	-	
	=	
	_	
	-	
	-	
	Skill le	vel 2
	2	
	1	
	0	
	NR	

Study **Figure 4** and answer the following question.

Figure 4: Natural and Agricultural Ecosystem.



Source: http://www.en.wikipedia.org

5.

Source: http://www.biologydictionary.net

Compare ONE (1) character of natural and agricultural ecosystem.		
	_	
	-	
	-	
	-	
	_	
	-	
	-	
	_	
	Skill le	vel 3
	3	
	2	
	1	
	0	
	NR	

SE	CTION B: SOILS	
Cir	cle the letter of the BEST answer.	
1.	Soil Weathering refers to A. the formation of carbonic acids on rocks. B. the breakdown of rocks, minerals, and soils.	Skill level 1
	B. the breakdown of rocks, minerals, and soils.C. soils and substances that are dissolved in water.D. the respiration of carbon dioxides by plant roots.	0 NR
2.	Soil pH is best defined as a	
	A. soil having a pH of less than 7	Skill level 1
	B. soil having a pH of greater than 7	1
	C. measurement of acidity or alkalinity of soilD. soil's ability to maintain its pH when changes are being made	0
	to the soil	NR
SH	ORT ANSWERS:	
3.	Describe the importance of Soil pH .	
		Skill level 2

Explain h	ow earthwo	rms can ii	mprove s	oil fertilit	y.			
						9	Skill lev	ve
							3	
						 	2	
							1	
							0	
							NR	

Study **Figure 5** and answer the following question.

5.



Figure 5: Composting

Source: http://cceniagaracounty.org

Explain the importance of Composting , as shown in Figure 5 .		
	-	
	-	
	-	
	-	
	-	
	-	
	_	
	Skill lev	/el 3
	3	
	2	
	1	
	0	
	NR	

SECTION C: FARM POWER AND AGRICULTURAL MACHINERY

SHORT ANSWERS:

1.	Name TWO (2) sources of renewable power .		vel 1
	• • • • • • • • • • • • • • • • • • •	1	
		0	
		NR	

2. Describe the importance of **renewable power**.

Skill level 2	
 2	
1	
0	
NR	

Study **Figure 6** below and answer the following questions.

CRB GLRSS / SERTS

EXHRUST COMPONENTS

SHEET METRL

PTO SHRFT

RRDIATOR / CONDENSOR COOLING SYSTEM

RRDIATOR / CONDENSOR COOLING SYSTEM

LIGHTS & ELECTRICAL SYSTEMS

FRONT END STEERING COMPONENTS

STRRTERS AND ALTERNATORS

Figure 6: Tractor Parts

Source: http://www.raparts.net/

3. Identify \mathbf{ONE} (1) part of a tractor that should be $\mathbf{checked}$ \mathbf{daily} .

Skill level 1		
1		
0		
NR		
	1 0	

CLINI	13
Skill le	evel 3
3	
2	
1	
0	

SECTION D: CROP PRODUCTION AND CROP PROTECTION

Study **Figure 7** below and answer the following questions.

Figure 7: Seed Germination



Source: http://sciencefun.info/

1.	Define	seed	germination.
----	--------	------	--------------

Skill level 1	
1	
0	
NR	

2. Identify **ONE** (1) advantage of **seed propagation**.

Skill le	Skill level 1	
1		
0		
NR		

Study **Figure 8** and answer the following questions.

Sclerenchyma

Vascular bundle

Ground tissue

Figure 8: Cross-section of a Dicot stem

Source: bio1520.biology.gatech.edu/

From the diagram of a Dicot stem in **Figure 8**, label the **phloem** and **xylem** using the identified parts **A** and **B**.

Skill level 1		
1		
0		
NR		

3.	Part A:	

Skill lev	vel 1
1	
0	
NR	

4. **Part B:** _____

Study **Figure 9** and answer the following questions.



Figure 9: Insect pollination.

	Source: https://phys.org/new/2014.		
5.	Describe how insects pollinate the squash flower.		
		Skill lev	vel 2
		. 2	
		. 1	
		0	
		NR	
6.	Compare insect pollination to wind pollination.	-	
		-	
		-	
		_	
		Skill level 3	
		3	
		. 2	
		. 1	
		0	
		NR	

Study **Figure 10** and answer the following questions.



Figure 10: Anthracnose of yam

Source: http://agritrop.cirad.fr/

7. **Anthracnose disease** has developed, multiplied and spread among the yam plants.

Explain ONE (1) weather condition that speeds up the development and spread of this disease.	_	
	-	
	Skill le	vel 3
	3	
	. 2	
	. 1	
	0	
	NR	

8.	Discuss ONE (1) effective control anthracnose (fungal disease) in yams.		
		_	
		-	
		-	
		-	
		-	
		-	
		-	
		-	
		-	
		-	
		Skill le	vel 4
		4	
		3	
		2	
		1	
		0	
		NR	

SECTION E: ANIMAL PRODUCTION AND HEALTH

Study **Figure 11** and answer the following question.

Breed A Breed B

Breed C Breed D

Figure 11: Pig Breeds

Source: http://www.agclassroom.org/tea

Circle the **BEST** answer.

- 1. Identify the **Duroc** Breed from the different Breeds in **Figure 11** above.
 - A. Breed A
 - B. Breed B
 - C. Breed C
 - D. Breed D

Skill lev	vel 1
1	
0	
NR	

Study **Figure 12** and answer the following questions.

Harderian gland Thymus Rumen Bursa of fabricus Rumen Liver Spleen Bone marrow

Figure 12: Digestive System

2. Compare the digestive system of poultry to the digestive system of a cow. Skill level		Source: https://www.dummies.com/		
3 2 1 1 0 NR Skill leve 1 0	2.			
3 2 1 1 0 NR Skill leve 1 0			-	
3 2 1 0 NR Skill leve 1 0			-	
3 2 1 0 NR Skill leve 1 0			-	
3 2 1 1 0 NR Skill leve 1 0			-	
3. Define digestibility. Skill leve			Skill lev	vel 3
3. Define digestibility . Skill leve 1 0 NR			3	
3. Define digestibility . Skill leve			2	
3. Define digestibility . Skill leve			1	
3. Define digestibility. Skill leve 1 0			0	
Skill leve			NR	
Skill leve				
	3.	Define digestibility .		
0			Skill le	vel 1
			_ 1	
NR NR			0	
			NR	

4.	Describe ONE (1) advantage of artificial insemination .		
		_	
		_	
		_	
		_	
		_	
		61 111 1	1.0
		Skill le	vei 2
		_ 2	
		1	
		0	
		NID	

Study Figure 13 and answer the following questions.



Figure 13: Brucellosis disease in cattle

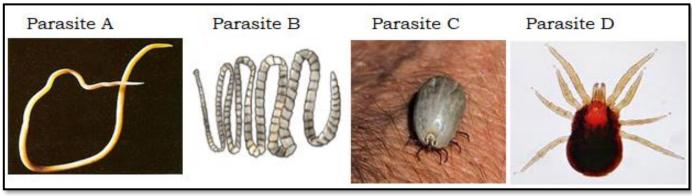
A cow aborted calf on her 7 months pregnancy. Source: https://www.researchgate.net.figure/.

5.	Identify the causes of aborted calf as seen in Figure 13 above.	Skill le	vel 1
0.	racinary are caused of aborton can as seen in Figure 10 above.	1	
		0	
		NR	
6.	Explain how to effectively control Brucellosis in cows.		
		Skill le	evel 3
		3	
		2	
		1	
		0	
			+

NR

Study **Figure 14** and answer the following questions.

Figure 14: Parasites



		Source: https://me.me/1/.different-types-of-parasite		
Cir	cle th	ne BEST answer.		
7.	Ide	ntify Namatode/round worm from the Parasites in Figure 14 above.	Skill le	vel 1
	A.	Parasite A	1	
	В.	Parasite B	0	
	C.	Parasite C	NR	
	D.	Parasite D		
8.	Dis	cuss ONE (1) method that can be used to control roundworms in pigs.		
			Skill lo	vol 1

Skill level 4
4
3
2
1
0
NR

SECTION F: AGRICULTURAL MANAGEMENT AND MARKETING

SHORT ANSWERS:

	Skill lev	/el :
	1	
	0	
	NR	
ribe the role of a farm manger in an agricultural enterprise.		
	Skill le	ve
	1	
		1
	0	
	0 NR	
ricultural trading, explain the roles of the WTO (World Trade O	NR	1).
ricultural trading, explain the roles of the WTO (World Trade O	rganization Skill le	
ricultural trading, explain the roles of the WTO (World Trade O	rganization Skill le	
ricultural trading, explain the roles of the WTO (World Trade O	rganization Skill le 3 2	
ricultural trading, explain the roles of the WTO (World Trade O	rganization Skill le	

Study **Figure 15** and answer the following questions.

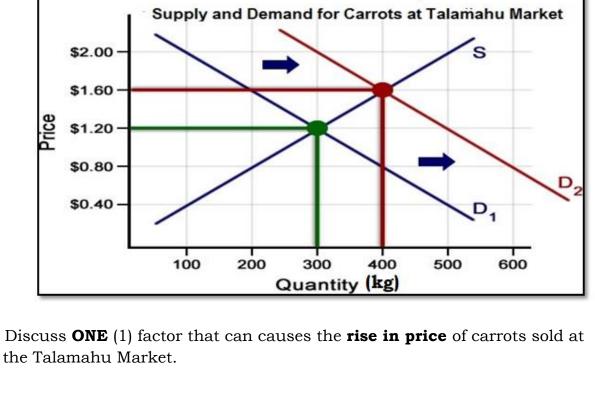


Figure 15: Demand for Carrots at Talamahu Market.

4. Discuss **ONE** (1) factor that can causes the **rise in price** of carrots sold at the Talamahu Market.

 Skill lev	II level 4	
 4		
 3		
 2		
 1		
0		
NR		

5. Identify **ONE** (1) importance of **Plant Quarantine** in Agricultural Trade.

racing one (1) importance of racing the first trace.		
	Skill level 1	
	1	
	0	
	NR	

THIS PAGE HAS BEEN DELIBERATELY LEFT BLANK.