TONGA NATIONAL FORM SEVEN CERTIFICATE
AGRICULTURAL SCIENCE
2017

QUESTION and ANSWER BOOKLET

Time allowed: 3 Hours

INSTRUCTIONS:

1. Write your Student Enrolment Number (SEN) on the top right-hand corner of this booklet.
2. Answer ALL QUESTIONS. Write your answers in the spaces provided in this booklet.
3. If you need more space for answers, 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.

<table>
<thead>
<tr>
<th>TOPICS</th>
<th>Total Skill Level</th>
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<tbody>
<tr>
<td>SECTION A PRIMARY PRODUCTION</td>
<td>13</td>
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<tr>
<td>SECTION B SUSTAINABLE PRIMARY PRODUCTION</td>
<td>17</td>
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<tr>
<td>SECTION C PRODUCTION MANAGEMENT</td>
<td>20</td>
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<td>SECTION D POST HARVEST</td>
<td>20</td>
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<td>TOTAL</td>
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Check that this booklet contains pages 2-15 in the correct order and that page 15 has been deliberately left blank.

YOU MUST HAND IN THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.
SECTION A: PRIMARY PRODUCTION

Question One: Primary Production

Select a primary product from the list below then use it to answer the questions that follow.

- Squash pumpkin
- Vanilla
- Kava
- Watermelon

Name of Primary Product: ______________

a. Name the export market for your selected Primary Product.

b. Explain the generic attribute of the named primary product for the named export market (named in a).

c. Describe the grading procedure of your named primary product for the selected export market (named in a).
Question Two: Factor influencing Primary Production

Below is the Quantity Demand for the watermelons in Talamahu market in relation to Quantity supply on quarter March 2014 to quarter March 2015.

Use the table and the graph below to answer the questions that follows.

a. Use the information on the graph above to **predict** the best time to plant watermelon next year in 2018 in order to get a higher return. *(consider demand and supply in your discussion)*

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b. Name a Primary Product then explain the influence of weather in the production of the named primary product. 
(provide data and example to support your answer)

**Primary Product:** ____________________

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SECTION B: SUSTAINABLE PRIMARY PRODUCTION

Question One: Analyzing Production Practices

Name a primary product you have studied, for local sales or export, and then use that crop to answer the following questions.

Name of Primary Product: _____________
Market: _______________

a. Define sustainable Agriculture.
_______________________________________________________________________
_______________________________________________________________________

b. List the impact of sustainable farming on agriculture.
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Use this diagram for part c.

<table>
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<tr>
<th>Block 1</th>
<th>Block 2</th>
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<tbody>
<tr>
<td>Yam (1 year)</td>
<td>Peanut (1 Year)</td>
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<th>Block 4</th>
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<tr>
<td>Cassava (1 Year)</td>
<td>Swamp Taro (1 Year)</td>
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Use this diagram for part c.

c. Explain the advantages of the farming practice illustrated above as a method of sustainable farming.
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d. Name a livestock production you have studied this year and describe a method you can use to sustain it. Consider pest, disease management and nutrition in your answer.

Name of Animal: ____________________

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e. Identify the problems of animal production (named in d.) in relation to sustainable production.

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Question Two: Sustainable Agriculture Issue

Select a crop or animal that you have studied in class for local or export market and identify an issue relevant to your selected crop/animal.

Crop/animal: ____________________________

a. From your chosen product identify the issues relevant to your product.

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b. Explain the importance of these issues, identified in (a.) to sustainable Agriculture.

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</table>
d. Name a farming animal that you have studied and a pest or parasite that affects it. **Describe** the best method to control the spread of the named pest or parasite in order to maintain the production.

Name of Animal: ______________
Pest or Parasite: ______________

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SECTION C: PRODUCTION MANAGEMENT

Select a locally produced crop/animal. Answer all of question One using the crop/animal you have selected.

Name of crop/animal: ______________________

Question One: Schedule of operation

a. Identify the possible establishment times of your chosen crop/animal to meet the seasonal demand.

_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________

b. Describe the variety/breed of crop or animal you prefer to grow or raise.

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_______________________________________________________________________
_______________________________________________________________________
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Managing of crop and animal involve the following management practices:

1. Controlling of pest and disease
2. weed control,
3. fertility/nutrition,
4. weaning
5. Irrigation.

c. Select ONE (1) of the management practice above and describe how it is done to improve the production of your chosen product.

Management : ___________________________

Brief description:
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Question Two: Factor affecting the Schedule of operation

Select one Primary Product from the List Below to answer Part a) to part c).

<table>
<thead>
<tr>
<th>Crop Production</th>
<th>Animal Production</th>
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<tbody>
<tr>
<td>Squash pumpkin</td>
<td>Cattle</td>
</tr>
<tr>
<td>Yam</td>
<td>Pig</td>
</tr>
<tr>
<td>Vanilla</td>
<td>Sheep</td>
</tr>
<tr>
<td>Kava</td>
<td>chicken</td>
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</tbody>
</table>

Name of Primary Product: ______________________

a. Identify areas where husbandry techniques affect production of the above named Primary product.

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_______________________________________________________________________

b. Explain the production process for the selected primary product.

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Skill level 1

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Skill level 3

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c. Relate the schedule of operations to achieve an optimum point of sale.

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Skill level 3

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Question Three: Manipulation of the Schedule of operation

a. Define product manipulation.

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b. Identify a product manipulation technique that can affect product quality or quantity.

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c. Describe the concept of profit maximization and yield maximization.

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d. Evaluate a market opportunity to decide the best manipulation technique to be applied during the production process.

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SECTION D: POST HARVEST

Question One: Preparation for market

Select a locally produced root crop. Answer all of question One using the crop/animal you have selected.

Name of crop: ______________________

a. Describe the appropriate methods of harvesting your named root crop.

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b. Explain the proper post-harvest treatment for your named product.

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(c. Discuss the appropriate storage method for your named product to maintain its freshness.

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Skill level 3

| 3 | 2 | 1 | 0 | NR |

Skill level 4

| 4 | 3 | 2 | 1 | 0 | NR |
Question Two: Procedure involved in Post-harvest

You can refer to the primary product named in Question One, when answering the following questions.

a. Describe the maturity index for your named product in Question One (page 12).

_______________________________________________________________________
_______________________________________________________________________
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b. Describe the advantages of packing of processed food stuffs.

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Skill level 2
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Skill level 3
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c. Distinguish between the advantages of these harvesting material; Polyethylene bags and wooden field boxes.

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Skill level 2
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Skill level 3
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Question Three: Post-harvest handling

Study the diagram below and use it to answer part a. and part b.

The steps in conducting a Hazard Analysis Critical Control Point (HACCP).

Identify hazard → Identify critical control points → Establish critical limit → Monitoring

Implement corrective action → Verification & validation → Documentation & Record keeping.

a. Describe the principle of Hazard Analysis Critical Point (HACCP).

_______________________________________________________________________
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b. Within the process of HACCP it involves packaging which indicates the brand name, logo, expiry date etc. Describe the importance of these practices prior to packing.

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