PRINCIPAL EXAMINER'S REPORT

BOTSWANA
EXAMINATIONS
COUNCIL

# JCE AGRICULTURE

## 2025

Advancing learning, certifying your future

## PAPER 1: MULTIPLE CHOICE

### General Comments

The overall performance for the current cohort shows a significant improvement compared to the previous year. The current mean is 23.42 while the previous year's mean was 21.57, a net increase of 1.85. As usual, the performance varied across the items with some having very high proportions of candidates getting the item correct while others had very low proportions.

High performance was observed in questions testing recall and basic application. The strongest distractors and distribution of the candidates across the options generally indicate that there were a few misconceptions that were shown by the candidates. The misconceptions and lack of content in a few items should be used to improve the teaching and learning.

Generally, with a four option Multiple-Choice format, the guessing factor probability remains at 25%. The mean of 23.42 indicates that the candidates performed well above the level of chance. There is no item which has the proportion of candidates who got it correct lower than the guessing factor. However, Candidates should be encouraged to always read the question for understanding before they select an answer. The report is mainly in table format showing Prop. - Percentage of candidates that selected the option as their answer, Key - the option that was taken as the answer for the item, and the comments per item.

### Comments on Individual Items

Question 1

| Option | Prop. | KEY. | Comment |
|---|---|---|---|
| A | 0.13 | B | Well done. The item is an easier topic for the candidates to understand and therefore the majority went for option B. |
| B | 0.49 | | |
| C | 0.21 | | |
| D | 0.17 | | |

Question 2

| Option | Prop. | KEY. | Comment |
|---|---|---|---|
| A | 0.03 | D | An easy and understandable topic for candidates, hence the majority went for option D. |
| B | 0.04 | | |
| C | 0.05 | | |
| D | 0.87 | | |

Question 3

| Option | Prop. | KEY. | Comment |
|---|---|---|---|
| A | 0.07 | C | Well done. General knowledge item that is very easy for most of the candidates. |
| B | 0.15 | | |
| C | 0.61 | | |
| D | 0.17 | | |

Question 4

| Option | Prop. | KEY. | Comment |
|---|---|---|---|
| A | 0.33 | B | Fairly done. Majority of the candidates went for the correct option B. However, the strongest option was A, BUAN which does not offer training in artificial insemination. |
| B | 0.44 | | |
| C | 0.12 | | |
| D | 0.11 | | |

Question 5

| Option | Prop. | KEY. | Comment |
|---|---|---|---|
| A | 0.04 | D | Well done. Almost all the candidates were able to identify that tool L is used for transplanting. |
| B | 0.04 | | |
| C | 0.06 | | |
| D | 0.85 | | |

Question 6

| Option | Prop. | KEY. | Comment |
|---|---|---|---|
| A | 0.18 | B | Well done. Most of the candidates were able to determine the subjects applied when constructing a fence corner cued by the diagrammatic stimulus material presented, hence choosing option B. |
| B | 0.74 | | |
| C | 0.03 | | |
| D | 0.04 | | |

Question 7

| Option | Prop. | KEY. | Comment |
|---|---|---|---|
| A | 0.70 | A | Well done. The candidates had to deduce a benefit mixed farming from a given scenario. Most candidates choose option A which demonstrate good conceptual understanding of the subject matter. |
| B | 0.09 | | |
| C | 0.07 | | |
| D | 0.13 | | |

Question 8

| Option | Prop. | KEY. | Comment |
|---|---|---|---|
| A | 0.42 | D | Fairly done. Scientific item that requires candidates to exhibit their comprehension of the composition of chemical fertilisers. While the candidates were spread among all the options, option A was the strongest distractor pulling most of the candidates. This option was wrong because superphosphate fertiliser does not supply nitrogen. |
| B | 0.15 | | |
| C | 0.18 | | |
| D | 0.25 | | |

Question 9

| Option | Prop. | KEY. | Comment |
|---|---|---|---|
| A | 0.44 | A | Fairly done. The candidates were mostly spread over the first three options which lack of conceptual understanding of content matter and hence prevalence of guessing factor. |
| B | 0.29 | | |
| C | 0.20 | | |
| D | 0.06 | | |

Question 10

| Option | Prop. | KEY. | Comment |
|---|---|---|---|
| A | 0.07 | C | Well done. An easy recall item and most of the candidates could identify an activity that can lead to loss of nutrients from the soil. |
| B | 0.11 | | |
| C | 0.72 | | |
| D | 0.10 | | |

Question 11

| Option | Prop. | KEY. | Comment |
|---|---|---|---|
| A | 0.57 | A | Well done. Most candidates were able to identify nutrient deficiency cued by the given scenario. However, option B was the strongest distractor. |
| B | 0.28 | | |
| C | 0.08 | | |
| D | 0.07 | | |

Question 12

| Option | Prop. | KEY. | Comment |
|---|---|---|---|
| A | 0.12 | B | Well done. The stimulus material enabled the candidates to work identify the plants that can be grafted together successfully. |
| B | 0.74 | | |
| C | 0.07 | | |
| D | 0.07 | | |

Question 13

| Option | Prop. | KEY. | Comment |
|---|---|---|---|
| A | 0.09 | C | Fairly done. An item related to item 12 and therefore the candidates who got item 12 correctly would find item 13 easy. Strongest distractor was fertigation. |
| B | 0.10 | | |
| C | 0.58 | | |
| D | 0.23 | | |

Question 14

| Option | Prop. | KEY. | Comment |
|---|---|---|---|
| A | 0.10 | C | Fairly done. Option **D** was the strongest distractor which indicate a guess factor. Centres are advised to cover the concepts well for candidates to understand classification of field crops. |
| B | 0.04 | | |
| C | 0.48 | | |
| D | 0.38 | | |

Question 15

| Option | Prop. | KEY. | Comment |
|---|---|---|---|
| A | 0.03 | D | Fairly done. Most of the candidates were pulled by option **C** which was wrong. The best time to transplant seedlings is in the late evening (or early morning) because it prevents heat stress, reduces water loss, and allows recovery when temperatures are cooler. |
| B | 0.15 | | |
| C | 0.33 | | |
| D | 0.49 | | |

Question 16

| Option | Prop. | KEY. | Comment |
|---|---|---|---|
| A | 0.06 | D | Fairly done. While many of the candidates went for the correct answer option, a significant proportion of the candidates were drawn to option **B** and option **C**. |
| B | 0.14 | | |
| C | 0.23 | | |
| D | 0.58 | | |

Question 17

| Option | Prop. | KEY. | Comment |
|---|---|---|---|
| A | 0.02 | C | Well done. Most of the candidates were able to identity the advantage of using a tractor in a farm. |
| B | 0.03 | | |
| C | 0.90 | | |
| D | 0.05 | | |

Question 18

| Option | Prop. | KEY. | Comment |
|---|---|---|---|
| A | 0.04 | B | Well done. The pulled most of the candidates indicating understanding of the concept. However, a significant number of the candidates were drawn to option **C** which is a misconception. |
| B | 0.72 | | |
| C | 0.19 | | |
| D | 0.06 | | |

Question 19

| Option | Prop. | KEY. | Comment |
|---|---|---|---|
| A | 0.05 | D | Fairly done. A significant number of the candidates were drawn to option **C** which is wrong. Centres should emphasise the distinction between financial and production records. |
| B | 0.05 | | |
| C | 0.33 | | |
| D | 0.57 | | |

Question 20

| Option | Prop. | KEY. | Comment |
|---|---|---|---|
| A | 0.52 | D | Poorly done. Most of the candidates were not able to identify the definition of marketing. The spread of candidates across the option indicates that there is generally lack of conceptual understanding of the subject matter. Option **A** was the strongest distractor, which could imply that most candidates were picking the option that appeared familiar. |
| B | 0.13 | | |
| C | 0.14 | | |
| D | 0.20 | | |

Question 21

| Option | Prop. | KEY. | Comment |
|---|---|---|---|
| A | 0.12 | D | Well done. Most candidates could analyse the stimulus given to identify the missing officer. |
| B | 0.14 | | |
| C | 0.08 | | |
| D | 0.67 | | |

Question 22

| Option | Prop. | KEY. | Comment |
|---|---|---|---|
| A | 0.19 | B | Fairly done. While most of the candidates were able to identify the answer, the distractors pulled significant proportions of the candidates. |
| B | 0.54 | | |
| C | 0.15 | | |
| D | 0.12 | | |

Question 23

| Option | Prop. | KEY. | Comment |
|---|---|---|---|
| A | 0.59 | A | Well done. While most of the candidates were able to identify the marketing mix, option **B** and option **D** pulled significant proportions of the candidates. |
| B | 0.14 | | |
| C | 0.05 | | |
| D | 0.21 | | |

Question 24

| Option | Prop. | KEY. | Comment |
|---|---|---|---|
| A | 0.04 | C | Well done. An application question involving calculation of input costs. A good proportion of the candidates demonstrated good grasp of the concept. The strongest distractor was option **D** which is the income. |
| B | 0.04 | | |
| C | 0.67 | | |
| D | 0.25 | | |

Question 25

| Option | Prop. | KEY. | Comment |
|---|---|---|---|
| A | 0.19 | B | Well done. Candidates were able to identify the correct conclusion that could be made about the enterprise described though there were significant proportions of candidates at option **A** and option **D**. |
| B | 0.60 | | |
| C | 0.03 | | |
| D | 0.18 | | |

Question 26

| Option | Prop. | KEY. | Comment |
|---|---|---|---|
| A | 0.04 | D | Well done. Candidates were able to pick the correct option that describes how farmer can leverage of cell phone use in marketing produce. |
| B | 0.11 | | |
| C | 0.05 | | |
| D | 0.80 | | |

Question 27

| Option | Prop. | KEY. | Comment |
|---|---|---|---|
| A | 0.26 | D | Poorly done. The candidates were spread across the options. Option **A** was the strongest distractor. |
| B | 0.24 | | |
| C | 0.17 | | |
| D | 0.33 | | |

Question 28

| Option | Prop. | KEY. | Comment |
|---|---|---|---|
| A | 0.40 | A | Fairly done. The candidates were almost spread across all the options an indication of guess work. Centres are advised to emphasise the best month for farmers to send cows for artificial insemination. |
| B | 0.18 | | |
| C | 0.17 | | |
| D | 0.25 | | |

Question 29

| Option | Prop. | KEY. | Comment |
|---|---|---|---|
| A | 0.10 | C | Well done. Candidates were able to show understanding of the reproduction process in cattle. |
| B | 0.07 | | |
| C | 0.79 | | |
| D | 0.05 | | |

Question 30

| Option | Prop. | KEY. | Comment |
|---|---|---|---|
| A | 0.52 | B | Fairly done. Most of the candidates were not able to calculate the number of birds which could be kept in the house. The highest proportion of the candidates was drawn to option **A,** which is wrong. |
| B | 0.40 | | |
| C | 0.06 | | |
| D | 0.03 | | |

Question 31

| Option | Prop. | KEY. | Comment |
|---|---|---|---|
| A | 0.06 | C | Well done. Most of the candidates were able to identify the reason for disbudding calves. |
| B | 0.05 | | |
| C | 0.74 | | |
| D | 0.15 | | |

Question 32

| Option | Prop. | KEY. | Comment |
|---|---|---|---|
| A | 0.04 | D | Well done. Candidates displayed understanding of the foot and mouth disease the highest proportion was drawn to the key, though a significant proportion was attracted by option **C**. |
| B | 0.06 | | |
| C | 0.15 | | |
| D | 0.74 | | |

Question 33

| Option | Prop. | KEY. | Comment |
|---|---|---|---|
| A | 0.08 | C | Well done. Candidates able to relate the disease control method with the reason for doing it. |
| B | 0.09 | | |
| C | 0.73 | | |
| D | 0.11 | | |

Question 34

| Option | Prop. | KEY. | Comment |
|---|---|---|---|
| A | 0.29 | B | Poorly done. Candidates are spread across all the options with significant proportions at option **A** and option **D**, indicating the prevalence of the guessing factor. Centres are advised to emphasise the classification of animal feeds in animal nutrition. |
| B | 0.33 | | |
| C | 0.10 | | |
| D | 0.29 | | |

Question 35

| Option | Prop. | KEY. | Comment |
|---|---|---|---|
| A | 0.24 | B | Well done. Most of the candidates could determine the correct order of the activities performed when milking cows. A significant proportion thought option A presented the correct order which is wrong. |
| B | 0.58 | | |
| C | 0.12 | | |
| D | 0.06 | | |

Question 36

| Option | Prop. | KEY. | Comment |
|---|---|---|---|
| A | 0.63 | A | Well done. Candidates were able to determine the number of bulls needed for a given number of cows. |
| B | 0.16 | | |
| C | 0.12 | | |
| D | 0.10 | | |

Question 37

| Option | Prop. | KEY. | Comment |
|---|---|---|---|
| A | 0.72 | A | Well done. Most candidates settled for the correct reason for removing a bull after the second breeding season. |
| B | 0.13 | | |
| C | 0.05 | | |
| D | 0.10 | | |

Question 38

| Option | Prop. | KEY. | Comment |
|---|---|---|---|
| A | 0.43 | A | Fairly done. Candidates were spread across all options, indicating guessing factor. |
| B | 0.16 | | |
| C | 0.15 | | |
| D | 0.25 | | |

Question 39

| Option | Prop. | KEY. | Comment |
|---|---|---|---|
| A | 0.79 | A | Well done. Candidates displayed good understanding of the external parasites of beef cattle. |
| B | 0.03 | | |
| C | 0.07 | | |
| D | 0.10 | | |

Question 40

| Option | Prop. | KEY. | Comment |
|---|---|---|---|
| A | 0.07 | B | Fairly done. Candidates were able to identify the causative agent of Newcastle disease. A considerable proportion of candidates were spread across option **C** and option **D** which were distractors. |
| B | 0.46 | | |
| C | 0.25 | | |
| D | 0.22 | | |

## PAPER 2: WRITTEN THEORY

### General Comments

The report covers Agriculture Paper 2. It reports on how candidates responded to items on the question paper. Generally, candidates' responses were of the same strength with those of the previous year, for both Knowledge & Understanding and Application questions. Most candidates were not able to access marks on high order questions. Items on management practices were poorly answered, especially on section B (goat/sheep management). Candidates failed to draw, and label expected diagrams. Centres are encouraged to use this report as a reference point for identifying areas of improvement.

### Comments on Individual Questions

### Section A

**1 (a)** Candidates were expected to state two types of farming. This question was generally well answered with most candidates stating arable farming, subsistence farming, mixed farming. Some of the candidates stated levels of production instead of types of farming.

**(b)** Candidates were required to explain the situation of food production in Botswana. The question was poorly answered. Most candidates merely mentioned that local food production is lower than the demand which is correct but inadequate to warrant full credit for the item. Candidates were expected to state the reasons leading to the low food production such as extreme temperatures, unreliable rainfall, pests and diseases or lack of capital and further state that local food production is supplemented by importing food.

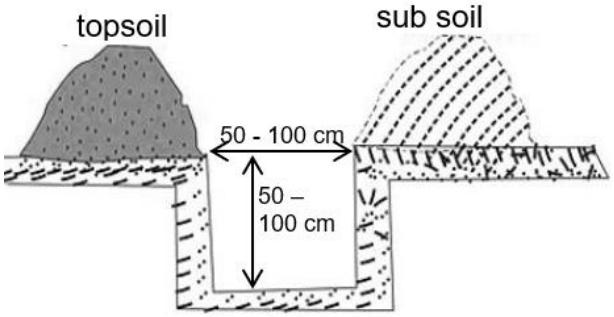
**2 (a)** A diagrammatic stimulus material showing a tool used in Agricultural production was presented. Candidates were expected to name the tool shown in the diagram. The item was well answered with most candidates stating knapsack sprayer as the name of the tool.

**(b)** Candidates were expected to describe how the tool shown in the diagram is used. This item was poorly answered. Most candidates wrote incomplete statements regarding different aspects of using the equipment, e.g., some candidates wrote pump the lever, instead of pump the lever to build pressure in the knapsack sprayer. The expected responses were place the tool on a flat surface; add or fill the tool with right amount of water; add the recommended amount of the chemical; shake / stir or agitate to mix the water with the chemical; pump the lever to build pressure inside; press the trigger to release or apply the chemical solution.

**3 (a)** Candidates were expected to give a nutritional disease affecting cattle. The question was well answered with most candidates giving correct responses as aphosphorosis, milk fever, anaemia, bloat, or rickets.

**(b)** This question required candidates to list one example of supplementary feeds. The question was well answered as most candidates listed correct responses such as di-calcium phosphate, rumevite, molasses, or phosphate block. However, a few candidates wrote bone meal as an example of supplementary feeds. It must be noted that use of bone meal as feed for cattle, sheep and goats was banned in the early 1990 s to 2000 s in many countries including Botswana as a precaution against mad cow disease.

**4** This item required candidates to describe how a planting hole of a tree seedling is prepared using a well labelled diagram. The question was fairly answered by most candidates. Most candidates were able to present drawings of a planting hole showing appropriate dimensions and two separate heaps of soil. The features of the planting hole were correctly labelled as shown in the following diagram:




However, most candidates described transplanting instead of how a transplanting hole is prepared. The expected answer was measuring a 50 cm to100 cm square area, digging a hole to a depth of 50 cm to 100 cm and putting topsoil separate from sub soil.

**5** **(a)** This is an application question where a scenario involving germination of tree seeds was presented. Candidates were expected to calculate the percentage germination of seedlings that emerged out of 25 seeds planted. The question was well answered with most candidates presenting the correct calculation of the germination percentage.

*Answer*: 80%.

**(b)** The item required candidates to suggest an advice to a farmer who wants to plant the seeds. This item was well answered. Candidates were able to interpret the presented scenario correctly in terms of seed viability and gave the correct responses such as planting the seeds, treating seeds to improve germination percentage or fumigating the soil to kill pests as advice to a farmer.

**6** **(a)** The question presented candidates with a stimulus material od a diagram showing poultry house. Candidates were expected to identify the feature labelled P in the stimulus material. The question was well answered, with most of the candidates stating roof as the name of the feature labelled P. However, some candidates wrote corrugated iron sheet which was incorrect as this is the materials used to make the feature.

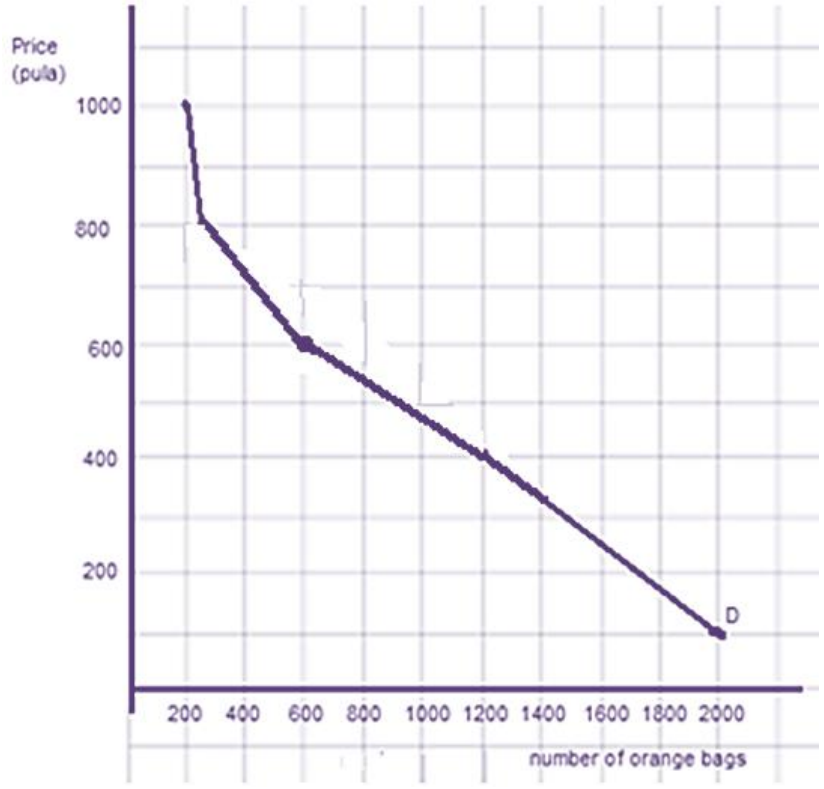
**(b)** This item required candidates to explain the role of the feature labelled Q. The item was well answered with most candidates writing correct response as: to allow air to flow inside and outside the house for ventilation.

**(c)** Candidates were expected to describe one way in which the poultry house structure can be kept hygienic. The item was well answered by most candidates as they were able to give expected responses such as regular cleaning /washing of the floor, regular washing of the walls, regular removal of dirt, regular removing of unwanted materials or disinfecting.

**7** **(a)** The question presented candidates with a scenario describing a productive hen that displays vices. Candidates were expected to name the management practice that a farmer can carry out to control the behaviour of the hen. The question was well answered, as most candidates were able to interpret the scenario and state debeaking as the name of the management practice cued by the scenario.

**(b)** Candidates were expected to describe how the management practice is carried out. This part was poorly answered. Most candidates simply defined debeaking instead of describing how it is carried out. Centres are encouraged to clarify the distinction between these command words. The expected responses for the different methods of debeaking were: for the knife method - hold the beak, cut the upper, and then lower separately; Or For use a debeaking tool/ machine - hold the beak, insert the beak into the machine to cut both the upper, and then lower beak; Or For the use of a hot object - hold the beak, press the beak against a hot object to reduce the size of the beak.

**8** **(a)** This was an application question that presented candidates with tabulated data showing a demand schedule for oranges. Candidates were required to use the data to draw a demand curve on a given graph pad. The item was fairly done. Some candidates labelled the price (P) on the horizontal x-axis and quantity (Q) on the vertical y-axis which is incorrect. Centres are encouraged to scale the axes. The quantity axis should go from zero to the highest quantity, and the price axis should go from zero to the highest price. The expected response is as follows:

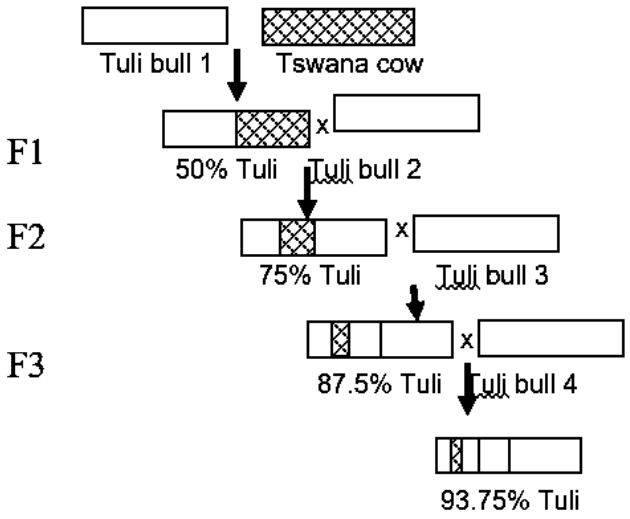


**(b)** This question was well answered. Candidates were expected to draw a conclusion about the relationship between demand and price. Most candidates were able to draw the right conclusion stating that: as the price increases the demand decreases.

**9** Candidates were expected to describe how vegetable seeds are planted. This question was well answered with most candidate stating the following details as their responses: dig out the soil for the planting holes, place the seeds inside the hole, then cover the holes with soil.

**10** Candidates were expected to define ovulation. The question was fairly answered. Some candidates defined fertilisation instead of ovulation. The expected response was: This is the release of the ovum from the ovary.

**11** **(a)** Candidates were expected to use a diagram to illustrate how upgrading method in animal breeding is done. This question was poorly answered. Most candidates have demonstrated misconception, failing to distinguish upgrading from mating, by simply drawing two animals mating. Some candidates showed lack of systematic knowledge failing to show crosses between a local inferior female and an exotic superior bull over successive generations. The expected response (illustration) was as follows;




**(b)** Candidates were expected to state one advantage of the breeding method, upgrading. This question was fairly answered. Some candidates stated the results of the breeding method instead of the advantages, e.g. some candidates wrote “it produces hybrids” instead of it results in hybrid vigour. The other expected response was that desirable characteristics are obtained.

**Section B**

**Goat/Sheep Production (The Section covers both question 12 and 13)**

**12/13(a)** Candidates were expected to state two feeds suitable for goats / sheep with water. The question was well answered with most candidates able to recall correct feeds for goats / sheep as grass, leaves, twigs, lucerne, lab lab, goat pellets feeds or mineral licks.

**(b)** Candidates were expected to state two effects of parasites on goats/sheep. The question was well answered. Most candidates stated the correct effects of parasites in goats such as the following: they cause anaemia / malnutrition, they cause wounds, they cause irritation on the skin, they cause patches on skin / coat, they lead to reduced feed intake, they lead to low production, they transmit diseases, or they cause loss of weight.

**(c)** Candidates were expected to describe how castration is carried out on goats/sheep using a knife. The question was fairly answered. Some candidates failed to write a complete process. The common responses were hold the scrotum and cut off the testicles. Centres should emphasise on proper restraint, incision technique, testicle exteriorization, and cutting of spermatic cords. The expected response was: tie the hind legs of a goat, hold the scrotum of the goat, make slit /cut on the scrotum with a knife, pull the testicles out of scrotum through the slit, and cut the sperm ducts.

**(d)** Candidates were expected to state two reasons for providing water to pregnant goats / sheep regularly. The question was well done as most candidates stated the expected reasons like to increase volume of maternal blood, to aid digestion / to prevent constipation, to prevent dehydration, to aid preparation for lactation / milk production, to aid in excretion / helps to remove waste, to help in body temperature regulation /to aid cooling the body, to transport minerals / nutrients in the body.

**Section C (Beekeeping / Fish farming/ Pig production/ Rabbit Production)**

**Bee Keeping**

**14 (a)** Candidates were expected to state three members of a bee colony. The question was well answered. Most of the candidates could recall the members as queen, drone and worker bee.

**(b)** Candidates were expected to explain two precautions observed when manipulating bees. The question was well answered. Most candidates were able to explain the precautions such as wearing protective clothing to avoid being stung by the bees, working with a partner to assist you to carry out other activities or assist in emergencies, smoking the bees to calm them down or avoiding crushing the bees since it makes them aggressive.

**(c)** Candidates were expected to state three reasons for manipulating bees. The question was poorly answered. Most candidates gave general reasons for keeping bees instead of reasons for manipulating bees. The expected responses were to aid in requeening a colony, to aid in dividing a colony, to enable collecting a swarm, to facilitate inspection of a colony, to make it easy to relocate a colony, to aid in harvesting, or to aid in feeding the colony.

**Fish Production**

**15 (a)** Candidates were expected to name three parasites of fish in Botswana. The question was well answered with most of the candidates recalling roundworms; fluke; tapeworms; fish lice; leech or trichodynia as parasites of fish.

**(b)** Candidates were expected to explain two factors that limit fish production in Botswana. It was fairly answered. Most candidates only stated the factors without explanations. The expected answers were: limited natural water supply makes it difficult to set up aquaculture; recurring drought which results in water scarcity for fish farming; limited technical knowledge/lack of education that results in poor management of fish; high cost of feed since most feeds for fish have to imported; poor infrastructure that leads to poor preservation, poor storage and transportation of fish.

**(c)** Candidates were expected to list steps of handling live fish in preparation for transportation. This question was poorly answered. Most candidates described transportation of fish from one place to another, instead of steps in handling live fish in preparation for transportation. The expected response was to fill a container half full of water from the pond, use a net to catch fish from the pond, put fish in the container immediately and cover the container with a net or a cloth.

**Pig Production**

**16** This question was not attempted by any of the centres.

**Rabbit Production**

**17 (a)** Candidates were expected to name three types of feeds for rabbits. The question was well answered. Most candidates were able to state the correct types of feeds for rabbits such as green feeds; root crops; rabbit pellets.

**(b)** The question was fairly well answered. Candidates were expected to explain two factors to be considered when starting rabbit production. Some candidates only stated the factors and did not explain them. The expected responses were availability of capital/money to purchase resources used in production; availability of land for production or for raising rabbits; knowledge and skills on rabbit production for proper management or to improve production; availability of market to sell produce.

**(c)** Candidates were expected to list steps in handling rabbits for inspection. The question was poorly answered. Most candidates were describing how inspection of rabbits is carried out instead of steps in handling rabbits or preparing rabbits for inspection. The expected responses were brush the rabbit gently on the back to calm it down; lift the rabbit by the scruff; place the rabbit on a flat surface.

## PAPER 3: COURSEWORK

### General Overview

Generally, crops were mature and have reached marketability stage except in a few centres where some crops were not marketable. In some instances, crops were damaged by floods, animals, and birds. In some Centres, the plot surroundings were very dirty. The centres are encouraged to keep their garden environment hygienic for healthy growth of crops. Centres which grow crops which take long to mature (e.g., onion) are advised to plant earlier so that they are marketable at the time of marking. Pits made during plot preparation were not backfilled which poses threat to examiners and candidates. There was also a challenge of levelling across the country. Nonetheless most centres presented very good and healthy crops. Centres must note that the plot presented for marking is part of the candidate script, hence candidate numbers be clearly displayed on the plots using T-markers.

### Areas Covered

**1.0 Layout: Ridges, Levelling and Measurement**

**1.1 Ridges**

The expectation was to find four well defined ridges which will keep water in the plot. Well-constructed ridges were found in most centres.

**1.2 Levelling**

The expectation was to find plots that are not sloping. In most centres plots were not level.

**1.3 Measurement**

The expectation was to find a 2 m × 1 m plot. All centres adhered to the set standard.

**2.0 Cleanliness**

**2.1 Weeds prevalence**

The expectation was to find clean plots which are free from weeds and other materials that can hamper plant growth. Generally, plots were clean in most Centres.

**2.2 Cultivation**

The expectation was to find well cultivated plots with a fine tilth. Plots were not well cultivated; clods were not broken after cultivation in some Centres

**3.0 Population**

**3.1 Spacing**

The expectation was to find correctly populated plots. The population is based on the recommended spacing given below:

| CROP | INTER ROW SPACING | INTRA ROW SPACING |
|---|---|---|
| Egg plant | 60-90 cm | 45-60 cm |
| Spinach/Swiss Chard Onion | 40-60 cm<br>25-60 cm | 20-25 cm<br>10-15 cm |
| Beetroot<br>Rape<br>Runner beans | 25-60 cm<br>40-60 cm<br>50-60 cm | 10-15 cm<br>20-40 cm<br>20-30 cm |
| Radish | 25-60 cm | 10 -15 cm |
| Cabbage | 40-60 cm | 40-50 cm |
| Garden Peas | 30-60 cm | 10-15 cm |
| Tomatoes<br>Dwarf beans | 40-60 cm<br>50-60 cm | 30-50 cm<br>15-20 cm |
| Sweet Pepper / Green Pepper | 60-80 cm | 30-45 cm |
| Kale / Choumollier | 40-60 cm | 20-40 cm |
| Carrots<br>Spring Onion | 25-60 cm<br>15 cm | 10-15 cm<br>1-5 cm |
| Okra | 50 cm-60 cm | 20– 40 cm |

### 3.2 Correct number

The expectation was to find a correctly populated plot based on the formula given below: Example: plot size 2 m × 1 m with a crop spaced 15 cm between plants (intra-row spacing)

$$\text{Formula} = \frac{\text{length of plot - 20 cm}}{\text{Intra-row spacing}} + 1$$

$$= \frac{(200\text{ cm} - 20\text{ cm})}{15\text{ cm}} + 1$$

$$= \frac{180\ \cancel{\text{cm}}}{15\cancel{\text{cm}}} + 1$$

$$= 12 + 1$$

$$= 13 \text{ crops in a row}$$

Plots were correctly populated. In all centres both the inter-row and intra-row spacing were correctly maintained.

### 3.3 Thinning

The expectation was to find one plant per station. All crops were properly thinned.

## 4.0 Condition of Crops

### 4.1 Colour

The expectation was to find crops with appropriate colour to the variety grown. The colour of the crops presented was appropriate to the variety grown.

### 4.2 Uniformity of Crops

The expectation was to find mature plants at the same growing stage. Most plants were mature and at the same growing stage. NB uniformity does not mean that crops should be at the same growing height but growing stage, e.g., flowering, harvesting stage etc. In few centres plants were at different growing stages.

### 4.3.0 Comments on Individual Crops

Crops presented were Spinach, Onion, Kale, Rape, Beetroot, Sweet Pepper, Tomatoes, Runner beans, Eggplant, Radish, Spring onion, Okra, and bush beans.

### 4.3.1 Spinach

The expectation was to find green, marketable, well pruned, and fresh crop. Generally, the crops were marketable but there were few instances where seedlings were found. Pruning was also not well done since tillers and overgrown leaves were left and there were a few centres in which the growing point was removed.

### 4.3.2 Onion

The expectation is to find a fresh, marketable, well-trimmed crop with an exposed bulb. Generally, the crop was mature but not marketable. Centres are advised to plant as early as a January. In some centres bulbs were earthed up and some plants under shade which resulted in poor bulbs since onion is a light crop. Trimming was not well done since it must be done at pencil height (15 cm from the neck of the bulb). The growing point must not be cut.

### 4.3.3 Rape

The expectation was to find fresh, well pruned and marketable crop. Crops were mature. However, there were a few instances where crops were not marketable. Pruning was not well done since some leaves which deserved to be pruned were left. Candidates should be encouraged to prune on time.

### 4.3.4 Beetroot

The expectation was to find fresh, mature, earthed up and marketable crop. Beetroot crops were mature but not marketable in some centres. In some centres, pruning and earthing-up were not well done. Candidates should ensure that roots remain covered after watering and pruning should be done correctly. NB: Earth when the root has expanded.

### 4.3.5 Sweet Pepper

The expectation was to find a fresh, marketable, and supported crop. In some centres, the crop was mature and not marketable while in other centres the crop marketable. Supporting was well done. In one centres some candidates did not tie the stem of the crop to the stick. Proper supporting should be done by tying the stem of the crop to the stake.

#### 4.3.6 Runner Beans

The expectation was to find fresh, mature, marketable and well supported crops. In some centres, the crop was mature and marketable while in other centres the crop was not marketable. Crops were well supported. In some centres the crop was poorly pruned since the pods and the leaves were touching the ground. Frequent trimming or pruning of lower branches should be done to avoid early bearing of fruits which leads to pods and leaves touching the ground.

#### 4.3.7 Radish

The expectation was to find a fresh, mature, pruned, earthed up and marketable crop. The crop was generally fresh, mature, well pruned, properly earthed-up, and in a few centres, they were not marketable.

#### 4.3.8 Tomatoes.

The expectation was to find a fresh, well supported, pruned, mature and marketable crop. Generally, the crop was mature but not marketable. The best way to support the crop would be to either trellis so that the branches do not fall over or prune continually if the crop is to be staked. Candidates are advised to shade the crops to avoid damage by birds.

#### 4.3.9 Egg plant

The expectation was to find fresh, matured, supported and marketable crop. The crop was mature and but not marketable. Crops were well supported.

#### 4.3.10 Okra

The expectation was to find fresh, mature, marketable, supported and well pruned crops. The crop was mature but not marketable. Candidates are encouraged to plant early.

## 5.0 CARDS

### 5.1 General Observations

Some candidates submitted cards without their examination identification details. Centres are advised to ensure that all candidates write their centre numbers followed by their candidate numbers as it is an examination requirement. Candidates should desist from writing cards in verbatim and are encouraged to show originality in writing the cards. Centres should encourage candidates to describe activities in their own words and avoid copying. Candidates must record their observations. Special needs candidates should be helped accordingly in card writing.

#### 5.2.1 Correct Entry/record of work done

The expectation was to find described activities and a list of tools used. A few centres were able to describe the activities along with the tools used. Most candidates continue to define activities instead of describing them. Candidates used the same term to describe the activity. e.g., Activity: Mulching Description: A layer of grass was put on top of the soil instead of mulching was done.

#### 5.2.2 Correct Reasons for activities carried out

The expectation was to find one or more relevant reasons for the activity done. Most of the reasons given by candidates were relevant. However, in a few instances reasons were irrelevant.

### 5.2.3 Timely Recording of important activities

The expectation was to find correctly timed activities (dates and intervals). Most activities were correctly timed. However, in some cases nothing was recorded during the month of April. NB. A card without dates is not regarded as a record. In some instance dates were wrong.

### 5.2.4 Logical Presentation

The expectation was to find activities correctly following one another. In most centres activities were correctly following one another as expected.

### 5.2.5 Neatness of work recorded

The expectation was to find cards with minimal cancellation and soiling. Cards were neat with minimal cancellation and no soiling.

## PAPER 4: ALTERNATIVE TO COURSEWORK

### General Comments

The performance of the candidates was average. Candidates were failing to calculate pesticides application rate showing lack of computation skills. Generally, most candidates presented a neat work that was legible and able to read. Some candidates were setting items which were not part of the paper. Candidates were using wrong tools in trying to describe some processes.

### Comments on Individual Questions

**1 (a)** The expectation was for candidates to name tools, V – rake, W – digging fork, and X – spade. It was well answered as most candidates were able to name the correct tools except a few who confused a spade for shovel.

**(b)** The expectation was for candidates to state safety measures when using tool X (spade). This item was fairly answered by the candidates. Most candidates stated ways for caring tools instead of safety measures when using tool X. The expected responses were as follows: maintain a straight back, use it for the right purpose, wear protective clothing, hold the handle with both hands, bend your knees, take short breaks as you work, allow adequate working space. Candidates should differentiate between safety measures and care for tools.

**(c)** The expectation was for candidates to describe how the tool W is used as follows: hold it with its handle, put the teeth / tine on the soil surface, press the teeth / tine into the soil, or turn the teeth / tine to invert the soil. Candidates were stating the use of a tool instead of describing how the tool W is used. Candidate should show the handling of the tool, placement into the soil and how it is used to turn over the soil.

**2 (a)** The expectation was for the students to name the pest shown in the picture as aphid. Most candidates failed to name the pest. They were confusing it with the corn cricket though the abdomen of the corn cricket is not the same as with that of an aphid.

**(b)** The expectation was for the candidates to explain ways how the pest damages the crop as:

| Factor | Explanation |
|---|---|
| feeds on the underside of the leaf; | weakens the plant; |
| sucks plant sap; | causes leaf curling /death of the leaves/ discolouration; |
| excretes a honeydew; | leads to development of fungus on plant; |

1 mark would be given for the factor (damage) and the other mark for the associated explanation. Most candidates who did not name the pest could not explain how the pest damages the crops. Some candidates were able to state the factor without the explanation while others were giving the explanation without the factor.

**(c)** Candidates were expected to list ways of controlling the pest without causing harm to the environment as follows: provide plants with adequate space, flush plants with water regularly, remove highly affected plants, introduce pest predator practice, crop rotation and regular weeding. Candidate failed to list ways of controlling pests instead they were listing the general method of controlling pests without causing harm to the environment.

**3** **(a)** The expectation was for the candidates to name any other type of seedbed beside the one shown as follows: flat seedbed / sunken seedbed. Most candidates were able to give the other types of seedbeds though others were naming the seedbed on the diagram.

**(b)** The expectation was for the candidates to suggest one type of plant suited for the seedbed as follows: root crop. Candidates were naming the examples of the crop instead of the class.

**(c)** The expectation was for the candidates to describe a suitable area where the type of seedbed is used as follows: area with high rainfall / flood area. Candidates were able to describe the suitable area where the seedbed is used.

**4** **(a)** It was expected that the candidates describe how a vegetable seedling is transplanted from a nursery to the plot as follows: dig a transplanting hole using a hand trowel; uproot the seedling with the root ball using a hand trowel; put the seedling in the hole; fill the hole with the soil; press the soil around the seedling to remove air pockets using your fingers. Candidates were able to describe how vegetables are transplanted.

**(b)** **(i)** The expectation was for the candidates to state any two activities carried out immediately after transplanting the seedlings as follows: watering, shading, mulching, supporting plants / staking / trellising, pruning, or addition of fertilisers. Candidates were able to state the activities.

**(ii)** The expectation of candidates to state a reason for carrying out each of the activities stated in (b)(i) were as follows: watering- to cool the plant / dissolve nutrients; shading – to provide a suitable temperature / to reduce evaporation; mulching – to conserve moisture / reduce growth of weeds; supporting plants - to improve exposure to light / reduce spread of pests / diseases; pruning – to reduce pests / diseases; adding fertilisers – to improve soil fertility / improve growth. Candidates were explaining the activities instead of giving reasons.

**5** **(a)** The expectation was for candidates to list reasons for applying manure to the soil as follows: maintain / improve soil organic matter; Improve soil tilth; improve soil structure; Improve water seepage / infiltration; increase soil nutrients; improve water holding capacity; bind soil particles together. Some candidates were repeating same reasons in different ways.

**(b)** The expectation was for the candidates to give examples of manure used in the garden as follows: farmyard manure / kraal manure / chicken manure; green manure; compost manure. Candidates managed to give the examples.

**6** **(a)** The expectation was for the candidates to classify a named crop studied as follows: onion - bulb; spinach – leaf; beetroot – root; tomato – fruit. Candidates concentrated more on naming the crop than the class.

**(b)** The expectation was for the candidates to state two signs of maturity of the crop named in (a) as follows: Spinach - leaves become dark green; big / large leaves; crispy texture of the leaves; Onion- brownish colour of the bulb; large / big bulb; shrinking of the leaves; Beetroot roots become reddish / purplish; large / big root; big / large leaves; Tomato – a firm feeling to touch; Fruits turn pale / red; fruits become large(depending on variety). Candidates failed to state the signs of maturity for a named vegetable.

**7** The expectation was for the students to determine the amount of water the farmer will need for 200 g of pesticide when the application rate is 500 g per 100 litre of water / ha. Almost all candidates were unable to quote the correct formula and determine the correct amount of water needed.

*Answer*: 40 litres