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Department:  
Basic Education  
**REPUBLIC OF SOUTH AFRICA**

## **NATIONAL SENIOR CERTIFICATE**

**GRADE 12**

**AGRICULTURAL SCIENCES P2**

**FEBRUARY/MARCH 2015**

**MARKS: 150**

**TIME: 2½ hours**

**This question paper consists of 15 pages.**

**INSTRUCTIONS AND INFORMATION**

1. This question paper consists of TWO sections, namely SECTION A and SECTION B.
2. Answer ALL the questions in the ANSWER BOOK.
3. Start EACH question on a NEW page.
4. Number the answers correctly according to the numbering system used in this question paper.
5. You may use a non-programmable calculator.
6. Show ALL the calculations, including formulae, where applicable.
7. Write neatly and legibly.

**SECTION A****QUESTION 1**

- 1.1 Various options are provided as possible answers to the following questions. Choose the answer and write only the letter (A–D) next to the question number (1.1.1–1.1.10) in the ANSWER BOOK, for example 1.1.11 A.

- 1.1.1 The following schematic representation shows a/an ... chain of products:

Distributers → Retailers → Buyers

- A supply
- B entrepreneur's
- C production
- D planning

- 1.1.2 Price inelasticity of demand means:

- (i) If the price of bread increases by R2,00, and there is no other alternative, consumers will still buy the bread.
- (ii) If the price of a slab of brown chocolate increases, consumers will buy white chocolate.
- (iii) If the price of diesel increases by 50%, farmers will not buy vehicles using petrol immediately.
- (iv) If the price of maize increases, consumers will continue to buy maize because it is their staple food.

Choose the CORRECT combination:

- A (i), (ii) and (iii)
- B (i), (iii) and (iv)
- C (ii), (iii) and (iv)
- D (i), (ii) and (iv)

- 1.1.3 The following are entrepreneurial success factors EXCEPT for ...

- A self-confidence.
- B dynamics.
- C creativeness.
- D bureaucratic analysis.

- 1.1.4 A strategic planning tool that can help to evaluate a business is known as a ...

- A business plan.
- B strategic management plan.
- C SWOT analysis.
- D future plan.

1.1.5 Money paid into a farmer's bank account and then withdrawn is known as the ... of the farming business.

- A budget
- B cash flow
- C assets
- D overdraft

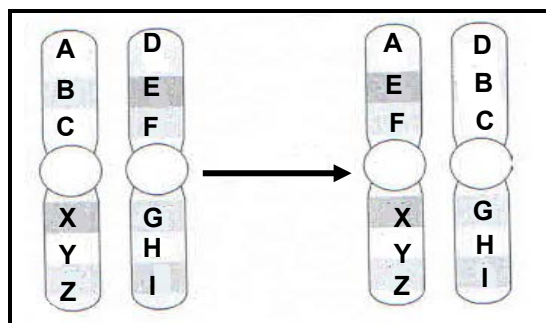
1.1.6 The economic characteristic of land which explains that an increase of a unit of production input will not result in a proportional increase in yield:

- A Indestructibility
- B Land is limited
- C Land appreciation
- D Law of diminishing returns

1.1.7 To be able to interact effectively with people and make your vision known to other stakeholders is a/an ... skill of a manager.

- A problem-solving
- B financial management
- C interpersonal and communication
- D decision-making

1.1.8 The illustration below indicates ... in gene mutation.



- A translocation
- B deletion
- C duplication
- D inversion

1.1.9 A description that refers to atavism:

- A Appearance of a red calf from the crossing of black male and female animals after generations of a black herd
- B Appearance of a black-and-white calf after crossing black-and-white parents
- C Appearance of a red calf after crossing homozygous red parents
- D Appearance of a red calf after crossing spotted and white parents

1.1.10 Genetic modification uses the following techniques:

- (i) Gene gun and the use of microbacterium anthrax
- (ii) Electrophoresis and environmental conditions
- (iii) Micro-injection and electroporation
- (iv) Biolistics and agrobacterium tumefaciens

Choose the CORRECT combination:

- A (i) and (ii)
- B (i) and (iii)
- C (ii) and (iv)
- D (iii) and (iv)

(10 x 2) (20)

1.2 Choose a term/phrase from COLUMN B that matches a description in COLUMN A. Write only the letter (A–H) next to the question number (1.2.1–1.2.5) in the ANSWER BOOK, for example 1.2.6 I.

| COLUMN A |                                            | COLUMN B |                         |
|----------|--------------------------------------------|----------|-------------------------|
| 1.2.1    | Uniformity of a group of products          | A        | evaluation              |
| 1.2.2    | Guarantee for a loan                       | B        | a problem-solving skill |
| 1.2.3    | Analysis and refinement of the plan        | C        | allele                  |
| 1.2.4    | One gene controlling another gene          | D        | collateral              |
| 1.2.5    | Alternative form of the same pair of genes | E        | standardisation         |
|          |                                            | F        | grading                 |
|          |                                            | G        | epistasis               |
|          |                                            | H        | heritability            |

(5 x 2) (10)

- 1.3 Give ONE word/term/phrase for each of the following descriptions. Write only the word/term/phrase next to the question number (1.3.1–1.3.5) in the ANSWER BOOK.
- 1.3.1 People who have the ability to recognise a unique business opportunity and who are willing to take the risk of starting their own businesses
- 1.3.2 An indicator of the amount of work that is done relative to the amount of money that is spent on wages and salaries
- 1.3.3 A strategy whereby the farmer can spread the risk by investing in several enterprises
- 1.3.4 The crossing whereby two hereditary factors on two different chromosomes are involved in cross-breeding
- 1.3.5 The alteration of the DNA resulting in a change in the sequence of the genes (5 x 2) (10)
- 1.4 Change the UNDERLINED WORD(S) in each of the following statements to make them TRUE. Write only the answer next to the question number (1.4.1–1.4.5) in the ANSWER BOOK.
- 1.4.1 The method used to divide the market for agricultural products into smaller groups of buyers is called market consolidation.
- 1.4.2 All business activities involving the flow of goods and services from the point of production until they reach the consumer is known as supply.
- 1.4.3 Seasonal fluctuation is a problem relating to the marketing of agricultural produce as it is exposed to spoilage and rotting.
- 1.4.4 Valuation is when the value of an asset declines with time.
- 1.4.5 Atavism is the ability of parents to transmit genetic characteristics to their offspring. (5 x 1) (5)

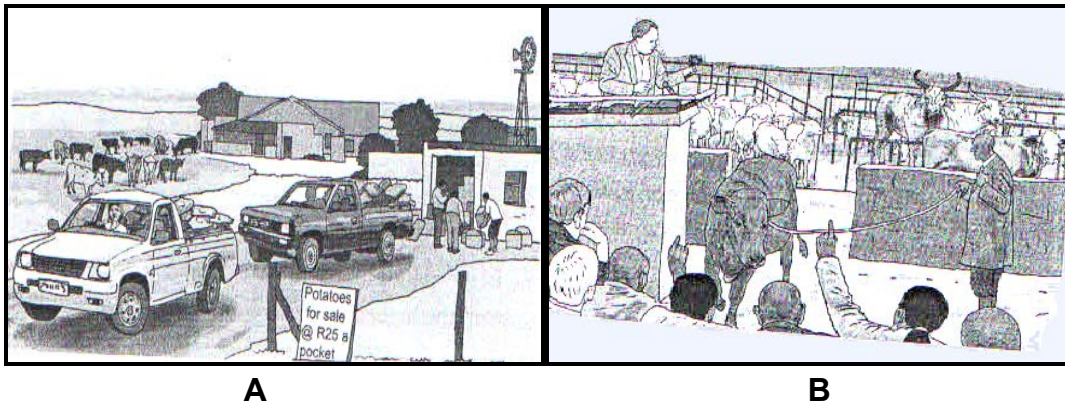
**TOTAL SECTION A: 45**

**SECTION B**

Start this question on a NEW page.

**QUESTION 2: AGRICULTURAL MANAGEMENT AND MARKETING**

2.1 The pictures below illustrate marketing outlets for agricultural produce.



- 2.1.1 Identify the marketing outlets in **A** and **B** above. (2)
- 2.1.2 Write down the letter (**A** or **B**) of the marketing outlet to which each of the following statements refer:
- (a) Products are sold at a lower price and buyers do not compete for a price (1)
  - (b) Small-scale farmers have easy access to it (1)
  - (c) Price can be higher than expected as buyers compete for the price (1)
  - (d) Marketing costs are reduced as no commission is paid (1)
- 2.1.3 Name the marketing system illustrated in picture **A** and picture **B**. Give ONE reason from pictures **A** and **B** to support your answer. (2)



2.2

A farmer realised that there were many unemployed youth in the surrounding communities as well as a good supply of peaches and an adequate infrastructure to support a processing plant. The farmer organised the youth and got a R300 000 grant to establish a jam-processing factory. When they started, they produced 100 bottles of jam daily and now they produce 1 500 bottles per day. They have secured contracts with local wholesalers.

- 2.2.1 Deduce TWO entrepreneurial skills displayed by the farmer. (2)
- 2.2.2 Justify the answer to QUESTION 2.2.1 by referring to the data in the scenario. (2)
- 2.2.3 State TWO possible advantages of securing contracts with local wholesalers. (2)
- 2.2.4 Indicate the source of each of the following as identified by the farmer in the scenario above:
- (a) Raw materials (1)
  - (b) Labour (1)
  - (c) Buildings (1)
- 2.2.5 Give the statement in the scenario that indicates that the enterprise was a success. (1)

2.3

The table below shows the supply and demand of apples at different prices.

| PRICE/2 kg (RAND) | SUPPLY PER WEEK | DEMAND PER WEEK |
|-------------------|-----------------|-----------------|
| 20                | 1 000           | 500             |
| 18                | 950             | 580             |
| 16                | 800             | 620             |
| 14                | 750             | 750             |
| 12                | 500             | 800             |
| 10                | 400             | 900             |
| 8                 | 300             | 1 000           |

- 2.3.1 Use the information in the table above and draw a line graph of both the supply and demand on the same pair of axes. (6)
- 2.3.2 Determine the equilibrium price for apples from the table above. (1)
- 2.3.3 Deduce what will happen to the availability and price of apples at the price of R18,00 if the demand doubles and the supply increases by 20% only. Show ALL calculations to support your conclusion. (5)

2.4 A group of sheep farmers in your area wanted to increase their profit and have a sustainable market. They identified the following possible markets for their produce:

- Small butcheries
- Large supermarket chains
- Local people who buy directly from the farm
- Auctions

- 2.4.1 Indicate the most sustainable market for mutton in the list above. (1)
- 2.4.2 Give TWO reasons to support your answer to QUESTION 2.4.1. (2)
- 2.4.3 Identify a market in the list above that has the highest security risk for a mutton producer. (1)
- 2.4.4 Justify your answer to QUESTION 2.4.3. (1)
- [35]**

**QUESTION 3: PRODUCTION FACTORS**

Start this question on a NEW page.

- 3.1 You are the manager on a sheep stud farm with 300 merino ewes and 15 rams. You are responsible for managing labour properly in order to increase productivity. The table below indicates tasks performed on the farm and the time in which each task is expected to be completed.

| TASKS PERFORMED                             | DURATION OF THE TASK              |
|---------------------------------------------|-----------------------------------|
| 1. Inspecting watering points               | Once per week                     |
| 2. Feeding of stud rams                     | Twice daily, 1 hour per feed      |
| 3. Dosing of sheep                          | On-going, as needed               |
| 4. Counting of sheep and keeping of records | Counting each camp once per month |
| 5. Shearing of sheep                        | Seven days per year               |
| 6. Upgrading of dams and watering troughs   | Ten days per year                 |

- 3.1.1 Identify TWO tasks in the table above that need to be performed by each of the following labourers:

(a) Permanent labourers (2)

(b) Temporary labourers (2)

- 3.1.2 Name ONE task in the table above that needs computer skills. (1)

- 3.1.3 Identify the most non-repetitive task to be performed by the labourers. (1)

- 3.2 When a farmer employs a new worker, a contract must be drawn up. The terms and conditions of the contract must comply with labour legislation. Some of the items to be included in the contract are:

- Working hours
- Compensation for injury whilst on duty
- Wages/Salaries
- Conditions for termination of service
- Affiliation to trade unions and right to strike
- Supply of protective clothing
- Contributions to the Unemployment Insurance Fund (UIF)

- 3.2.1 Choose ONE statement from the list above which is addressed by the following:

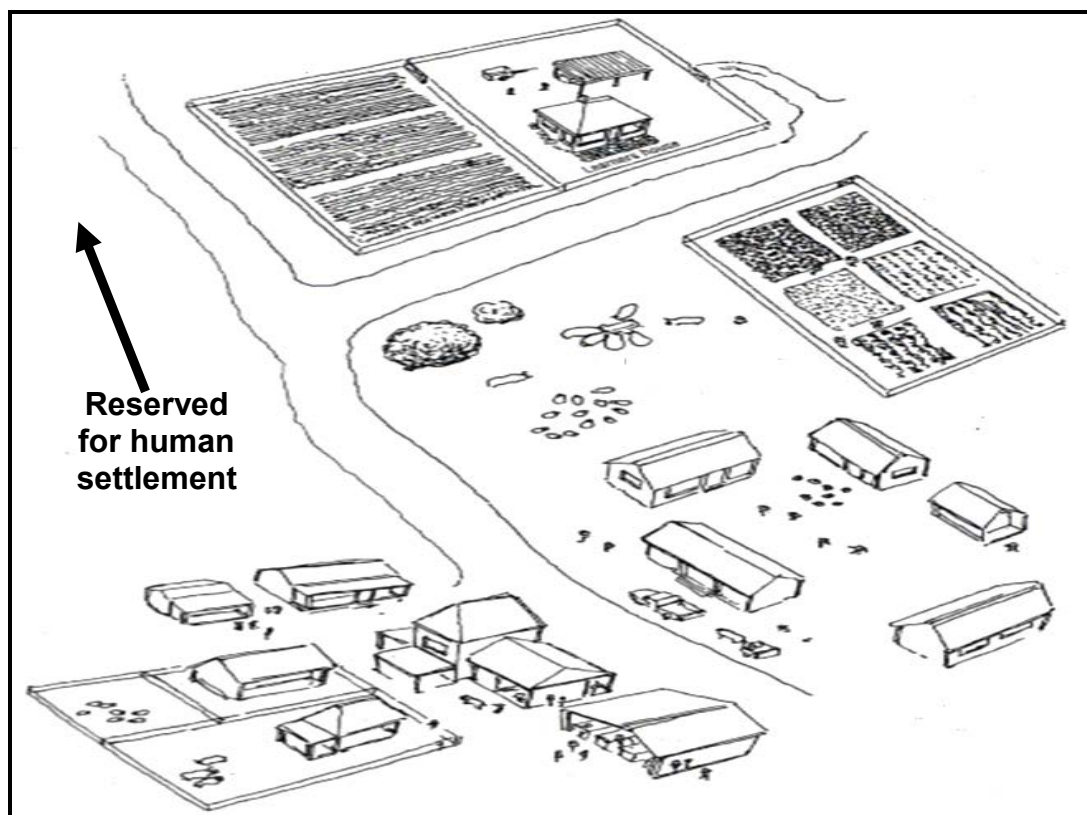
(a) Occupational Health and Safety Act, 1993 (Act 85 of 1993) (1)

(b) Basic Conditions of Employment Act, 1997 (Act 75 of 1997) (1)

(c) Labour Relations Act, 1995 (Act 66 of 1995) (1)

- 3.2.2 State TWO benefits of the Unemployment Insurance Fund for farm workers. (2)

- 3.3 An increase in the human population in recent times has led to the use of good agricultural soil for non-agricultural purposes as indicated in the diagram below.



- 3.3.1 Identify the economic characteristic of land indicated in the diagram above. Give a reason for your answer. (2)
- 3.3.2 Suggest TWO ways in which the economic characteristic above impacts on the productivity of the land. (2)
- 3.3.3 State TWO ways in which the productivity of land can be improved. (2)

- 3.4 A farmer obtained a loan of R2 million from a bank. This loan was used to build a dam and install an irrigation system for a 50 ha maize field. The farmer also purchased three bakkies, each worth R165 000, and 50 beef cattle using his inheritance from his parents.

- 3.4.1 Redraw the table below in the ANSWER BOOK. Use the passage above as reference and write down the answers to (a) to (f).

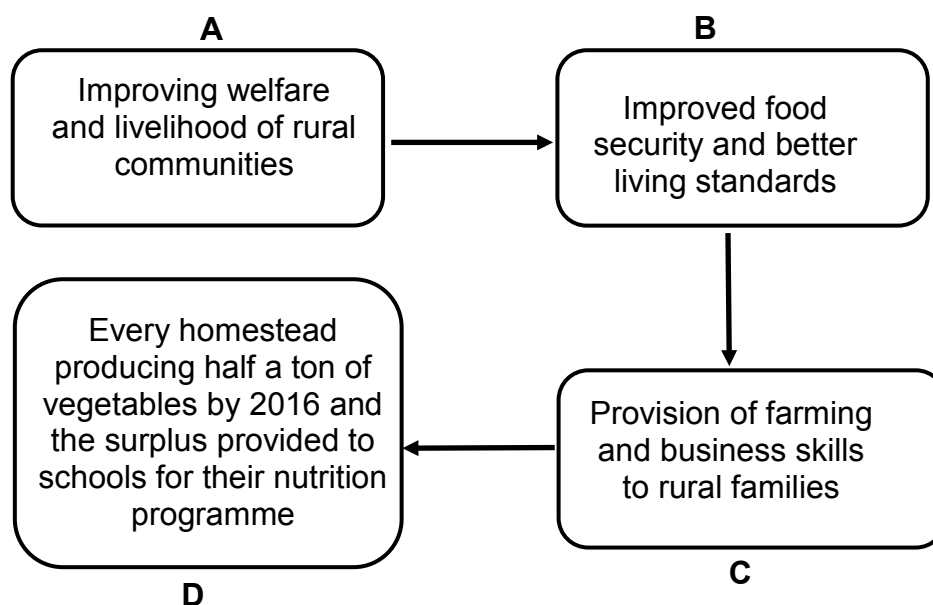
| TYPES OF CAPITAL | EXAMPLE | SOURCE OF CAPITAL |
|------------------|---------|-------------------|
| (a)              | (b)     | (c)               |
| (d)              | (e)     | (f)               |

(7)

3.4.2 At a later stage the farmer experienced problems with capital. Study each of the statements below and indicate what type of capital problem the farmer experienced as a result of his actions (in the passage):

- (a) Buying three bakkies instead of only one bakkie which could perform all the tasks required (1)
- (b) Getting a loan from a bank instead of using his inheritance (1)
- (c) Investing lots of money in production inputs which yielded no profits and even lead to losses as a result of natural disasters like droughts (1)

3.5 The schematic representation below shows the strategic management of a food security programme in a provincial department of agriculture. The steps in such a strategic management process involve the mission, objectives, goals and vision. These steps are not sequentially arranged.



- 3.5.1 Match statements **A**, **B**, **C** and **D** with the relevant strategic management steps. (4)
  - 3.5.2 State THREE benefits that this programme would have for the rural community. (3)
  - 3.5.3 Name ONE skill that will enable the farm manager to anticipate and deal with challenges. (1)
- [35]**

**QUESTION 4: BASIC AGRICULTURAL GENETICS**

Start this question on a NEW page.

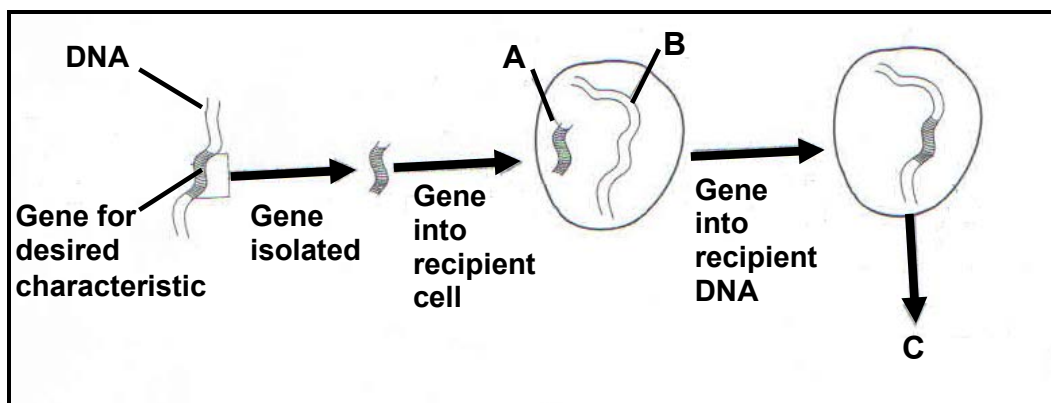
- 4.1 A homozygous red bull (r) is mated with a homozygous black cow (R).
- 4.1.1 Use the information above to show the genotype of the offspring that resulted from this crossing. (4)
- 4.1.2 Calculate the percentage of black offspring. (3)
- 4.1.3 Indicate the number of offspring with a homozygous gene pair. (1)
- 4.1.4 Suppose the probability of having a red calf was 0%. Indicate the genotype of the bull calf. (1)

- 4.2 A farmer can use heritability and estimated breeding value to predict the progress of a breeding programme. The higher the heritability of a characteristic, the greater the chances of improving performance through selection and breeding. The average slaughter weight of the flock is 47,5 kg. The parent weighs 52,5 kg. The table below shows the heritability characteristics of sheep.

| HERITABILITY<br>OF CHARAC-<br>TERISTICS | BIRTH<br>WEIGHT | POST-<br>WEANING<br>GAIN | MEAT<br>TENDERNESS | SLAUGHTER<br>WEIGHT |
|-----------------------------------------|-----------------|--------------------------|--------------------|---------------------|
| Heritability %                          | 49              | 50                       | 60                 | 85                  |

- 4.2.1 Use the heritability value to calculate the slaughter weight (genetic gain). Show ALL calculations, including the formula. (4)
- 4.2.2 Explain the implication of the value in QUESTION 4.2.1. (2)

4.3 The illustration below indicates the process involved in plant improvement.



4.3.1 Identify the process illustrated above. (1)

4.3.2 State the TWO main potential risks of the process identified in QUESTION 4.3.1. (2)

4.3.3 Name organism **C**. (1)

4.3.4 Organism **C** shows certain characteristics that are useful in crop production. State THREE of these characteristics. (3)

4.4 Variation is a phenomenon that refers to differences in the characteristics of individuals and causes individual offspring to be slightly different from their parents. This phenomenon is a natural occurrence and is very important for farmers as it forms the foundation of selection and breeding programmes.

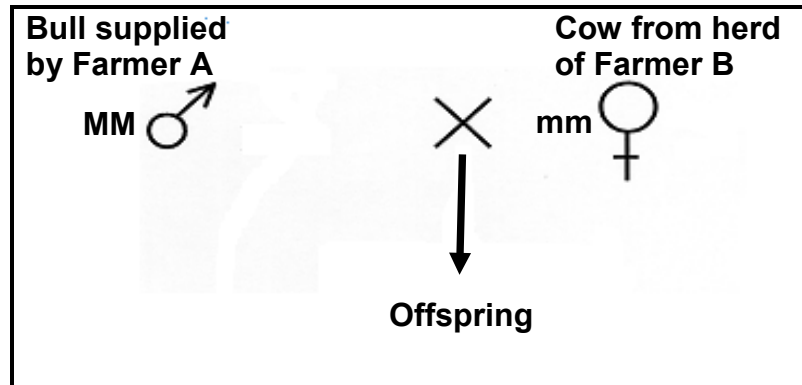
4.4.1 Explain the importance of variation in a breeding programme. (2)

4.4.2 Name TWO genetic processes that cause variation. (2)

4.4.3 Distinguish between *continuous variation* and *discontinuous variation*. (2)

4.4.4 Define the concept of *selection* as used in breeding. (2)

- 4.5 The illustration below shows an animal breeding method with cattle from two farmers (**A** and **B**). Farmer **A** has a commercial Hereford herd while Farmer **B** is a Sussex stud breeder.



- 4.5.1 Identify the breeding method depicted above. (1)
- 4.5.2 State THREE benefits that this breeding method will have for Farmer **B**. (3)
- 4.5.3 Deduce a possible advantage that this breeding process can have for Farmer **A**. (1)
- [35]**

**TOTAL SECTION B: 105**  
**GRAND TOTAL: 150**