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TOTAL MARKS

NATIONAL SENIOR CERTIFICATE EXAMINATION
MAY 2025

# AGRICULTURAL SCIENCES

**EXAMINATION NUMBER**

Time: 3 hours 300 marks

## PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. This question paper consists of 32 pages. Please check that your question paper is complete.
2. Read the questions carefully.
3. **Answer ALL the questions on the question paper and hand it in at the end of the examination. Remember to write your examination number in the space provided on the question paper.**
4. This question paper consists of **THREE** sections, namely **SECTION A**, **B** and **C** that, together, have six questions.
5. ALL SIX questions must be answered in the spaces provided on the question paper.
6. Use the marks awarded for each question as an indication of the detail required in the answer.
7. Non-programmable calculators may be used.
8. Show all your calculations, including formulae and units, where applicable.
9. It is in your own interest to write legibly and to present your work neatly.
10. Two blank pages (pages 31 and 32) are included at the end of the paper. If you run out of space for a question, use these pages. Clearly indicate the number of your answer should you use this extra space.

**FOR MARKERS' USE ONLY**

| **Question** | 1 | 2 | 3 | 4 | 5 | 6 | **Total** |
|---|---|---|---|---|---|---|---|
| **Marks** | 80 | 50 | 50 | 50 | 50 | 20 | **300** |
| **Obtained** | | | | | | | |

*N12AGSC–1–E*

## SECTION A

## QUESTION 1

1.1 Select the term in COLUMN B that best matches a description in COLUMN A. Write down only the letter of your choice in the space provided at the bottom of the page. Each term in COLUMN B may be used only ONCE.

| | COLUMN A |
|---|---|
| 1.1.1 | Value of assets increasing over time. |
| 1.1.2 | A carrier of a disease-causing agent. |
| 1.1.3 | The process by which a cow gives birth to a calf. |
| 1.1.4 | The South African Binomial soil classification is based on these. |
| 1.1.5 | Entering into future contracts to ensure a secure market and price. |
| 1.1.6 | The genetic characteristics that give rise to a range of phenotypes from one extreme to the other. |
| 1.1.7 | Female reproductive organ of a flower. |
| 1.1.8 | The failure of a farm animal to show any signs of oestrus leading to infertility in cows. |
| 1.1.9 | A muscular tissue tube for excretion of urine and semen. |
| 1.1.10 | The genotypic ratio when a heterozygous Brahman bull is mated with a heterozygous cow. |

**COLUMN B**

A. Gynoecium
B. Depreciation
C. 1:2:1
D. Soil pH and soil texture
E. Qualitative
F. Anoestrus
G. Androecium
H. Pathogen
I. Vas deferens
J. Quantitative
K. Appreciation
L. Parturition
M. 1:3
N. Gestation
O. Soil forms and soil families
P. Met-oestrus
Q. Urethra
R. Hedging

| 1.1.1 | 1.1.2 | 1.1.3 | 1.1.4 | 1.1.5 | 1.1.6 | 1.1.7 | 1.1.8 | 1.1.9 | 1.1.10 |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |

(20)

1.2 Give the correct term for each of the following descriptions. Write only the term in the space provided below.

1.2.1 The picking of individual cultivars based on the records of their respective offspring.

_____

(2)

1.2.2 The activity that involves the combination and coordination of human, physical and financial resources.

_____

(2)

1.2.3 The passing on of traits from generation to generation.

_____

(2)

1.2.4 Measuring genetic characteristics by using computer technology.

_____

(2)

1.2.5 The production of seedless fruit without fertilisation of ovules.

_____

(2)

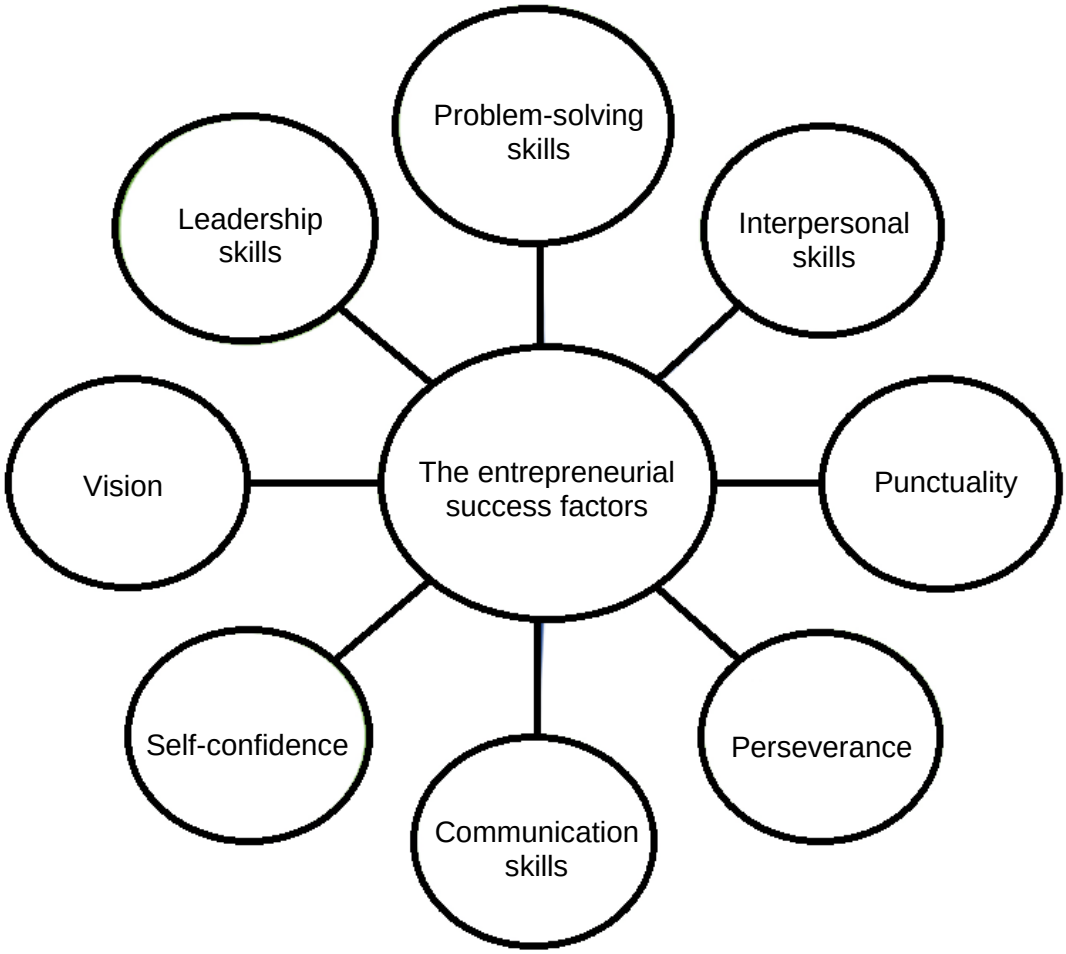
1.2.6 An individual that has different alleles for a particular gene on each homologous chromosome.

_____

(2)

1.3 The schematic representation below shows different entrepreneurial success factors.




Identify the most relevant entrepreneurial success factor from the schematic representation above that relates best to each of the following statements below.

1.3.1 Ability to inspire the team members towards a common goal through working together.

_____

(2)

1.3.2 Having a clear mental image of something that one would like for the future of a business.

_____

(2)

1.3.3 The characteristic of completing required task and fulfil obligations before or on designated time.

_____

(2)

1.3.4 The ability to continue pursuing a goal or task despite obstacles, setbacks, and failures.

_____

(2)

1.3.5 Being able to share information between workers within the workplace and customers outside the business.

_____

(2)

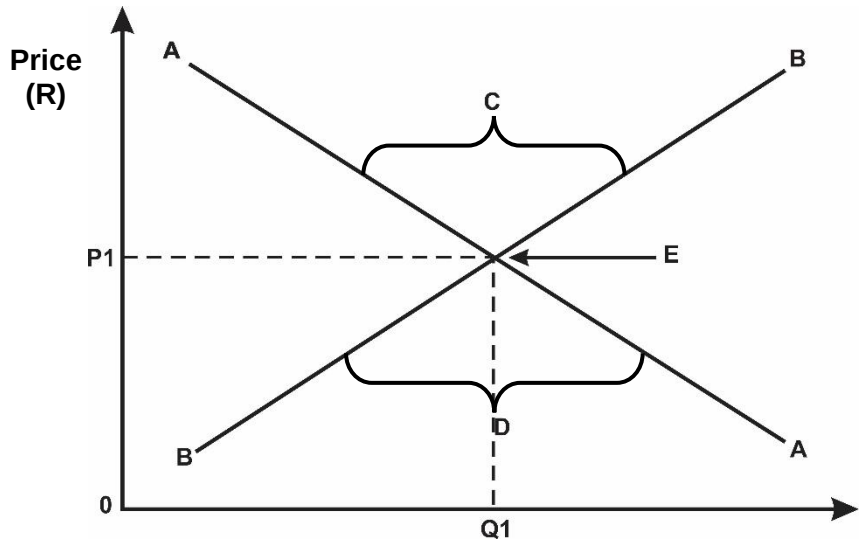
1.3.6 Accepting and trusting yourself and have a sense of control in your life and a positive view of yourself.

_____

(2)

1.4 The curves below illustrate the correlation between the quantity of oranges that producers and consumers are willing to exchange at different prices.

**Demand and supply curves for oranges at different prices**




Give the correct economic term for each of the following based on the graph above.

1.4.1 Line AEA _____ (2)

1.4.2 Point E _____ (2)

1.4.3 Area C _____ (2)

1.4.4 Line BEB _____ (2)

1.4.5 Area D _____ (2)

1.4.6 Point P1 _____ (2)

1.5 Change the UNDERLINED WORD(S) in each of the following statements to make the statements TRUE. Write only the correct word(s) on the line provided.

1.5.1 Artificial selection is where only individuals that are best suited to the environment survive.

_____

(2)

1.5.2 Mutation involves the act of artificially changing of the genes of an organism to develop a new and better one.

_____

(2)

1.5.3 The process of classifying soil types and other soil properties in a given area and geo-encoding such information is known as soil sodicity.

_____

(2)

1.5.4 Biometrics is the degree to which a characteristic is determined mostly by genes.

_____

(2)

1.5.5 Subsistence farming involves application of the exact and correct amount of inputs at the correct time to the crop to maximise yields.

_____

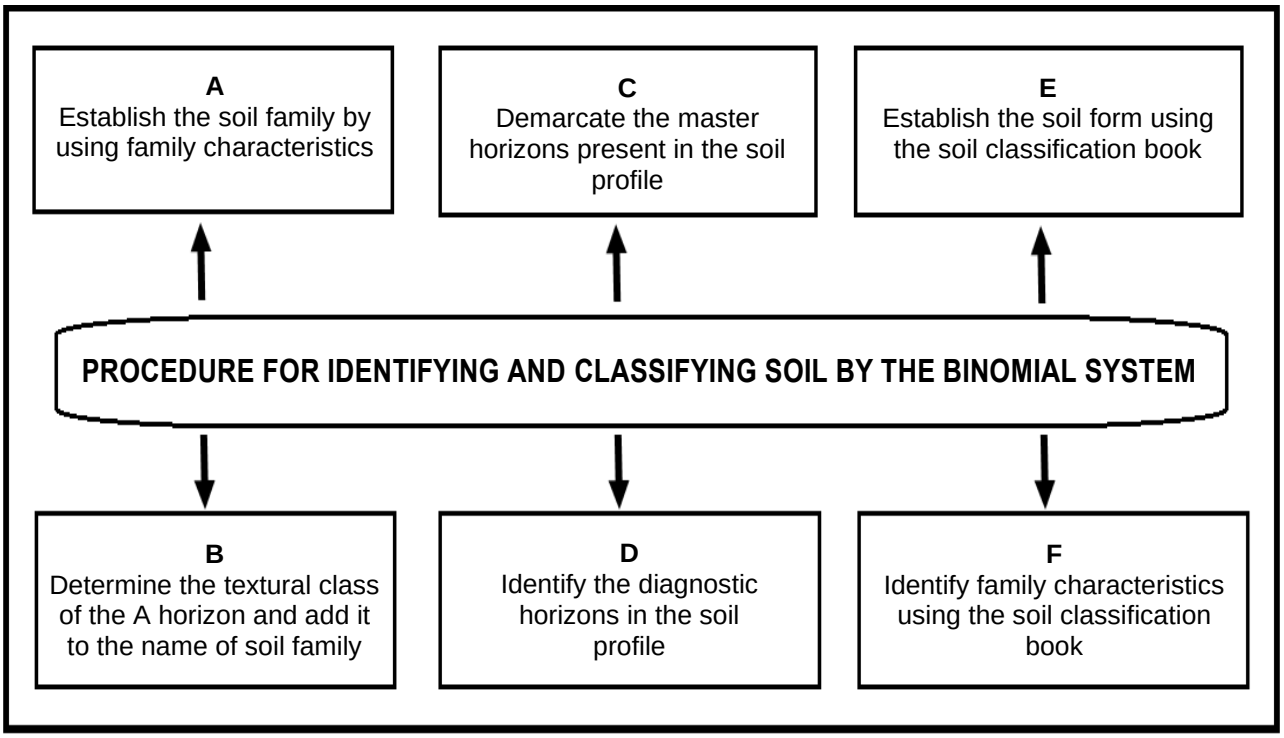
(2)

1.5.6 The law of dominance states that an organism possesses two alleles which separate so that each gamete receives only one allele.

_____

(2)

1.6 Rearrange the descriptions of steps in the procedure below according to its correct sequence. DO NOT write the whole description use letters **(A–F)** ONLY. Write the correctly rearranged letters next to the numbers (1.6.1 to 1.6.6).




1.6.1 _____ (2)

1.6.2 _____ (2)

1.6.3 _____ (2)

1.6.4 _____ (2)

1.6.5 _____ (2)

1.6.6 _____ (2)

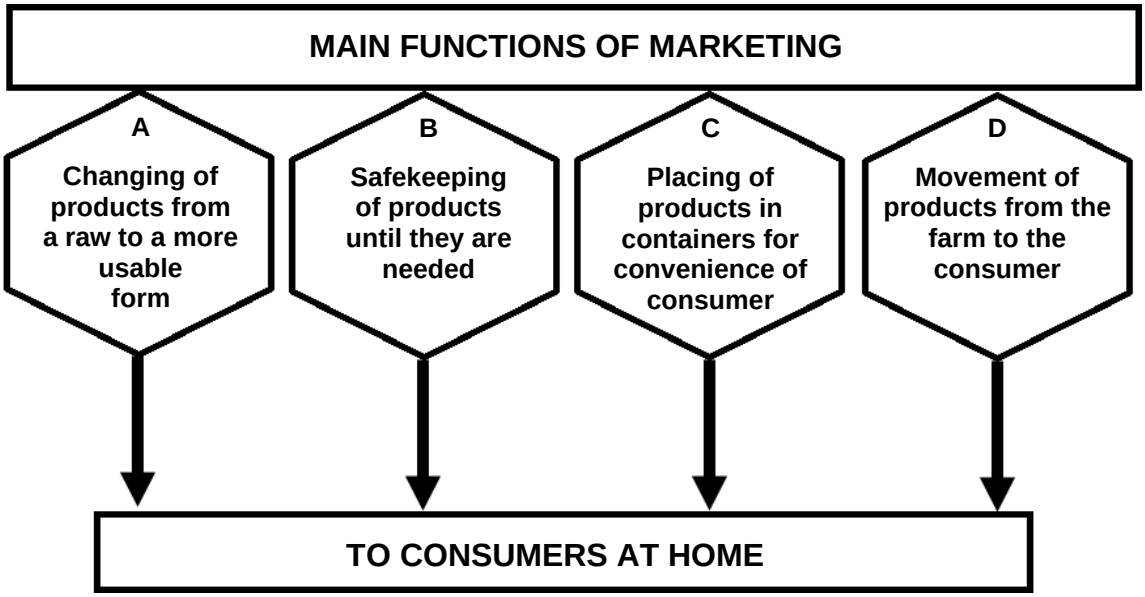
**80 marks**

## SECTION B

## QUESTION 2

2.1 The schematic representation below shows marketing in agriculture.




2.1.1 Identify functions of agricultural marketing represented by **A**, **B**, **C** and **D**.

**A** _____ (1)

**B** _____ (1)

**C** _____ (1)

**D** _____ (1)

2.1.2 Indicate TWO guidelines that farmers should consider when performing marketing function **C**.

_____

_____

(2)

2.1.3 Name TWO advantages of marketing function **A** to the consumer.

_____

_____

_____

_____

(2)

2.2 The table below shows different approaches to marketing of agricultural products.

| | |
|---|---|
| **Sustainable marketing** | **Multi-segmented marketing** |
| **Niche marketing** | **Mass marketing** |

Match the marketing approaches indicated in the table above to each of the following statements (2.2.1–2.2.4) below:

2.2.1 A marketing strategy that focuses on the environmental and social impact of products or services produced by the farming business.

_____

(2)

2.2.2 A marketing strategy of dividing a target market into various sections in order to closely target each section with a different message or product.

_____

(2)

2.2.3 A marketing strategy that focuses on a small group of consumers that have the same interests with a particular product or service.

_____

(2)

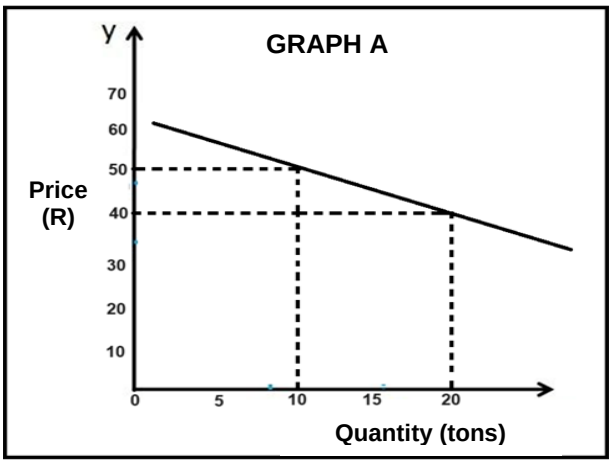
2.2.4 A marketing strategy in which a farming business decides to ignore market group differences and appeal to the whole market with one offer.

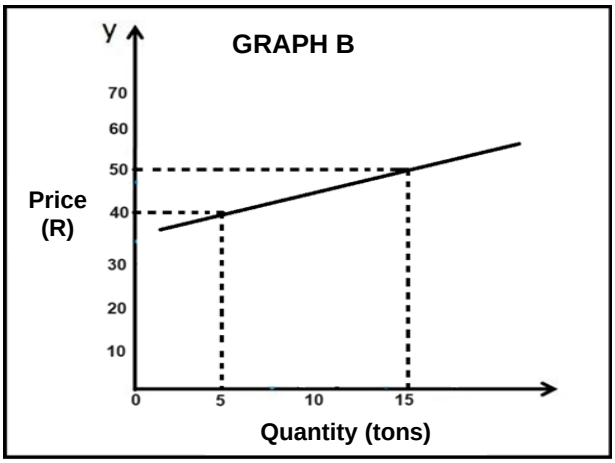
_____

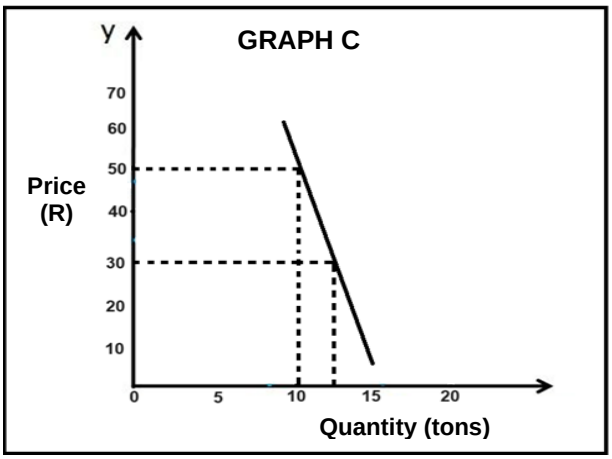
(2)

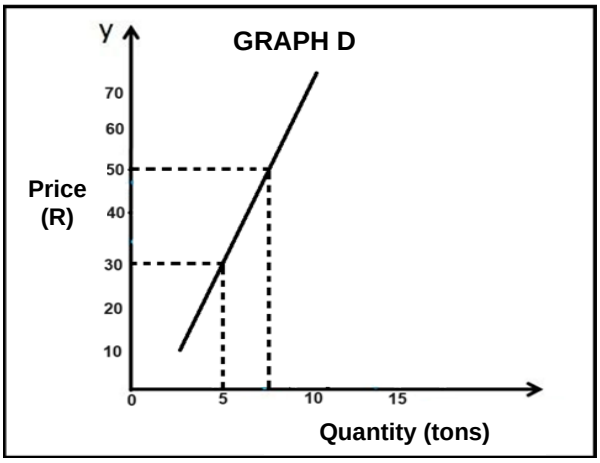
 

2.3 The graphs below show the response of quantity to a unit price change.




2.3.1 Deduce from the graphs **(A–D)** above a graph representing each of the following:

(a) Price elastic supply _____ (2)

(b) Price inelastic demand _____ (2)

(c) Price elastic demand _____ (2)

(d) Price inelastic supply _____ (2)

2.3.2 Name TWO factors affecting supply of agricultural products.

_____

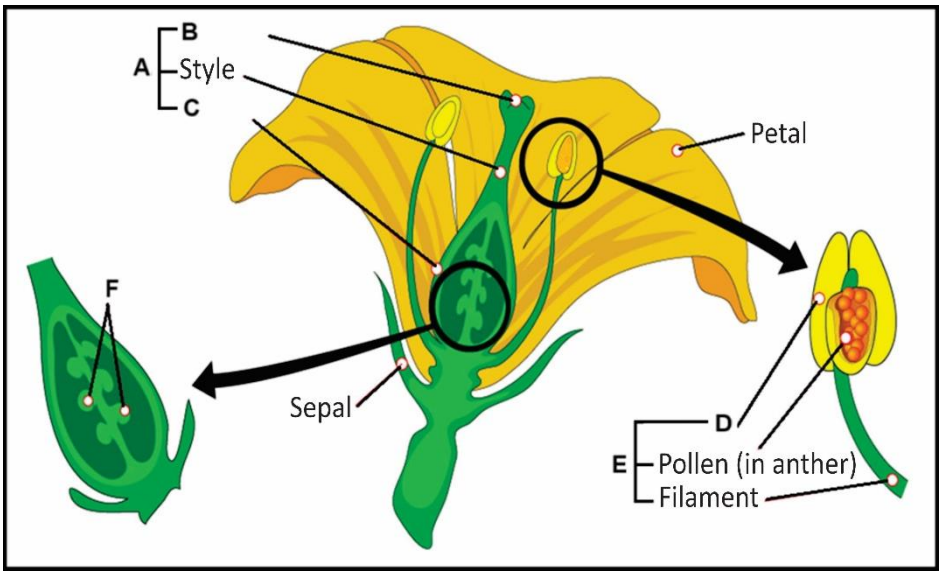
_____

_____

_____

(2)

2.4 The picture below shows parts of a flower.




2.4.1 Label parts **A** to **F**.

**A** _____ (1)

**B** _____ (1)

**C** _____ (1)

**D** _____ (1)

**E** _____ (1)

**F** _____ (1)

2.4.2 Give ONE function for each of the following:

(a) **C** _____

_____

(2)

(b) **D** _____

_____

(2)

(c) **F** _____

_____

(2)

2.4.3 Identify a letter **(A–F)** from the picture above that represents each of the following:

(a) Female part of a flower _____ (1)

(b) Male part of a flower _____ (1)

2.5 Production factors are resources required for the generation of goods and services. The table below shows characteristics, examples and rewards for each production factor.

| PRODUCTION FACTORS | CHARACTERISTICS | EXAMPLES | REWARDS |
|---|---|---|---|
| Management | Coordinating all other factors | Manager | **A** |
| **B** | Production, working and fixed | Machinery | Interest |
| **C** | Soil and extracted resources | Farm and crops | Rent |
| **D** | Physical and mental input | Workforce | **E** |

2.5.1 Name the production factor rewards labelled **A** and **E** from the table above.

**A** _____ (1)

**E** _____ (1)

2.5.2 Identify the production factors labelled **B**, **C** and **D** from the table above.

**B** _____ (1)

**C** _____ (1)

**D** _____ (1)

2.5.3 Indicate ONE way to increase productivity of land.

_____

_____

(1)

2.5.4 Differentiate between enterprise budget and whole-farm budget.

**Enterprise budget** _____

_____

(2)

**Whole-farm budget** _____

_____

(2)

**[50]**

## QUESTION 3

3.1 The table below shows diseases, pathogens causing the disease and symptoms of the disease. Complete the table by providing labels for letters **A** to **J**.

| DISEASE | PATHOGEN | MAJOR SYMPTOM OF THE DISEASE |
|---|---|---|
| **A** | **B** | Hair loss, red thick itchy lesions on the skin and crusty grey-white scabs. |
| **C** | **D** | High fever, swelling on the body, bloody discharge from mouth, nose and rectum. |
| **E** | **F** | Dark red or brown urine, anaemia, acute abdominal pain and high rate of abortion. |
| **G** | **H** | Transmitted by mosquitos, blood-stained nasal discharge, hepatitis, anorexia and diarrhoea. |
| **I** | **J** | Sores on the skin, secrete pus, scab, hard lumps on the skin and wool. |

**A** _____ (1)

**B** _____ (1)

**C** _____ (1)

**D** _____ (1)

**E** _____ (1)

**F** _____ (1)

**G** _____ (1)

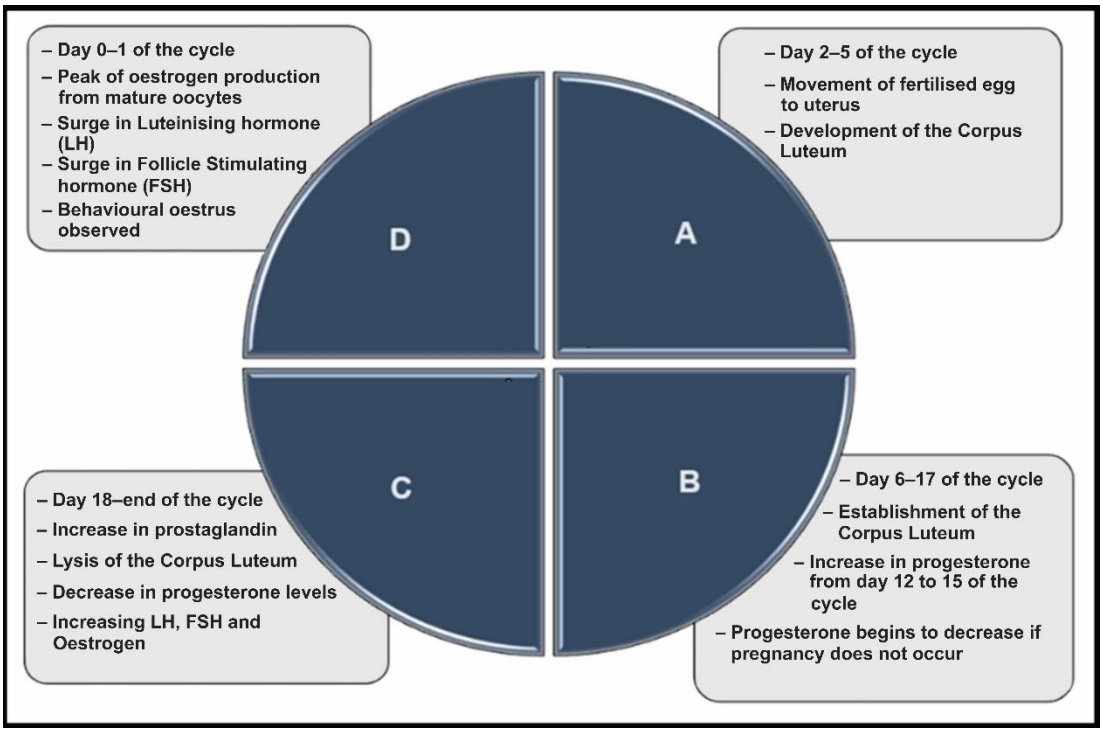
**H** _____ (1)

**I** _____ (1)

**J** _____ (1)

3.2 The diagram below shows a reproductive cycle of female farm animals.




3.2.1 Give the name of the reproductive cycle represented by the diagram above.

_____ (2)

3.2.2 Identify the stages of the reproductive cycle labelled **A**, **B**, **C** and **D**.

**A** _____ (1)

**B** _____ (1)

**C** _____ (1)

**D** _____ (1)

3.2.3 Name THREE noticeable characteristics of a cow that is in the reproductive cycle above.

_____

_____

_____

(3)

3.2.4 Indicate TWO practical methods dairy farmers can adopt to assist in identifying cows that are on the reproductive cycle above.

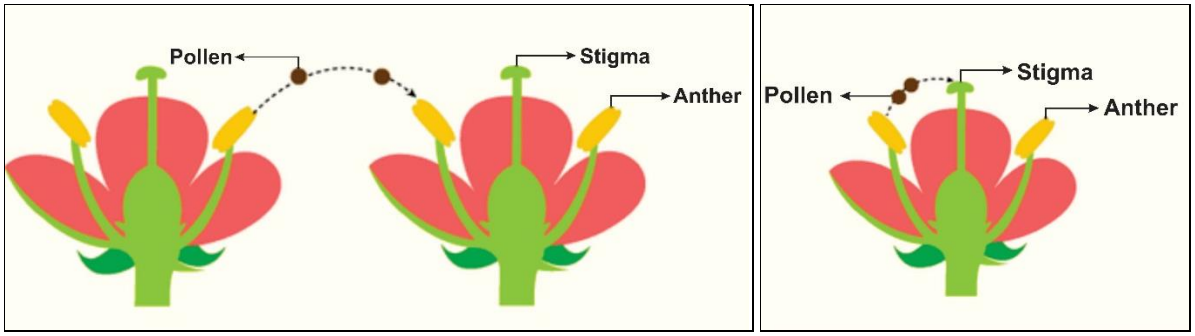
_____

_____

_____

(2)

3.3 **DIAGRAM A** **DIAGRAM B**




3.3.1 Deduce the phenomenon shown by the diagrams above.

_____

(2)

3.3.2 The phenomenon named in Question 3.3.1 can be grouped into two types. Name the type represented by:

(a) **DIAGRAM A**

_____

(2)

(b) **DIAGRAM B**

_____

(2)

3.3.3 Give THREE agents promoting the phenomenon in Question 3.3.1 above.

_____

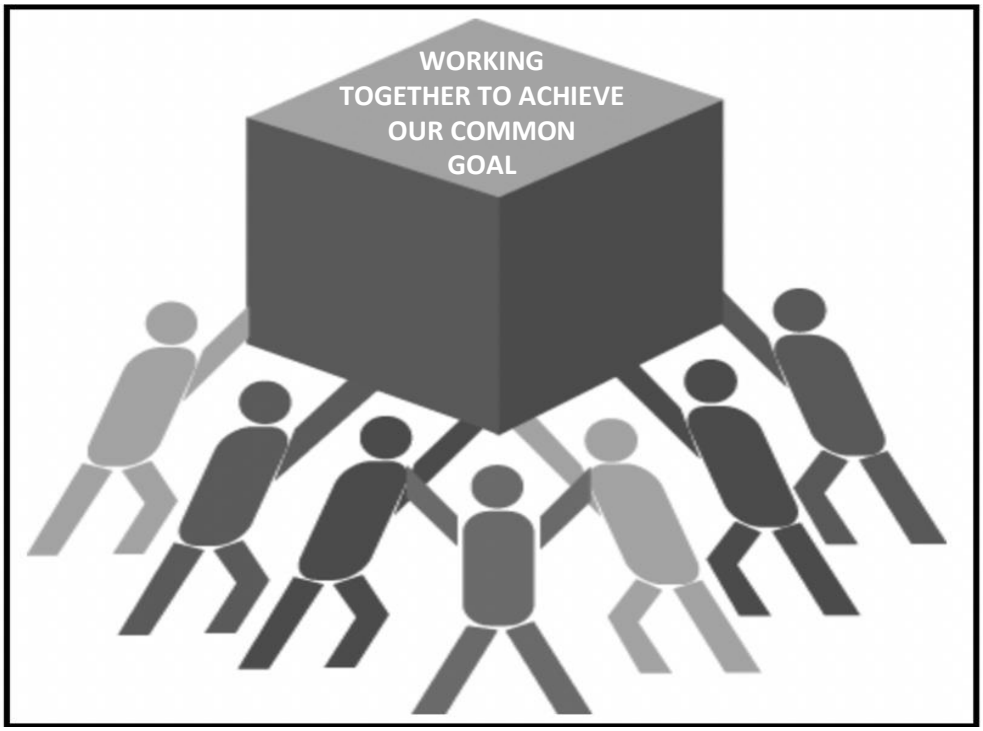
_____

_____

(3)

3.4 The picture below represents a marketing system where farmers voluntarily work together to market their produce.




3.4.1 Identify the marketing system represented in the picture above.

_____

(2)

3.4.2 Give TWO types of the marketing system represented in Question 3.4.1.

_____

_____

(2)

3.4.3 Indicate THREE principles of marketing system represented in the picture above.

_____

_____

_____

_____

_____

_____

_____

(6)

3.4.4 Provide TWO other marketing systems that farmers can use except the one in Question 3.4.1.

(2)

3.5 The milk production of a dairy cow is controlled by three pairs of genes. The genotype **ppqqrr** gives a milk yield of 150 litres. Each additive dominant gene adds 25 litres of milk per lactation period.

3.5.1 Indicate the type of inheritance that controls the milk yield of a dairy cow above.

(2)

3.5.2 Justify with a reason the answer in Question 3.5.1 by referring to the scenario.

(2)

3.5.3 Calculate the milk yield of the dairy cow with the **PpQqrR** genotype.

(2)

3.5.4 Give the genotype of a dairy cow that will produce 200 litres of milk.

(2)
**[50]**

## QUESTION 4

4.1 The table below shows dry matter yield of three crop cultivars over three successive years.

| YEAR | CULTIVAR A YIELD (kg/ha) | CULTIVAR B YIELD (kg/ha) | CULTIVAR C YIELD (kg/ha) |
|---|---|---|---|
| 2000 | 800 | 900 | 600 |
| 2001 | 900 | 1100 | 800 |
| 2002 | 600 | 800 | 600 |

The table below shows different scenarios for farmer A and farmer B.

| FARMER A | FARMER B |
|---|---|
| • The farmer produced **CULTIVAR C** in 2001 on 65 hectares of land. | • The farmer produced **CULTIVAR A** in 2001 on 56 hectares of land. |

4.1.1 Identify a cultivar with the highest yield per hectare compared to others over the period of three years.

_____

(2)

4.1.2 Draw a combined bar graph using the information from the table above.

(10)

4.1.3 Calculate the total production in 2001 expressed in tons for:

(a) **CULTIVAR C** of **FARMER A**

(3)

(b) **CULTIVAR A** of **FARMER B**

(3)

4.1.4 Determine the difference in yield between **FARMER A** and **FARMER B** cultivars expressed in tons.

(3)

4.2

A purebred plant with green leaves (G) is crossed with another purebred plant with yellow leaves (g).

4.2.1 Use a Punnet square to illustrate the possible $F_1$ generation when these two plants are cross-pollinated show the crossing of the two plants up to the $F_1$ generation.

(4)

4.2.2 Determine the genotype ratio of the $F_2$ generation.

(3)

4.2.3 Identify the genetic characteristic that is dominant in the crossing.

(2)

4.2.4 Calculate the percentage of $F_1$ generation that will have yellow leaves.

(2)

4.2.5 The plant with green leaves in $F_1$ generation is self-pollinated and 28 new plants are produced from it. Indicate the number of possible yellow leaves.

(3)

4.3 Identify the breeding method shown in each of the pictures below.

**PICTURE A** **PICTURE B**


4.3.1 (a) **PICTURE A**

_____

(2)

(b) **PICTURE B**

_____

(2)

4.3.2 Justify with a reason the answer given in Question 4.3.1 for:

(a) **PICTURE A** _____

_____

(2)

(b) **PICTURE B** _____

_____

(2)

4.3.3 Give ONE advantage for the breeding method shown in each of the following pictures above.

(a) **PICTURE A** _____

_____

(2)

(b) **PICTURE B** _____

_____

(2)

4.4 Variation is a phenomenon that refers to differences in the characteristics of individuals.

4.4.1 Give the importance of variation in a breeding programme.

_____

(1)

4.4.2 Name TWO genetic causes of variation.

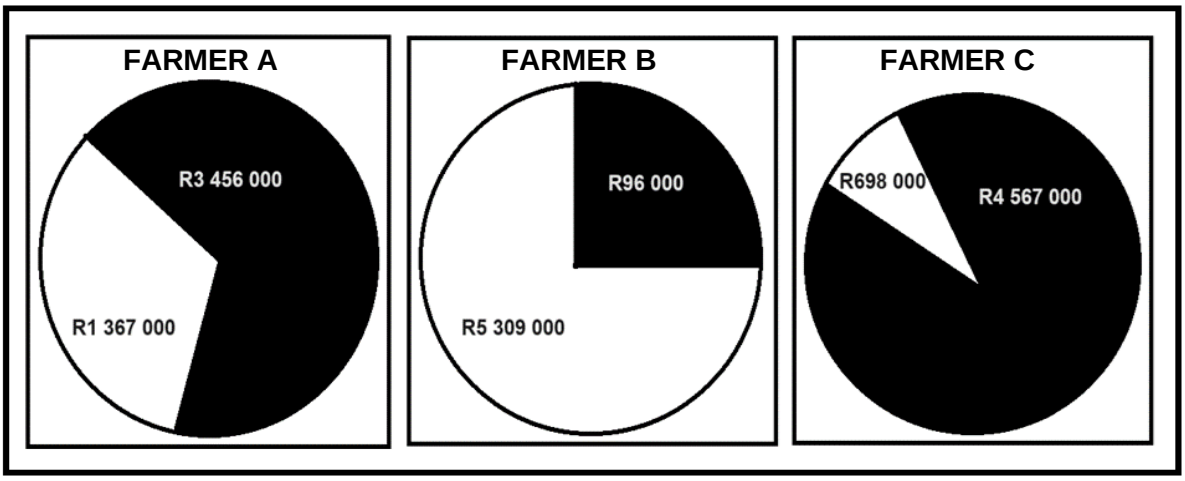
_____

_____

(2)
**[50]**

## QUESTION 5

5.1 The pie charts below show income and expenditure for different farmers.




**Key:**

● = Income

◯ = Expenditure

5.1.1 Identify a pie chart that represents a farmer with the highest profit.

_____

(2)

5.1.2 Calculate the profit or loss for **FARMER B**.

(4)

5.1.3 Comment on the viability of business for **FARMER B** and justify with a reason.

_____

_____

(2)

5.2

With recent developments, a maize cultivar was genetically modified by inserting the bacterium Bacillus thuringiensis (Bt) into the plasma of the plant to make it more resistant against pests.

5.2.1 Identify the technique used in the passage above to modify the maize cultivar genetically.

(2)

5.2.2 State TWO potential benefits of genetically modified crops to the environment.

(2)

5.2.3 Name TWO potential risks of genetically modified crops.

(2)

5.3 Read the following scenario and then answer questions that follow.

Soil surveys are the methodical examination, classification and description of soil by the physical examination of a soil profile. Different factors are taken into consideration when doing soil survey. These include the physical, chemical and biological soil factor.

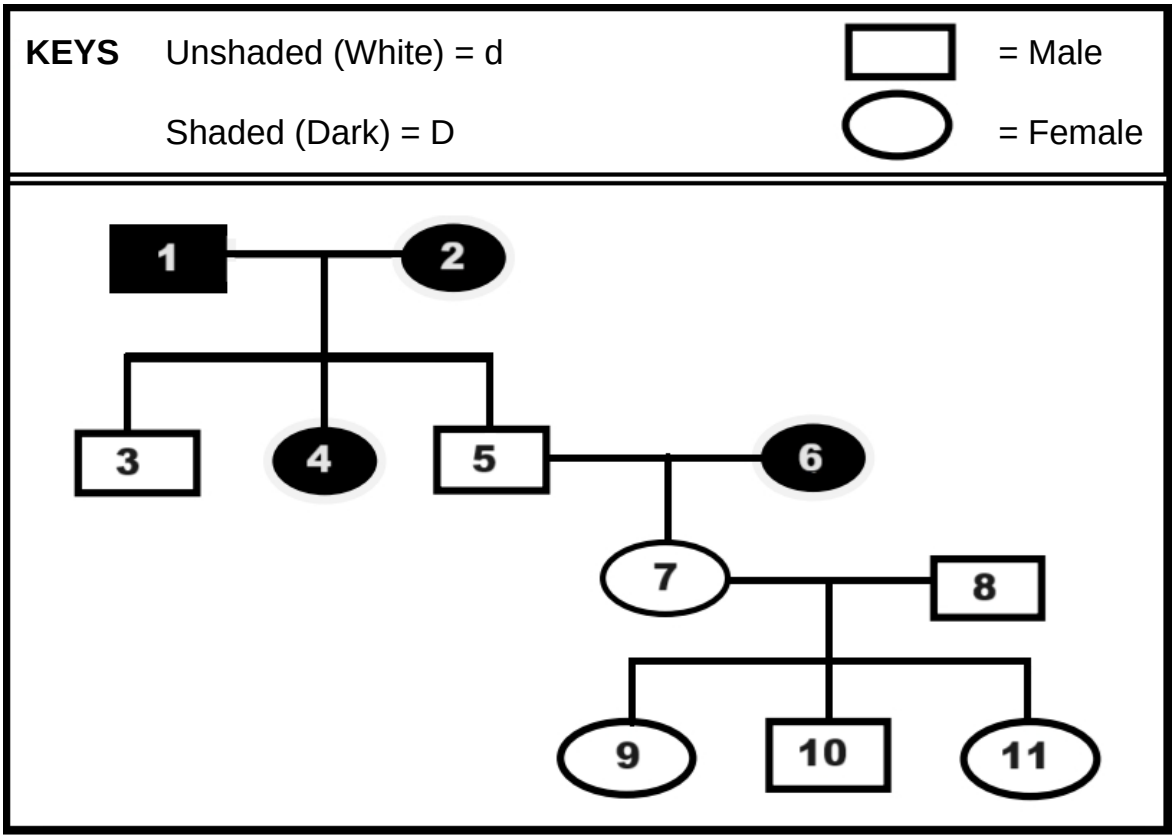
5.3.1 Give TWO aims of soil surveys in the agriculture industry.

(2)

5.3.2 Indicate TWO reasons for classifying soils in agriculture.

(2)

5.4 The pedigree diagram below shows the inheritance of coat colour in goats. It shows how coat colour can be traced back over several generations.




5.4.1 State the number of generations obtained from parents **1** and **2** in the pedigree diagram above.

_____ (2)

5.4.2 Indicate the number of white male individuals in the pedigree diagram above.

_____ (2)

5.4.3 Determine the genotypes of EACH of the following individuals:

(a) 1 _____ (2)

(b) 5 _____ (2)

5.4.4 Refer to the pedigree diagram above and indicate whether the following individuals are homozygous or heterozygous:

(a) 6 _____ (2)

(b) 10 _____ (2)

5.4.5 Give a reason for the answer to Question 5.4.4 (b).

_____

_____

_____

(2)

5.5 The pictures below show three different fruit types.

| A | B | C |
|---|---|---|
|  |  |  |

5.5.1 Classify each of the fruits (**A**, **B**, and **C**) above as follows:

(a) Simple _____ (1)

(b) Compound _____ (1)

(c) Accessory _____ (1)

5.5.2 Briefly explain the reason behind your classification of fruit **B** in Question 5.5.1.

_____

_____

_____

_____

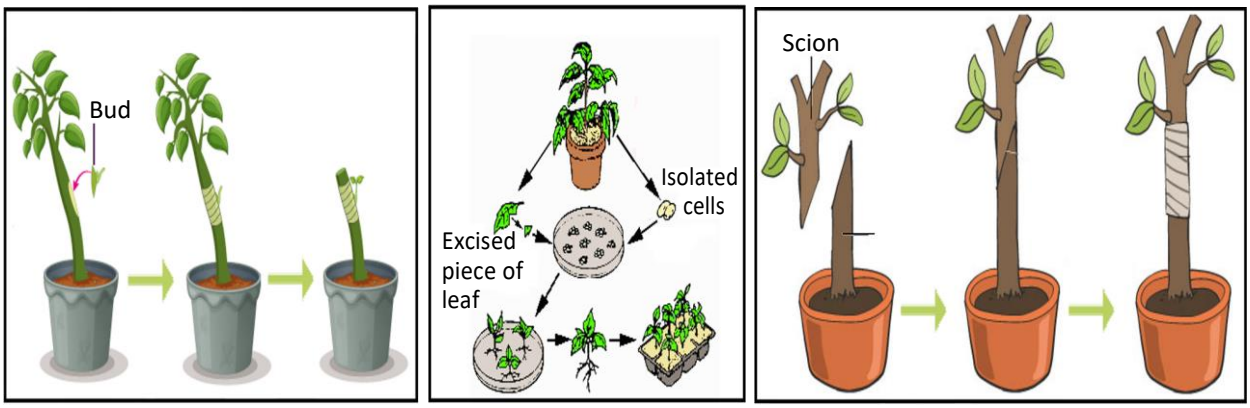
(2)

5.5.3 Name the part of a flower from which the fruit structure below develops:

(a) Seeds _____ (1)

(b) Fruit _____ (1)

5.6 Different plant parts may be used for vegetative reproduction. Some plant parts are shown in the illustration below. Carefully examine the information provided in the pictures below and answer the questions that follow.




**PICTURE A** **PICTURE B** **PICTURE C**

5.6.1 Identify the type of asexual reproduction technique in Pictures **B** and **C**.

**B** _____

**C** _____

(2)

5.6.2 Explain THREE steps that are taken to perform the method of artificial reproduction shown in **PICTURE A**.

_____

_____

_____

_____

_____

_____

_____

_____

_____

(3)

5.6.3 Suggest TWO challenges of using asexual reproduction.

(2)

5.6.4 Differentiate between epigeal and hypogeal germination.

Epigeal germination

Hypogeal germination

(4)
**[50]**

**200 marks**

## QUESTION 6

Discuss how soil degradation can be a threat to agricultural productivity.

Your discussions should have sub-headings as follows:

- Introduction
- Definition of terms
- Body
- Conclusion

**20 marks**

**Total: 300 marks**

**ADDITIONAL SPACE (ALL QUESTIONS)**

**REMEMBER TO CLEARLY INDICATE AT THE QUESTION THAT YOU USED THE ADDITIONAL SPACE TO ENSURE THAT ALL THE ANSWERS ARE MARKED.**