



Please paste the barcoded label here

TOTAL MARKS

NATIONAL SENIOR CERTIFICATE EXAMINATION NOVEMBER 2024

AGRICULTURAL SCIENCES

EXAMINATION NUMBER [grid]

Time: 3 hours

300 marks

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

- 1. This question paper consists of 37 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.
4. This question paper consists of THREE sections, namely SECTION A, B and C.
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.
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 36 and 37) 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

Table with 8 columns: Question, 1, 2, 3, 4, 5, 6, Total. Rows: Marks, Obtained.

SECTION A

QUESTION 1

1.1 Various options are provided as possible answers to the following questions. Choose the answer and make a cross (X) in the block next to the correct answer. NO marks will be awarded if more than one cross (X) appears for the answer.

1.1.1 ... is the female reproductive structure of a flower essential for sexual reproduction.

- A Gynoecium
 - B Stamen
 - C Androecium
 - D Filament
- (2)

1.1.2 The South African binomial soil classification is based on ...

- A soil forms and soil pH.
 - B soil families and soil texture.
 - C soil forms and soil families.
 - D soil pH and soil texture.
- (2)

1.1.3 Notifiable diseases are diseases that ...

- A can be transmitted from animals to humans and vice versa.
 - B are non-infectious.
 - C are caused by nutritional deficiencies.
 - D if they occur, it is required by law that the farmer should alert government authorities.
- (2)

1.1.4 The process where pollen grains from the anther are transferred to the stigma of a flower.

- A Fertilisation
 - B Pollination
 - C Germination
 - D Double fertilisation
- (2)

1.1.5 ONE of the following processes is NOT a stage for mating.

- A Courtship
- B Copulation
- C Ovulation
- D Ejaculation

(2)

1.1.6 The following statements apply to the marketing of agricultural products:

- (i) Planning for new products and future products is long-term
- (ii) Focuses on needs of a seller
- (iii) Marketing management is profit-orientated
- (iv) Determines consumer needs and decides on how to produce and supply

Choose the correct combination.

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

(2)

1.1.7 A tube of muscular tissue and the common canal for excretion of urine and semen.

- A Penis
- B Vas deferens
- C Oviducts
- D Urethra

(2)

1.1.8 The scrotum encloses the male reproductive organs listed below:

- (i) Testis
- (ii) Penis
- (iii) Seminiferous tubules
- (v) Epididymis

Choose the correct combination

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

(2)

1.1.9 A heterozygous Brahman bull is mated with a heterozygous cow. The expected genotypic ratio in the F₁-generation will be as follows:

- A 1:3
- B 1:2:1
- C 1:3:1
- D 1:1

(2)

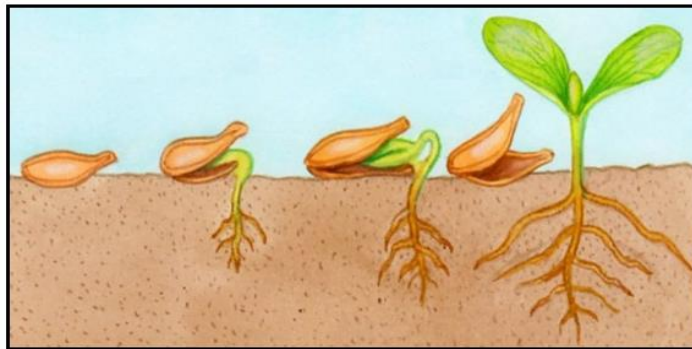
1.1.10 The visible characteristic produced by an individual's genetic make-up.

- A Genotype
- B Phenotype
- C Segregation
- D Hybrid

(2)

1.2 Each of the following questions has a sketch and two labels, A and B. Indicate in the answer lines 1.2.1–1.2.6 on page 7 whether the sketch relates to **only A**, **only B**, **A and B** or **Neither A nor B**.

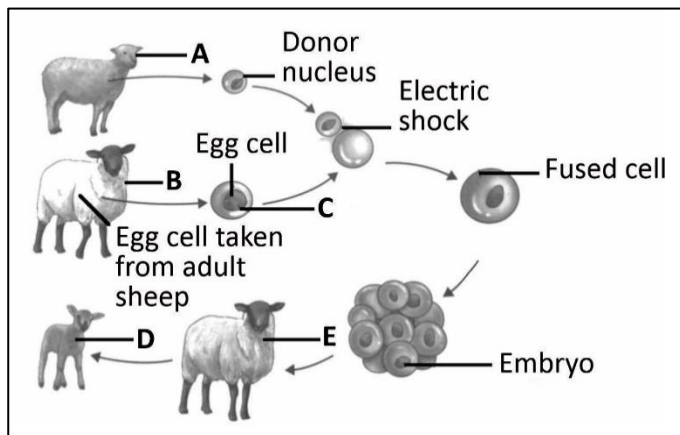
1.2.1



A Germination

B Fertilisation

1.2.2



A Embryo transfer

B Artificial insemination

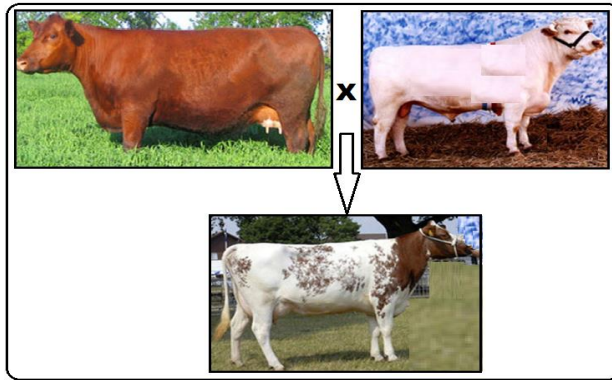
1.2.3



A Auction marketing channel

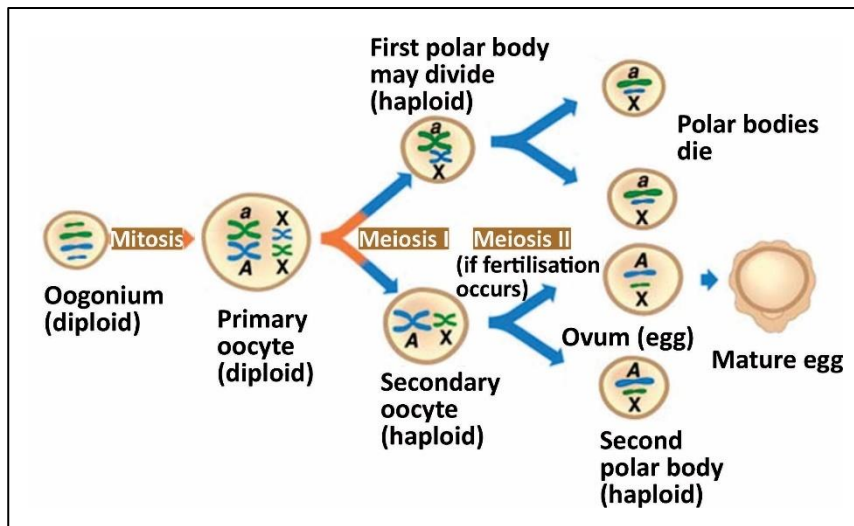
B Farm gate marketing channel

1.2.4



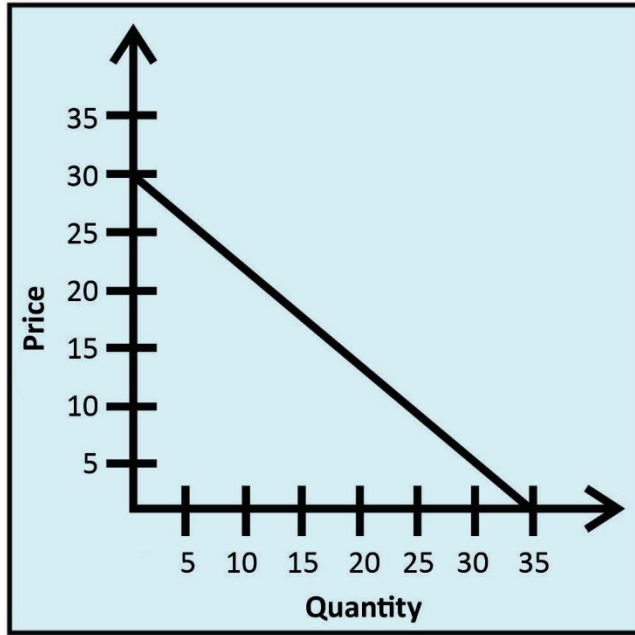
- A Incomplete dominance
- B Complete dominance

1.2.5



- A Spermatogenesis
- B Oogenesis

1.2.6



- A Demand curve
- B Low price, more quantity

- 1.2.1 _____ (2)
- 1.2.2 _____ (2)
- 1.2.3 _____ (2)
- 1.2.4 _____ (2)
- 1.2.5 _____ (2)
- 1.2.6 _____ (2)

1.3 The following descriptions show the procedures to be followed when identifying and classifying soil by the binomial system:

- A Establish the soil family by using family characteristics
- B Determine the textural class of the A horizon and add it to the name of soil family
- C Demarcate the master horizons present in the soil profile
- D Establish the soil form using the soil classification book
- E Identify diagnostic horizons in the soil profile
- F Identify family characteristics using the book

Rearrange the descriptions of the procedure above 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 (1.3.1 to 1.3.6) below.

- 1.3.1 _____ (2)
- 1.3.2 _____ (2)
- 1.3.3 _____ (2)
- 1.3.4 _____ (2)
- 1.3.5 _____ (2)
- 1.3.6 _____ (2)

1.4 Match column A and column B.

COLUMN A	COLUMN B
1.4.1 The type of capital represented by livestock on a farm.	A Meiosis B Fixed
1.4.2 Falling of many flowers and fruitlets to reduce the amount of fruit setting.	C Related breeding
1.4.3 A reduction cell division resulting in four haploid daughter cells.	D Liabilities E Parthenocarpy
1.4.4 Physical items of economic value which could be easily converted to cash.	F Movable
1.4.5 Line breeding and inbreeding systems.	G Biotechnology
1.4.6 An advanced technology that allows breeders to manipulate and make precise genetic changes to impart beneficial traits to the organism.	H Cross-breeding I Mitosis J Assets K Ablactation

- 1.4.1 _____ (2)
- 1.4.2 _____ (2)
- 1.4.3 _____ (2)
- 1.4.4 _____ (2)
- 1.4.5 _____ (2)
- 1.4.6 _____ (2)

1.5 Give the correct term for each of the following descriptions. Write only the term.

1.5.1 The removal of testes in a male farm animal that causes sterility.

(2)

1.5.2 A document that outlines the idea of a new business, describing how it will operate including goals, skills and resources required, risks, procedure and expected profit.

(2)

1.5.3 A financial document that summarises all cash received and cash paid and cash balances over a certain period.

(2)

1.5.4 Pattern of inheritance where the action of one gene is modified or controlled by one or several other genes.

(2)

1.5.5 A process where seed coat is weakened, opened or altered for easy germination.

(2)

1.5.6 The loss of the productive potential of soil as a result of human activities.

(2)

1.6 The table below shows diseases, pathogens causing the disease and symptoms of the disease. Analyse the table and answer questions that follow:

DISEASE	PATHOGEN	MAJOR SYMPTOM OF THE DISEASE
Newcastle disease	1.6.1	Green diarrhoea, twisted neck, lameness, listlessness, rapid breathing
1.6.2	Fungus	Sores on the skin, secrete pus, scab, hard lumps on the skin and wool
Mastitis	1.6.3	1.6.4
Anaplasmosis	1.6.5	High fever, anaemia, constipation, weakness
1.6.6	Bacteria	High fever, swelling on the body, bloody discharge from mouth, nose and rectum

Complete the table by providing CORRECT answers for 1.6.1 to 1.6.6.

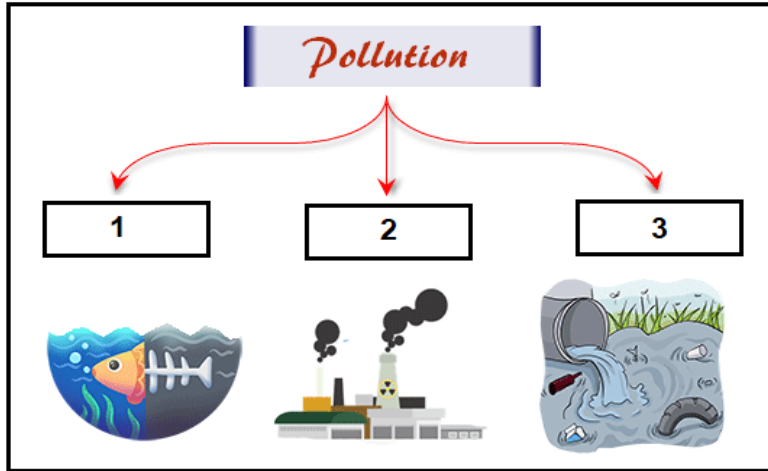
- 1.6.1 _____ (2)
- 1.6.2 _____ (2)
- 1.6.3 _____ (2)
- 1.6.4 _____ (2)
- 1.6.5 _____ (2)
- 1.6.6 _____ (2)

80 marks

SECTION B

QUESTION 2

2.1 The illustration below shows different types of pollution.



2.1.1 Identify 1, 2 and 3 from the illustration above.

1 _____

2 _____

3 _____

(6)

2.1.2 Explain TWO effects of pollution process 3 in the environment.

(4)

2.1.3 Explain TWO ways in which farmers can prevent pollution process 3 from taking place.

(4)

2.2

Corm	Stolon	Rhizome	Tuber
-------------	---------------	----------------	--------------

Match the methods of asexual reproduction listed above with each of the following statements.

2.2.1 A horizontal branch from the base of a plant that produces new plants from buds at tips or nodes such as strawberries.

(2)

2.2.2 The short underground stem in which food is stored such as potatoes.

(2)

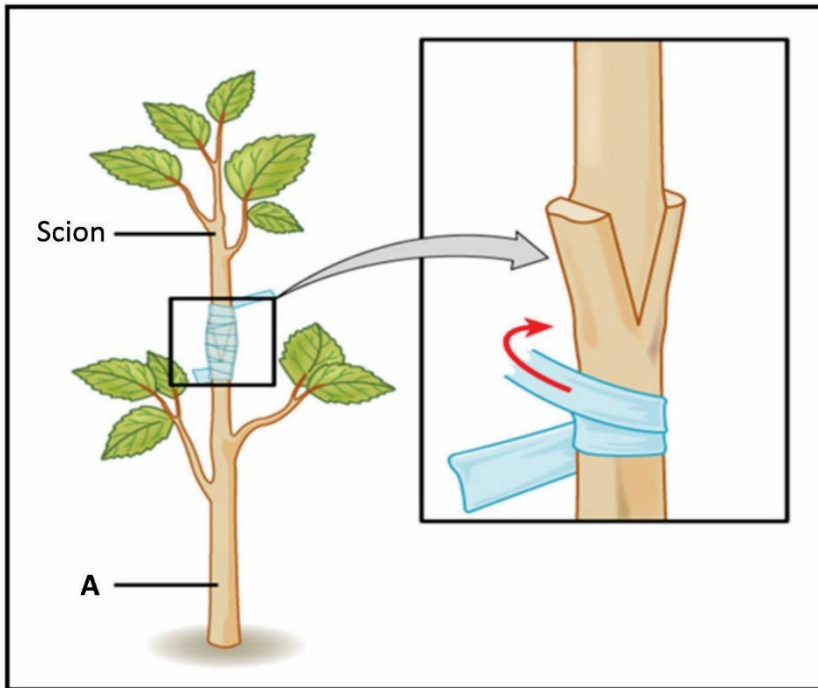
2.2.3 A rounded underground storage organ in plants such as gladiolus.

(2)

2.2.4 A continuously growing horizontal underground stem which puts out lateral shoots and adventitious roots at intervals such as fern.

(2)

2.3 The picture below shows an artificial propagation method used for shrubs and fruit trees.



2.3.1 Identify the method of plant propagation shown in the picture above.

(2)

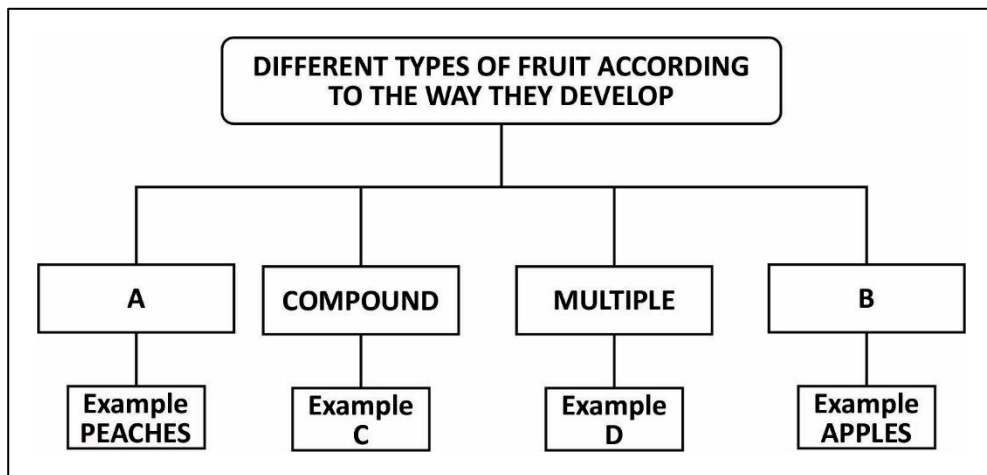
2.3.2 Label part **A** from the picture above.

(2)

2.3.3 Explain TWO disadvantages of using asexual reproduction methods to propagate plants.

(4)

2.4



2.4.1 Provide labels for **A**, **B**, **C** and **D** to complete the schematic representation.

A _____

B _____

C _____

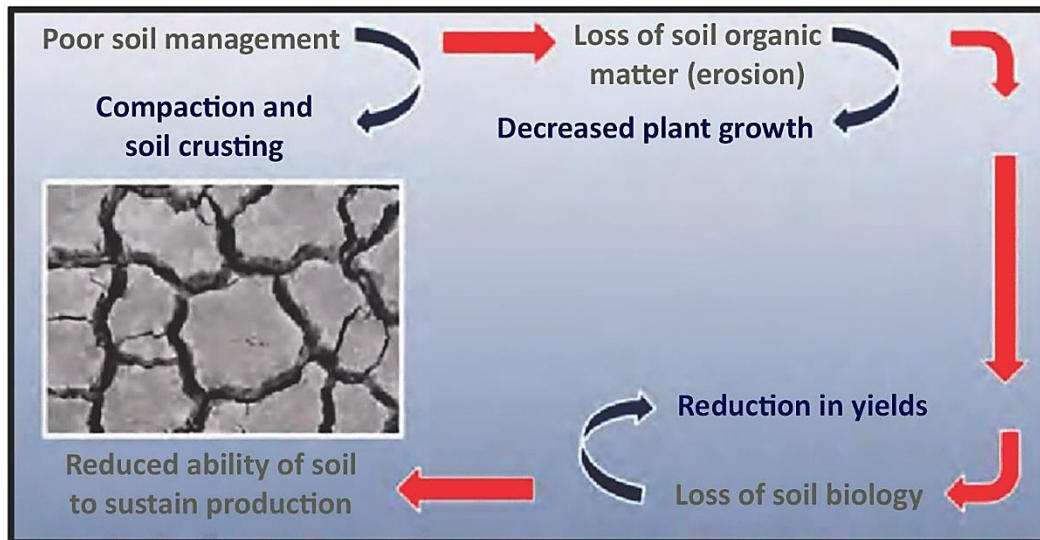
D _____

(8)

2.4.2 Name THREE layers that form the pericarp.

(3)

2.5



2.5.1 Give the name for the decline in soil quality shown in the diagram above.

_____ (1)

2.5.2 Name THREE types in which the decline in soil quality occurs.

_____ (6)

2.5.3 Deduce TWO impacts of the decline in soil quality on agricultural productivity from the illustration above.

_____ (2)
[50]

QUESTION 3

3.1 Marketing serves a very significant role in the movement of agricultural products from the point of production to the consumer.

3.1.1 Name FOUR main functions of agricultural marketing.

(4)

3.1.2 Define the following terms:

(a) Market equilibrium

(2)

(b) Entrepreneur

(2)

3.2 Which animal breeding system is represented by each of the following examples?

3.2.1 The mating of a donkey with a horse.

(2)

3.2.2 The mating of a Nguni bull with his daughter.

(2)

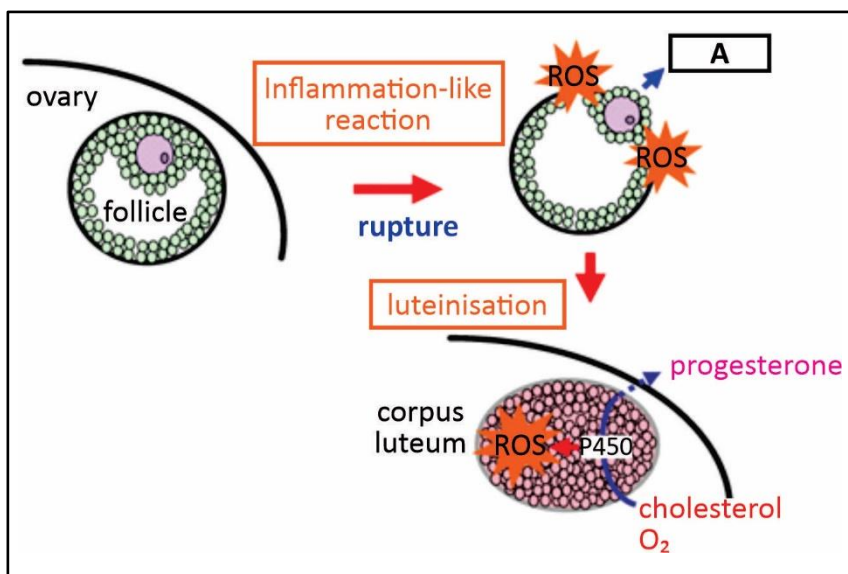
3.2.3 A Hereford bull mated with a Brahman cow.

(2)

3.2.4 The repeated use of pure breed Friesland bulls on a herd of cross-bred cows and again on the progeny.

(2)

3.3



3.3.1 Identify the process taking place at part labeled **A**.

(2)

3.3.2 Provide the name of the hormone responsible for each of the following functions:

(a) Stimulates the development of follicle.

(2)

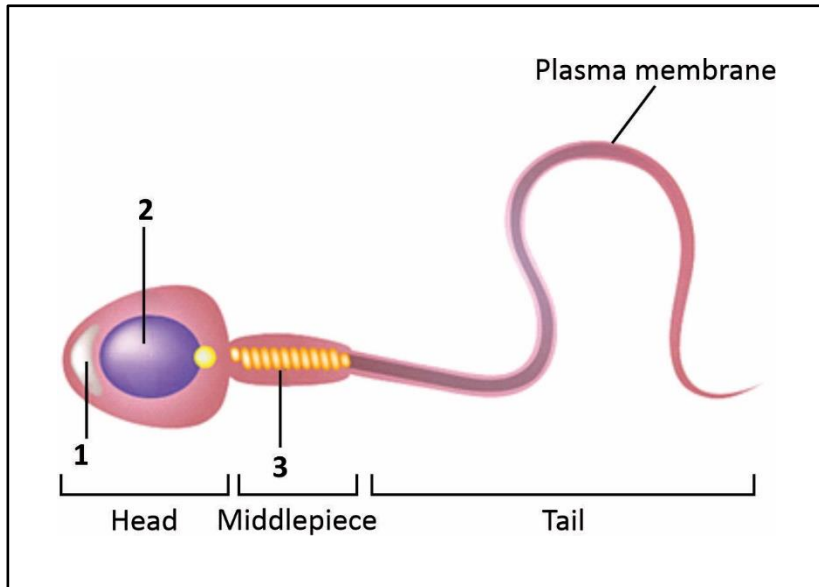
(b) Gives the characteristic marked by oestrus.

(2)

- (c) Prepares the uterus for the reception of the fertilised ovum and is responsible for maintenance of pregnancy.

(2)

3.4



3.4.1 Label parts 1, 2 and 3.

- 1 _____
- 2 _____
- 3 _____

(3)

3.4.2 Name the part responsible for each of the following functions:

- (a) Contains the genetic information of an individual.

(1)

- (b) Provides energy to the sperm cell.

(1)

3.5

Sometimes animals experience difficult birth. Difficult births require more labour time and attention. It may result in placenta retention and the death of both the cow and the calf. It is a heritable characteristic which occurs more frequently in heifers and bull calves. It can be corrected by means of proper management.

3.5.1 Provide the scientific term for *difficult births*.

(2)

3.5.2 Give TWO reasons for difficult births in heifers.

(4)

3.5.3 The parturition process has three distinct stages. List them according to their sequence.

(3)

3.6 The table below indicates the characteristics of the ejaculates of different species:

Species	Volume (ml)	Sperm concentration ($\times 10^9/\text{ml}$)	% motility	% normal
Bull	8,0	1,5	75	95
Ram	1,0	3,0	95	95
Boar	200	0,25	70	90
Stallion	80	0,15	80	70
Man	2–6	0,15	65	70

3.6.1 Identify the species with the highest sperm concentration from the table above.

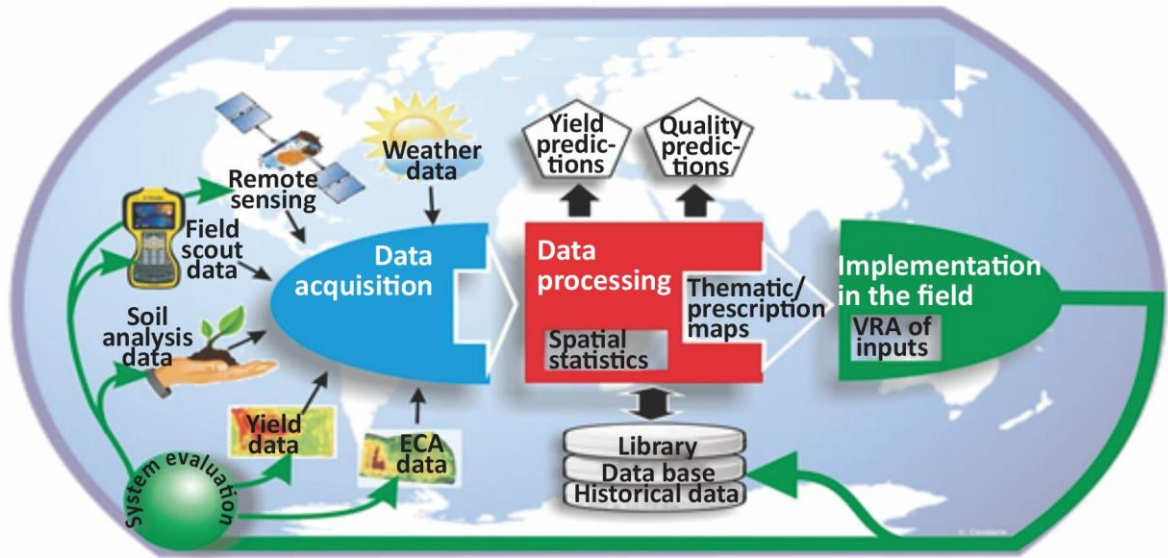
(2)

3.6.2 Use the information from the table in Question 3.6 to draw a combined bar graph indicating the percentage motility and normal percentage of different species.

(10)
[50]

QUESTION 4

4.1 New Information and Communication Technologies (NICT) make sustainable crop management more operational and easier to achieve for farmers.



4.1.1 Identify the form of sustainable farming illustrated in the picture above.

(1)

4.1.2 Give TWO basic principles of the form of sustainable farming identified in Question 4.1.1.

(4)

4.1.3 Name the main ultra-modern technologies utilised for each of the following function:

(a) Determines a precise position on the globe.

(2)

(b) Captures, manages and analyses special data related to crop production and field inputs.

(2)

4.2

South African farmers used to market their maize through a government regulated single channel marketing system, but nowadays there is no intervention and the maize price is determined entirely in the market place according to the laws of supply and demand. All participants, both buyers and sellers, are therefore affected by price movements and many unknowns which is the nature of the free market.

4.2.1 Identify TWO marketing systems discussed in the passage above.

(2)

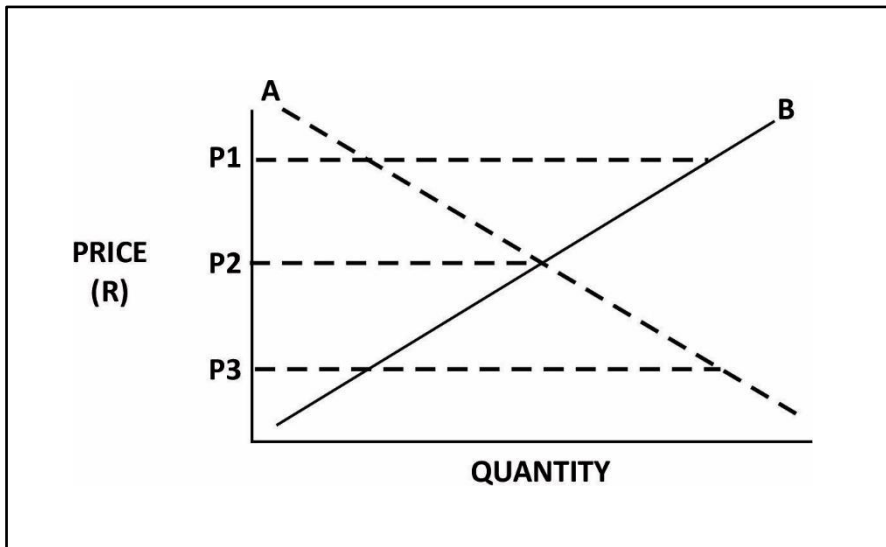
4.2.2 Deduce ONE disadvantage of a free market from the passage above.

(1)

4.2.3 Supply TWO advantages of a free marketing system to the farmer.

(4)

4.3 The graph below shows the effect of price on demand and supply.



4.3.1 Identify the letter representing the demand curve.

_____ (1)

4.3.2 Describe what would happen on the market, if produce is sold at prices P1.

 _____ (2)

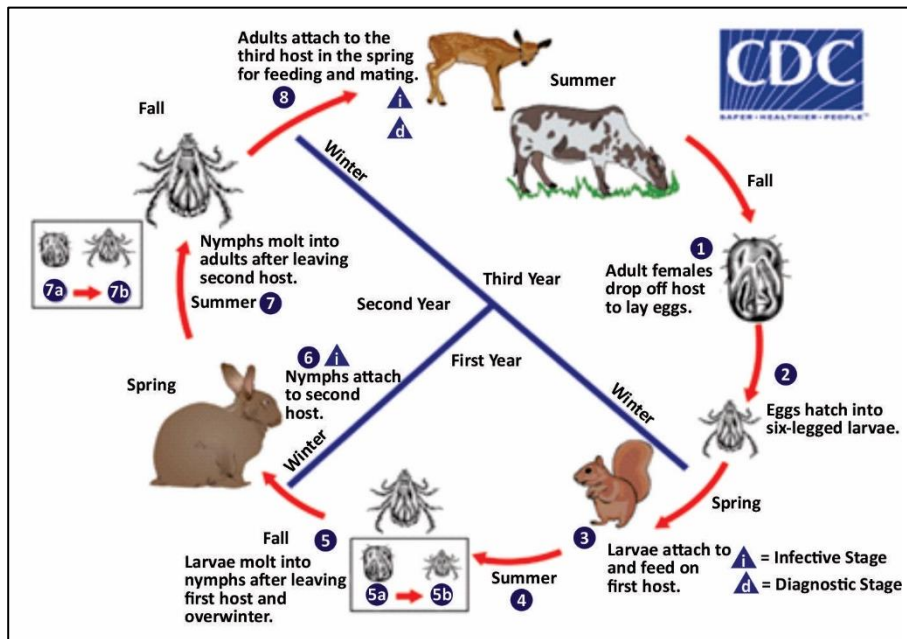
4.3.3 Suggest TWO strategies farmers can employ to deal with the situation in Question 4.3.2 above.

 _____ (2)

4.3.4 Indicate ONE factor that would influence the shape of Curve **B**.

_____ (1)

4.4



4.4.1 Classify the parasite in the picture above.

_____ (1)

4.4.2 How many hosts does the parasite above need to complete its life cycle?

_____ (1)

4.4.3 State TWO costs involved when controlling parasites in farm animals.

 _____ (2)

4.5 In Nguni cattle, the black (B) colour is dominant over the white (b) colour. A homozygous black bull is crossed with a homozygous white cow.

4.5.1 Determine the genotype of the cow.

_____ (1)

4.5.2 Draw a Punnett square to determine the phenotype of the F₁-generation.

(7)

4.5.3 Name the type of dominance that occurs in Nguni cattle.

(2)

4.5.4 Give a reason to motivate the answer to Question 4.5.3.

(2)

4.6 Fruit colour in plants is controlled by two alleles, black (B) and red (b). Fruit shape is controlled by two alleles, round (R) and wrinkled (r). Black and round are dominant over red and wrinkled respectively. Two plants, heterozygous for both characteristics, were crossed.

CHARACTERISTIC 1: COLOUR B: Black b: Red	CHARACTERISTIC 2: SHAPE R: Round r: Wrinkled
---	---

The table below shows the possible genotypes of the offspring of the first generation.

	BR	Br	bR	br
BR	BBRR	BBRr	BbRR	BbRr
Br	BBRr	BBrr	BbRr	Bbrr
bR	BbRR	BbRr	bbRR	bbRr
br	BbRr	Bbrr	bbRr	bbrr

4.6.1 Identify the type of crossing represented above.

(1)

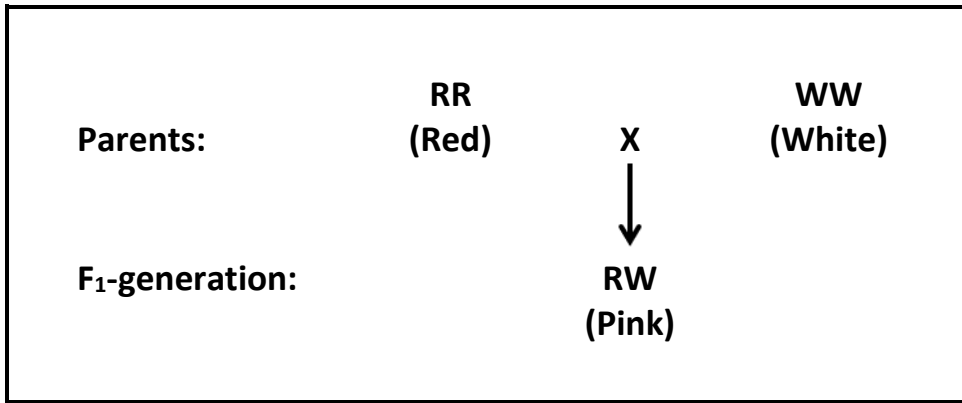
4.6.2 Give a reason for the answer to Question 4.6.1.

(2)

4.6.3 Name ONE genotype of the offspring which is different from that of parents in the Punnett square above, that will give rise to the phenotype that is similar to that of the parents.

(2)

4.7



4.7.1 Indicate whether the parents are homozygous or heterozygous.

_____ (1)

4.7.2 Give a reason for the answer to Question 4.7.1.

 _____ (2)

4.7.3 Determine the following after interbreeding of the F₁-offspring:

(a) The phenotypic ratio of the F₂-generation.

_____ (2)

(b) The percentage of red offspring.

_____ (2)
[50]

QUESTION 5

- 5.1 Genotypically identical maize seeds were planted in different areas of the province. The seeds were planted at the same time. The table below shows the height of the maize plants after three months.

AREA	HEIGHT
A	Tall
B	Dwarf
C	Medium

- 5.1.1 Indicate the genetic phenomenon illustrated in the table above.

(1)

- 5.1.2 Name TWO environmental factors that may have contributed to the difference in height of the maize plants.

(2)

- 5.1.3 If two different cultivars of maize are crossed, the offspring normally shows a very large and drastic improvement in yield. Give a scientific term for this improvement.

(2)

- 5.2 The South African labour market is regulated by various Acts of Parliament, which include the following:

- A Labour Relations Act (Act 66 of 1995)
- B Basic Conditions of Employment Act (Act 75 of 1997)
- C Occupational Health and Safety Act (Act 85 of 1993)
- D Compensation for Occupational Injuries and Diseases Act (Act 130 of 1993)
- E Skills Development Act (Act 97 of 1998)

Choose the legislation above which is applicable to each of the statements below. Write only the letter (A–E) in the space provided at each question.

- 5.2.1 Farmers were trained to use hazardous chemicals.

(2)

5.2.2 A farm worker who was injured driving a tractor.

(2)

5.2.3 Workers wish to join a trade union.

(2)

5.2.4 Farm workers signed a labour contract.

(2)

5.3 The data below shows the assets and liabilities on a farm.

- Overdraft R160 000,00
- Bond: R3 200 000,00
- Value of the farm R4 000 000,00
- Cash on hand: R120 000,00

5.3.1 Use the table below and complete it with the data provided above.

ASSETS		LIABILITIES	
	Value (R)		Value (R)
TOTAL ASSETS		TOTAL LIABILITIES	

(6)

5.3.2 Calculate the net worth of the farming business above.

(3)

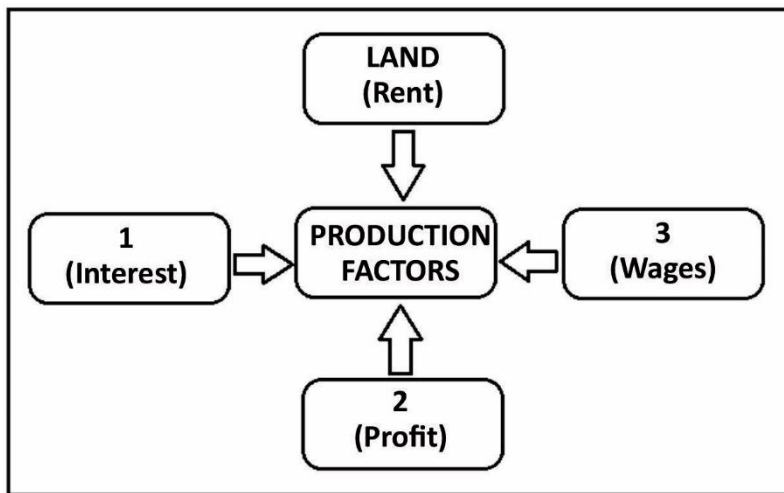
5.3.3 Indicate whether the farming business represented by the data above is viable.

_____ (2)

5.3.4 Justify the answer to Question 5.3.3.

_____ (2)

5.4



5.4.1 Provide labels for 1, 2 and 3.

1 _____
2 _____
3 _____

(3)

5.4.2 Indicate the production factor that could be used as a collateral.

_____ (2)

5.4.3 Give TWO types of the production factor number 1.

_____ (2)

5.4.4 Indicate the type of labour that can be used in each of the following situations:

(a) Sheep shearing

_____ (1)

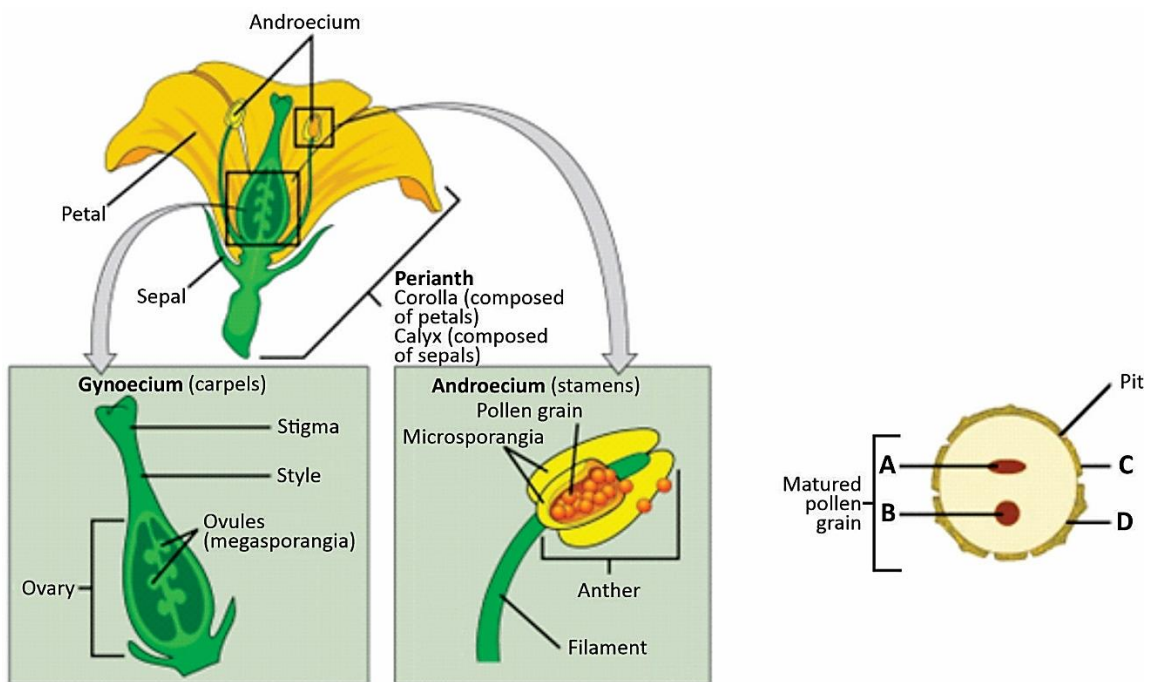
(b) Erecting a fence

_____ (1)

(c) Year-round tractor driver

_____ (1)

5.5



5.5.1 Label **A**, **B**, **C** and **D** of the matured pollen grain.

A _____

B _____

C _____

D _____

(4)

5.5.2 Define asexual reproduction in plants.

(2)

5.5.3 Give ONE function of the following parts in the picture above:

(a) Stamen

(2)

(b) Pistil

(2)

(c) Petals (corolla)

(2)

(d) Sepals (calyx)

(2)
[50]

200 marks

