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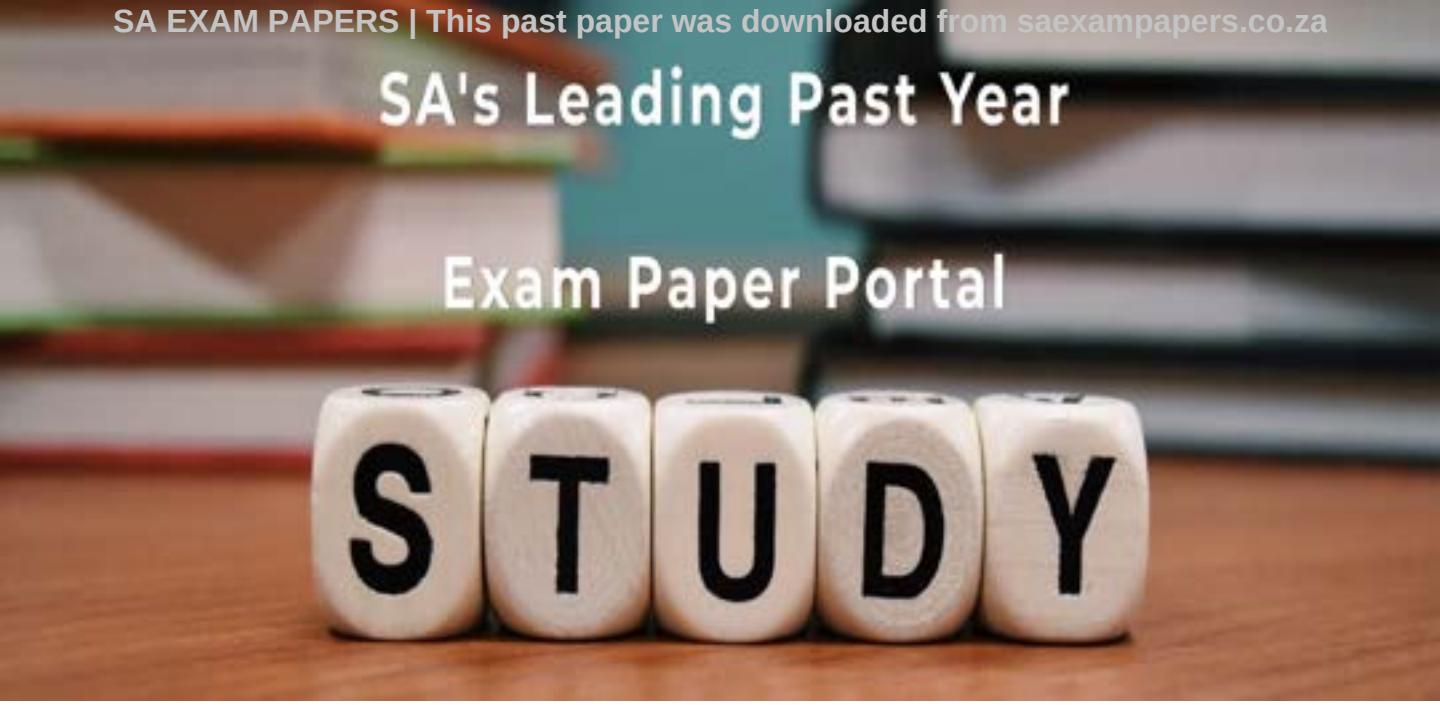

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Basic Education
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GRADE 12

AGRICULTURAL SCIENCES P2

NOVEMBER 2024

MARKS: 150

TIME: 2½ hours

This question paper consists of 16 pages.

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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 calculations, including formulae, where applicable.
7. Write neatly and legibly.

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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 numbers (1.1.1 to 1.1.10) in the ANSWER BOOK, e.g. 1.1.11 B.

1.1.1 The marketing process involves …

A determining the product the consumer wants.
B determining the product of interest to the supplier.
C management of sales volume.
D planning based on current products.

1.1.2 ONE of the following statements is NOT CORRECT about factors that hamper the marketing of agricultural products:

A Poor infrastructure
B Perishability of the product
C High value in relation to volume
D Wide distribution of the product

1.1.3 A channel where products are advertised to a global consumer with upfront payment, is … marketing.

A contract
B farm gate
C stock sale
D internet

1.1.4 The downward sloping curve to the right in a market implies that:

(i) As the price of a product rises, the quantity demanded drops.
(ii) When the price of a product rises, the supply remains constant.
(iii) There is an inverse relationship between price and quantity demanded.
(iv) The quantity demanded is high as the price of a product is low.

Choose the CORRECT combination:

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

1.1.5 ONE of the following is NOT a method to improve productivity of land:

A Intercropping
B Improving soil fertility
C Monocropping
D Restoring land potential

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1.1.6 ONE of the following is NOT a source of capital:

A Risk factor
B Trust company
C Business partner
D Land Bank

1.1.7 A farmer may apply the measures below to increase labour productivity on the farm:

(i) Have the correct type and number of workers
(ii) Set clear unattainable goals for workers
(iii) Give workers the opportunity to be involved in decision-making
(iv) Ensure the welfare of workers

Choose the CORRECT combination:

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

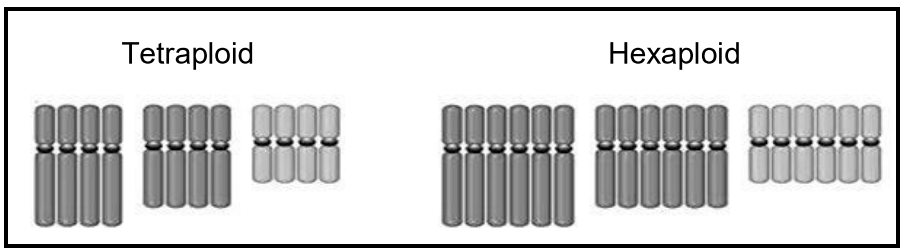
1.1.8 The external force which can affect a farming business:

A Quality and cost of a product
B Available equipment and machinery
C Amount of debt a farmer has at a bank
D Policies about the labour force

1.1.9 If a homozygous dominant tall plant (TT) is crossed with a homozygous recessive plant (tt), the genotypic and phenotypic percentages of tall plants in the F_1-generation will be …

A 50%.
B 100%.
C 75%.
D 25%.

1.1.10 The illustration below demonstrates an example of … in chromosomal mutation.



A haploidy
B pentaploidy
C polyploidy
D diploidy

(10 x 2) (20)

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1.2 Choose a term/phrase from COLUMN B that matches a description in COLUMN A. Write only the letter (A–J) next to the question numbers (1.2.1 to 1.2.5) in the ANSWER BOOK, e.g. 1.2.6 K.

COLUMN A		COLUMN B	
1.2.1	Marketing strategy that targets the whole market with a single offer	A	storage
1.2.2	Keeping goods until they are needed for future use and guarantee food security	B	XX and XY
1.2.3	Unemployment Insurance Fund	C	both the farmer and the farm worker contribute
1.2.4	The value of assets increases over time	D	depreciation
1.2.5	Sex chromosomes	E	multisegmented marketing
		F	X-linked and Y-linked characteristics
		G	appreciation
		H	value adding
		I	only the farmer contributes
		J	mass marketing

(5 x 2) (10)

1.3 Give ONE word/term for each of the following descriptions. Write only the word/term next to the question numbers (1.3.1 to 1.3.5) in the ANSWER BOOK.

1.3.1 A long-term plan that enables the manager to minimise the risk of losing production due to drought

1.3.2 A measure of output per unit of input

1.3.3 A situation where one parent has more homozygous dominant alleles for certain traits which are passed on to offspring than the other parent

1.3.4 The use of statistics for analysing biological data

1.3.5 Herbicide-resistant hybrid plants that are the products of a cross between wild plants and genetically modified crops (5 x 2) (10)

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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 numbers (1.4.1 to 1.4.5) in the ANSWER BOOK.

1.4.1 Market mix is the result of the interaction between the supply and demand of goods and services.

1.4.2 Cost is the money paid over and above the amount borrowed.

1.4.3 A dominant allele is not expressed in the phenotype of a heterozygous organism.

1.4.4 The mating of a pure-bred bull with inferior cows, generation after generation, refers to inbreeding.

1.4.5 Breeding value is a form of technology that involves highly advanced scientific techniques of inserting genes to obtain desirable characteristics. (5 x 1) (5)

TOTAL SECTION A: 45

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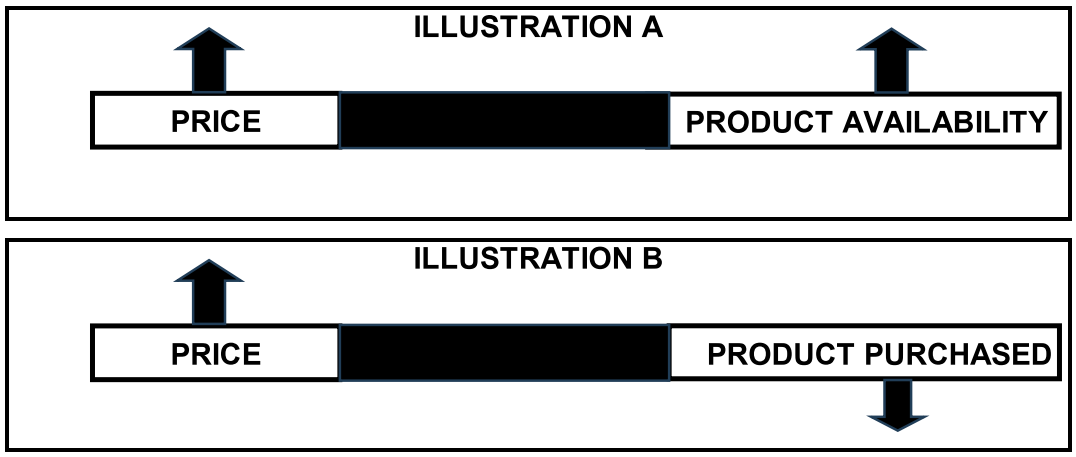
SECTION B

QUESTION 2: AGRICULTURAL MANAGEMENT AND MARKETING

Start this question on a NEW page.

2.1 The illustrations below represent supply and demand in a market.



2.1.1 Identify the illustration that represents EACH of the following:

(a) Demand (1)

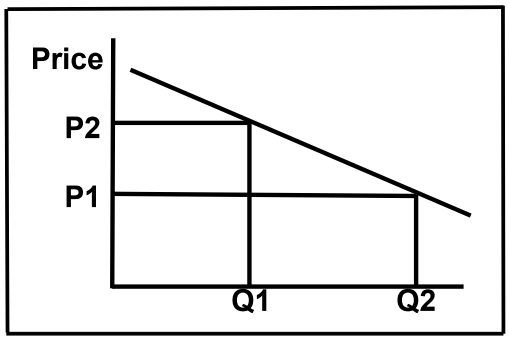
(b) Supply (1)

2.1.2 Explain the law applicable to ILLUSTRATION B. (2)

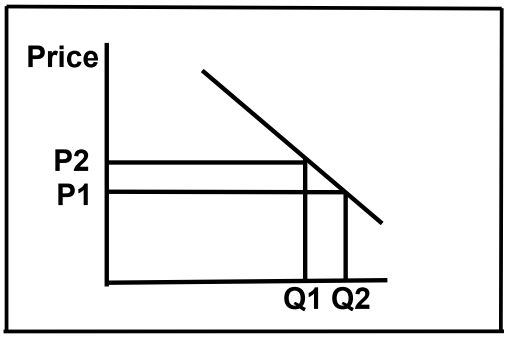
2.1.3 Name TWO factors that influence the illustration in **A**, other than the one indicated. (2)

2.2 The graphs below show the response to the change in quantity demanded in relation to price in a market.

GRAPH A



GRAPH B



2.2.1 Indicate the type of elasticity illustrated in:

(a) Graph A (1)

(b) Graph B (1)

2.2.2 Give a reason for the answer to QUESTION 2.2.1(a). (1)

2.2.3 State TWO factors that could have led to the situation illustrated in GRAPH A. (2)

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2.3 The picture below shows a system used to market agricultural products.

2.3.1 Identify the marketing system represented in the picture above. (1)

2.3.2 From the picture above, deduce TWO advantages of the marketing system identified in QUESTION 2.3.1 for the buyer. (2)

2.3.3 Give the economic term referring to the phenomenon where producers negotiate prices artificially rather than competing freely. (1)

2.3.4 State TWO principles of agricultural cooperatives. (2)

2.4 A farmer owning one hectare of land, saw an opportunity to start a small business of producing eggs to sell to the community. Despite two break-ins and a scarcity of water, the farmer continued with the business. Determination, resilience and passion kept the farmer going.

2.4.1 The farmer in the case study above is an entrepreneur. Justify this statement by giving a reason from the case study. (1)

2.4.2 Identify TWO entrepreneurial success factors of the farmer in the case study above. (2)

2.4.3 Give ONE example from the case study of EACH of the following:

(a) Strength of the enterprise (1)

(b) Threat to the enterprise (1)

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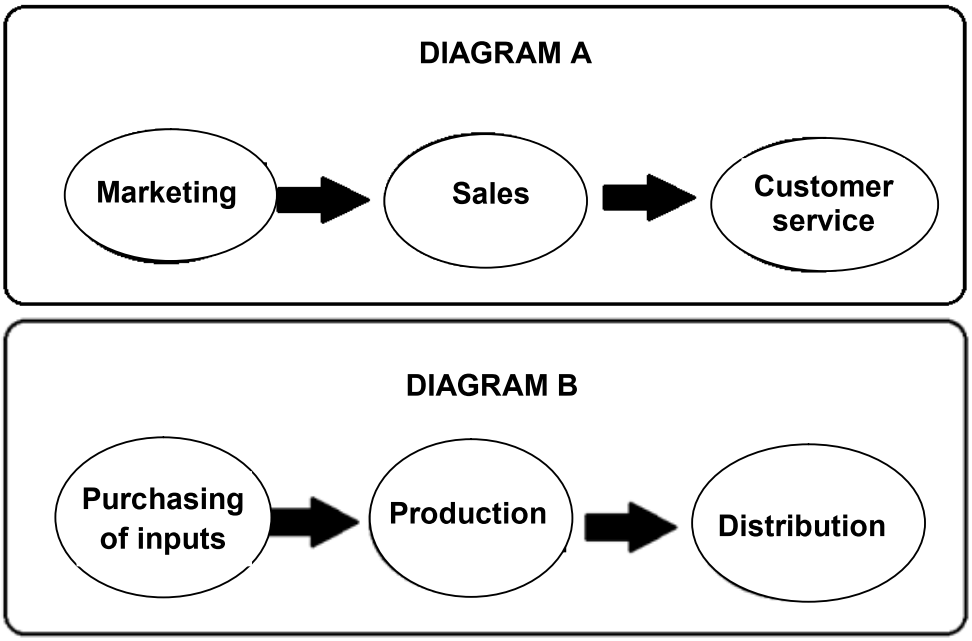
2.5 The diagrams below represent an agricultural marketing chain.



2.5.1 Indicate the type of agricultural marketing chain represented by:

(a) DIAGRAM A (1)

(b) DIAGRAM B (1)

2.5.2 Identify the agricultural marketing chain (DIAGRAM A or DIAGRAM B) that is described by each of the following statements:

(a) Efficiency focused, short-term orientated, planning and control (1)

(b) Focus on effectiveness, long-term orientated, demand, management and supply (1)

2.5.3 Indicate TWO ways that farmers can use to streamline and improve the agribusiness chain. (2)

2.6 State TWO roles of legislation in the effective marketing of agricultural products. (2)

2.7 Before starting a farming enterprise, a document describing the business and its goals and objectives should be developed.

2.7.1 Identify the document in the statement above. (1)

2.7.2 Give TWO reasons for developing the document identified in QUESTION 2.7.1. (2)

2.7.3 State TWO problems that a farmer may encounter when drawing up the document identified in QUESTION 2.7.1. (2)

[35]

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QUESTION 3: PRODUCTION FACTORS

Start this question on a NEW page.

3.1 All the production factors are important and should be well managed in order to maximise production.

3.1.1 Name a production factor that is durable and found in a specific environment. (1)

3.1.2 State TWO economic functions of the production factor named in QUESTION 3.1.1. (2)

3.2 The table below illustrates the quantity of fertiliser applied and maize production.

FERTILISER (kg)	MAIZE PRODUCTION (kg)
1	8
5	20
10	35
15	38
20	39
25	39

3.2.1 Identify the economic characteristic of land illustrated in the table above. (1)

3.2.2 Compare the maize production response to increased fertiliser application from:

(a) 1 kg to 10 kg (1)

(b) 15 kg to 20 kg (1)

3.3 The table below shows duties performed by two different workers on the farm.

WORKER 1	WORKER 2
• Building a dam • Erecting a fence • Painting farm buildings	• Shearing sheep • Picking avocadoes • Harvesting grapes

3.3.1 Identify the type of temporary worker represented by EACH of the following:

(a) WORKER 1 (1)

(b) WORKER 2 (1)

3.3.2 Give a reason for the answer to QUESTION 3.3.1(b). (1)

3.3.3 State TWO ways to increase labour productivity in agriculture. (2)

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3.4 An extract from a contract of employment between a farmer and a farm worker is shown below.

CONTRACT OF EMPLOYMENT

1. **Job title:** Driver
2. **Duration of contract:** 1 February 2021 to retirement
3. **Mode of payment:** Payment into bank account (monthly)
4. **Remuneration:** Minimum wage with regard to the specific area
5. **Terms of employment:**
   - **5.1 Working hours:** 08:00 to 17:00
   - **5.2 Leave:** As prescribed by legislation
6. **Protective clothing:** None

Signature: …… **Date:** ……
(Employee – Farm worker)
Signature: …… **Date:** ……
(Employer – Farmer)

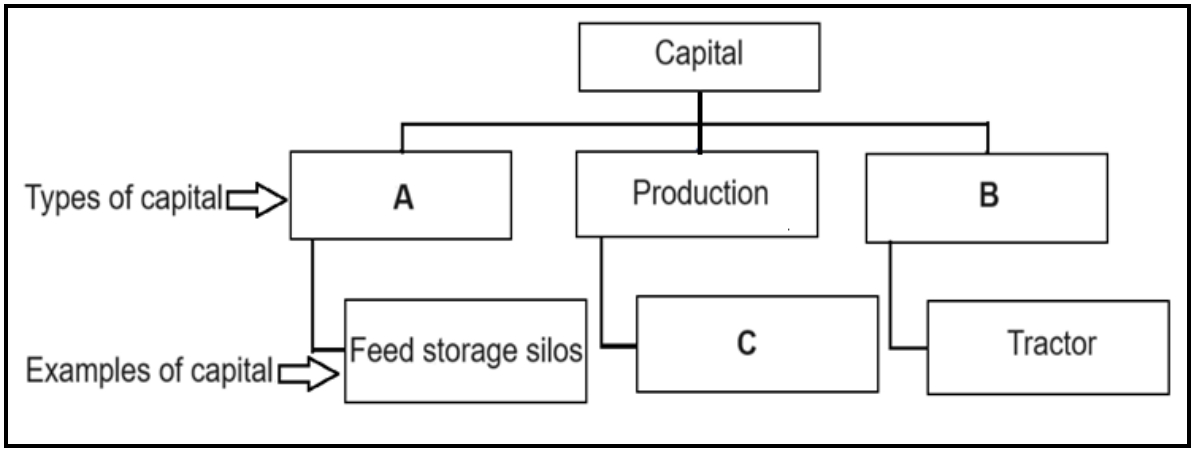
3.4.1 Select an item from the contract of employment above that relates to each of the following labour laws:

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

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

3.4.2 State TWO ways in which migration of labour from farms to other industries will decrease production in a farming enterprise. (2)

3.5 The schematic representation below shows types of capital with examples.



3.5.1 Identify the types of capital represented by **A** and **B** in the schematic representation above. (2)

3.5.2 Give ONE example of a capital item represented by **C**. (1)

3.5.3 Suggest the type of credit that can be sourced from a financial institution to acquire the following types of capital:

(a) A (1)

(b) C (1)

3.5.4 Name ONE method of creating capital. (1)

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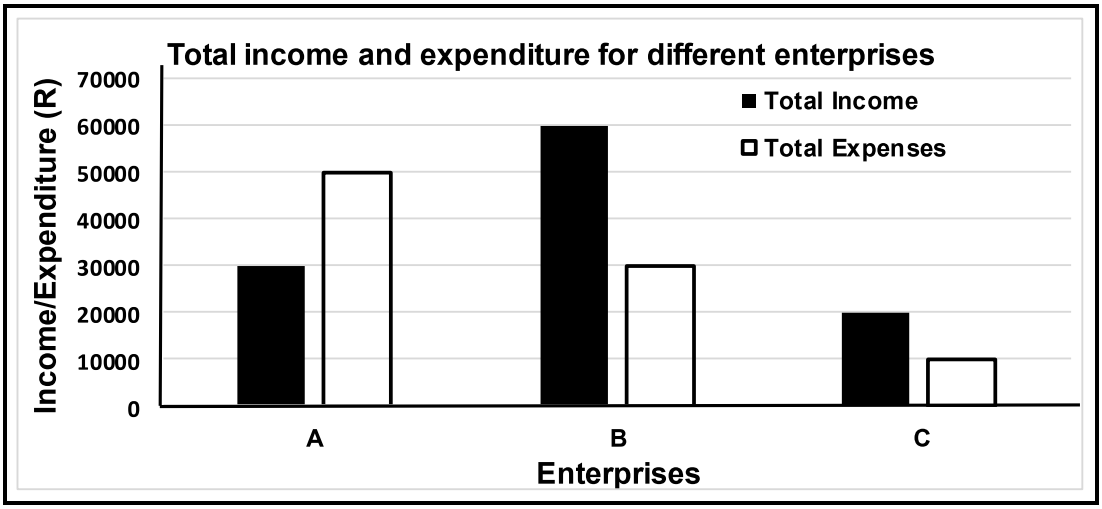
3.6 The graph below shows income and expenditure for different farming enterprises for the 2023/24 financial year.



3.6.1 Identify the enterprise in the graph above with the:

(a) Highest income (1)

(b) Lowest expenses (1)

3.6.2 Name the financial record that shows the information in the data above. (1)

3.6.3 Calculate the profit or loss for enterprise **A**. Show ALL the calculations, including the formula. (3)

3.7 State the problem associated with capital that is applicable to EACH of the following statements:

3.7.1 The farmer does not have enough capital to buy equipment to run the farming enterprise. (1)

3.7.2 Too much capital is invested in the enterprise in relation to available land and labour. (1)

3.8

The farmer took the opportunity of having an orchard to start a business making jam and dried and canned fruit. The business was growing until the machinery broke down, resulting in a drop in sales. The farmer then introduced a piggery, poultry, sheep farming and sold manure to other farmers and community members.

3.8.1 Identify TWO sources of risks in the scenario above. (2)

3.8.2 Justify EACH source of risk identified in QUESTION 3.8.1 based on the scenario. (2)

3.8.3 Identify the risk management strategy used by the farmer to deal with the risks identified in QUESTION 3.8.1. (1)

3.8.4 State ONE applicable management principle that would assist the farmer to manage the risks. (1)

[35]

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QUESTION 4: BASIC AGRICULTURAL GENETICS

Start this question on a NEW page.

4.1 In pea plants, spherical seeds (S) are dominant over dented seeds (s). Two heterozygous plants for seed shape were crossed, as shown in the Punnett square below.

GAMETES	S	s
S	SS	Ss
s	Ss	ss

4.1.1 Indicate the fraction of the offspring that will have dented seeds. (1)

4.1.2 Calculate the percentage of heterozygous spherical seeds. (2)

4.1.3 Determine the phenotypic ratio of the F_1-generation. (1)

4.1.4 Give the number of offspring that will look similar to the parents. (1)

4.2 The illustrations below show the crossing of different flowers.

ILLUSTRATION A

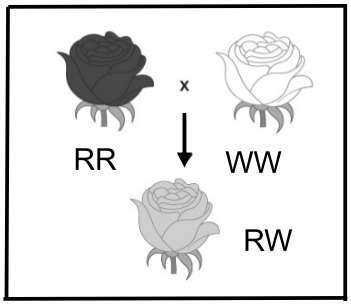
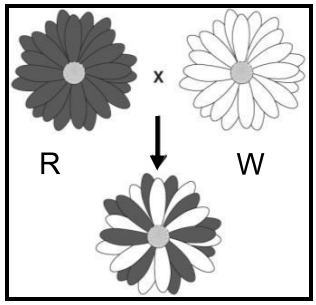


ILLUSTRATION B



4.2.1 Identify the pattern of inheritance represented by EACH of the following:

(a) ILLUSTRATION B (1)

(b) ILLUSTRATION A (1)

4.2.2 Justify the answer to QUESTION 4.2.1(b). (1)

4.2.3 Indicate the genotype of the offspring in ILLUSTRATION B. (1)

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4.3 Quantitative characteristics are controlled by many pairs of genes and have more forms without boundaries, while qualitative characteristics are controlled by one pair of genes and have few clear-cut boundaries.

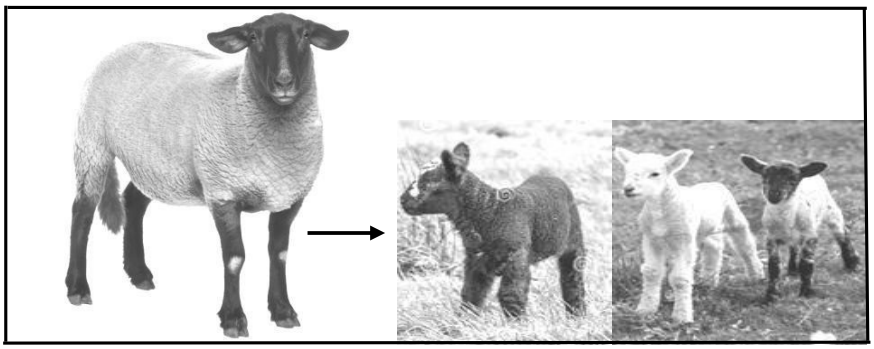
Indicate whether the characteristics below are qualitative or quantitative:

4.3.1 Height (1)

4.3.2 Horn conformation (1)

4.3.3 Milk production (1)

4.4 The picture below shows an ewe with her triplets.



4.4.1 Identify the phenomenon visible with regard to the colour of each of the triplets. (1)

4.4.2 State whether the phenomenon in the picture above is environmental or genetic. (1)

4.4.3 Indicate ONE cause that could have led to the phenomenon in the triplets above. (1)

4.4.4 State the importance of the phenomenon identified in QUESTION 4.4.1, in a breeding programme. (1)

4.5 A farmer crossed two cultivars, CULTIVAR A **(PPLL)** and CULTIVAR B **(ppll)** to improve the characteristics of CULTIVAR B. Assume that **P** is for purple seed, **p** for yellow seed, **L** for long leaf and **l** for short leaf.

4.5.1 Identify ONE characteristic that the farmer needs to improve. (1)

4.5.2 Use a Punnett square to show the F_1-generation of the two cultivars in the extract above. (4)

4.5.3 Indicate the law that applies during gamete formation in QUESTION 4.5.2 before crossing is done. (1)

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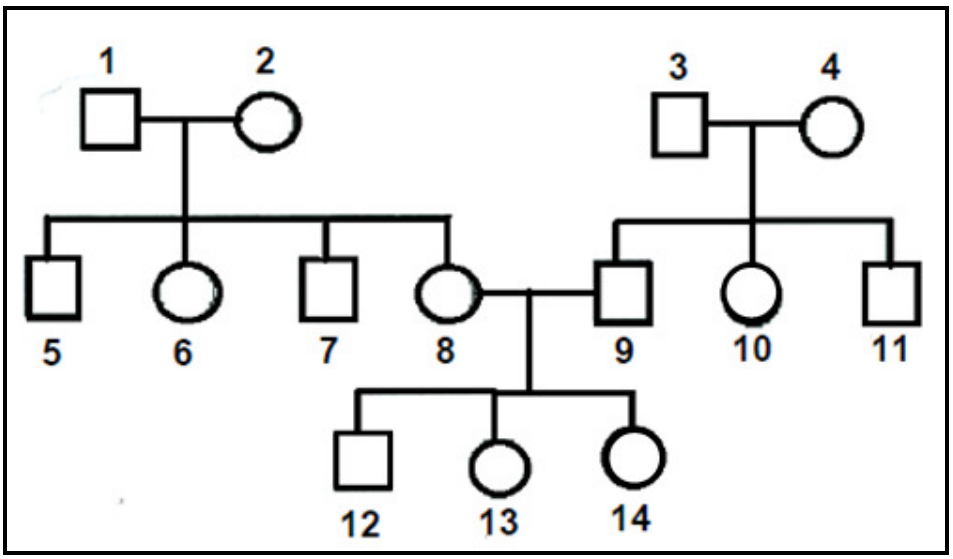
4.6 The schematic representation below is an example of different breeding systems in cattle.

Bull

Cow



4.6.1 Identify, in the schematic representation above, the breeding system illustrated by EACH of the following:

(a) If animal **1** is a Hereford and mates with animal **2** that is a Shorthorn (1)

(b) If animal **3** mates with animal **4** and both are Holstein pure breeds and not related (1)

4.6.2 State ONE advantage that animals **12**, **13** and **14** will have over their parents. (1)

4.6.3 State ONE selection method that could be used in the animal breeding systems identified in QUESTION 4.6.1. (1)

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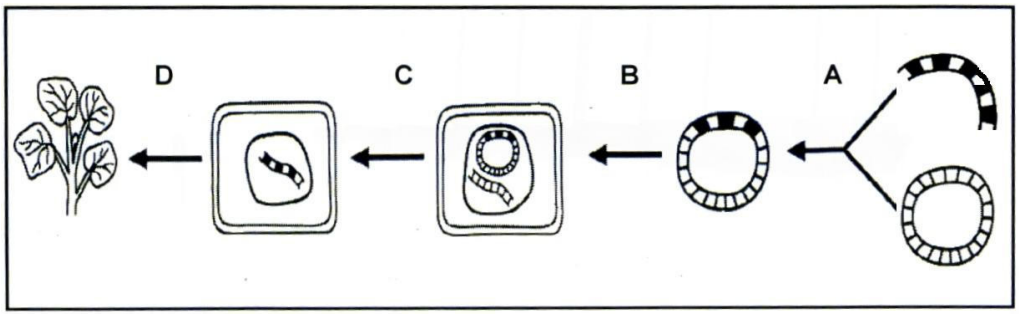
4.7 The flow chart below illustrates a technique used in plant breeding.



4.7.1 Identify the plant breeding technique illustrated above. (1)

4.7.2 State TWO potential environmental benefits of GM crops. (2)

4.8 The table below represents data of genetically modified (GM) maize and non-GM maize with regard to yield in different provinces.

PROVINCE	NON-GM MAIZE YIELD (kg/ha)	GM MAIZE YIELD (kg/ha)
A	3 500	4 500
B	5 500	8 000
C	8 000	9 500
D	8 500	10 000
E	4 500	6 000

Draw a line graph showing the yields of genetically modified (GM) maize and non-GM maize in the different provinces on the same axis. (6)
[35]

TOTAL SECTION B: 105
GRAND TOTAL: 150

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