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basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

AGRICULTURAL SCIENCES P2

NOVEMBER 2023

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 channel where livestock is sold to the highest bidder:

A Farm gate
B Auction
C Direct marketing
D Indirect marketing

1.1.2 The phase in the entrepreneurial process where a farmer secures capital for infrastructure and equipment:

A Starting an enterprise
B Resource mobilisation
C Identification of an opportunity
D Planning

1.1.3 The following is NOT a problem encountered when drawing up a business plan:

A Plan is vague with loop holes
B Unrealistic assumptions and projections
C Business is financially very strong
D Hiding weaknesses and risks

1.1.4 When a price is fixed in a market, …

(i) the price set for the goods and services allows bargaining.
(ii) the price is held constant regardless of the cost of production.
(iii) the price is maintained at a given level by controlling supply and demand.
(iv) there is an agreement between the participants to buy and sell at a predetermined price.

Choose the CORRECT combination:

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

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1.1.5 The management strategies that allow a farmer to manage risks:

A Diversification and risk sharing
B Risk sharing and problem solving
C Diversification and organising
D Specialisation and planning

1.1.6 … is/are a cause of labour shortages on farms.

A Fair labour practices
B The provision of medical insurance and pension
C Less attractive working conditions
D The provision of incentives

1.1.7 The following description implies that land is indestructible:

A Has different production potentials
B Found in a specific environment
C Cannot produce anything by itself
D Can renew itself after it has been degraded

1.1.8 The following are problems related to capital as a production factor:

(i) Scarcity
(ii) Low risk
(iii) Undercapitalisation
(iv) High interest rates

Choose the CORRECT combination:

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

1.1.9 When the alleles on homologous chromosomes differ, an organism is …

A heterozygous.
B recessive.
C dominant.
D homozygous.

1.1.10 … is a measure of how much better or less than average the offspring of an individual will be for a particular characteristic.

A Breeding system
B Pedigree performance
C Breeding method
D Estimated breeding value (10 x 2) (20)

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1.2 Choose a description from COLUMN B that matches a term/phrase 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	The response of demand or supply to a change in price of a product	A	sustainable marketing
1.2.2	Use of recyclable material when packaging produce	B	communication skills
1.2.3	Funding provided by the state that does not have to be paid back	C	grant
1.2.4	The ability of a farm manager to forecast future demand, prices and trends	D	heredity
1.2.5	The transfer of characteristics from parents to offspring	E	progeny
		F	price elasticity
		G	multisegmented marketing
		H	price inelasticity
		I	loan
		J	analytical skills

(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 The process of collecting, recording, analysing and interpreting data on consumers, competitors and the environment for a product

1.3.2 A financial document that summarises assets and liabilities

1.3.3 A type of cell division that leads to the production of haploid sex cells

1.3.4 The selection of organisms that is driven by the particular traits a breeder desires

1.3.5 The technology that involves highly advanced scientific techniques of altering the genes to obtain a desired characteristic (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 A retailer is the type of buyer who works for commission on behalf of other participants.

1.4.2 Variable costs do not change with the level of production.

1.4.3 Biolistic is a technique where bacteria are used to incorporate genes of a desired plant into the DNA of another organism.

1.4.4 Genetics is a measure where the genes contribute to the phenotype.

1.4.5 Incomplete dominance is a pattern of inheritance where characteristics of both parents are expressed in the phenotype of an offspring. (5 x 1) (5)

TOTAL SECTION A: 45

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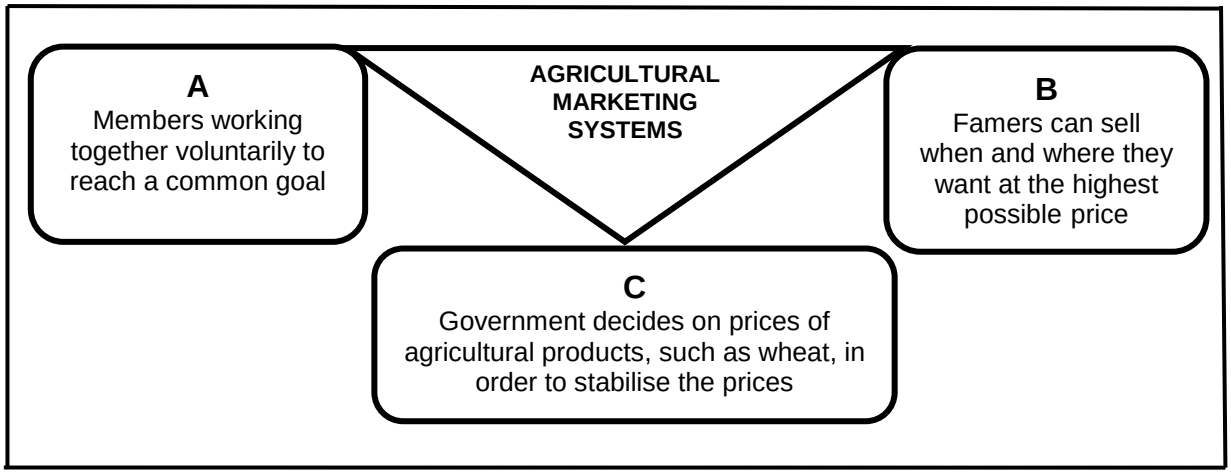
SECTION B

QUESTION 2: AGRICULTURAL MANAGEMENT AND MARKETING

Start this question on a NEW page.

2.1 The diagram below shows the different agricultural marketing systems.



2.1.1 Identify agricultural marketing systems **A**, **B** and **C** represented in the diagram above. (3)

2.1.2 State TWO principles of marketing system **A**. (2)

2.1.3 State ONE disadvantage of marketing system **B**. (1)

2.1.4 State ONE benefit of marketing system **A** to the members. (1)

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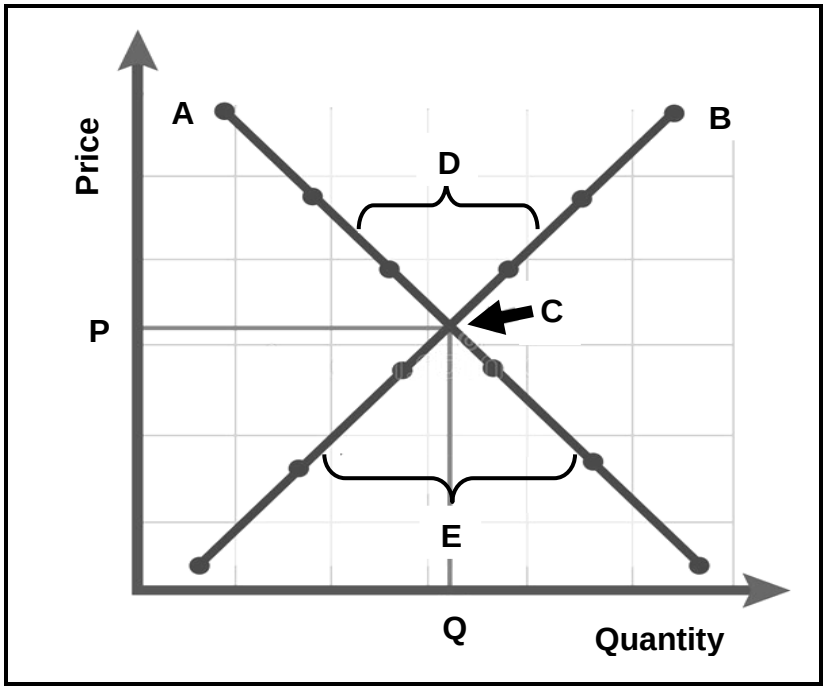
2.2 The graph below shows the price and the quantities in a market.



2.2.1 Identify curves **A** and **B** in the graph above. (2)

2.2.2 Give the economic term for point **C**. (1)

2.2.3 Identify the situation at the market illustrated by **D** and **E**. (2)

2.2.4 Explain the relationship between the price and curves **A** and **B** indicated in the graph. (3)

2.3 The legislative and regulatory framework controls the marketing of agricultural products. Legislation intends to protect both producers and consumers.

2.3.1 State TWO roles of legislation for the effective marketing of agricultural products. (2)

2.3.2 State TWO factors that hamper the marketing of agricultural products. (2)

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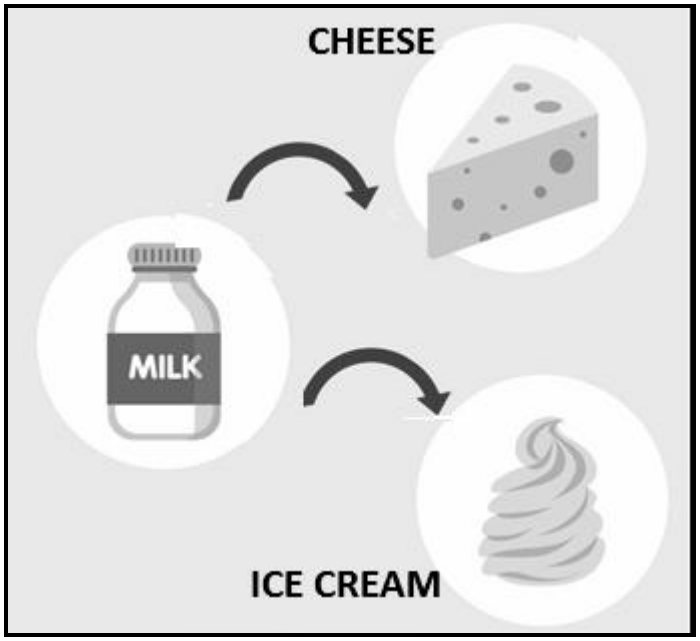
2.4 The picture below illustrates a function of agricultural marketing.



2.4.1 Identify the agricultural marketing function depicted in the picture above. (1)

2.4.2 State TWO advantages of the marketing function identified in QUESTION 2.4.1. (2)

2.4.3 State TWO other main agricultural marketing functions NOT shown in the picture above. (2)

2.5 It is important for entrepreneurs to have good qualities to be able to run a business successfully.

2.5.1 Distinguish between an *entrepreneur* and *entrepreneurship.* (2)

2.5.2 Identify the success factors below that will match EACH of statements (a) and (b):

- Appreciation
- Punctuality
- Leadership
- Motivation
- Confidence

(a) The entrepreneur sets standards and executes the roles for the success of the business. (1)

(b) The entrepreneur is on time for duty on a daily basis. (1)

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2.6 Indicate the components of the SWOT analysis represented by EACH of the statements (2.6.1 to 2.6.4) below.

2.6.1 Increased competition from other producers (1)

2.6.2 Having out-dated and inefficient machinery (1)

2.6.3 Skilled workforce (1)

2.6.4 Newly introduced technology that increases farm efficiency is coming soon (1)

2.7 A business plan is a document that describes a business that a farmer wants to start, its goals and objectives.

2.7.1 Name TWO components that should be included in a good business plan. (2)

2.7.2 Give ONE reason for drawing up a business plan. (1)
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QUESTION 3: PRODUCTION FACTORS

Start this question on a NEW page.

3.1 The table below shows the amount of fertiliser applied and quantity of maize produced on a piece of land.

FERTILISERS (kg)	MAIZE (bags)
5	10
10	25
15	35
20	40
25	40

3.1.1 Draw a line graph using the information in the table above. (6)

3.1.2 Identify the economic characteristic of the land depicted in the table above. (1)

3.1.3 Deduce the function of the land reflected in the table above. (1)

3.1.4 Suggest TWO methods of increasing the productivity of the land other than the one in the table. (2)

3.2 Below are different types of labour employed to perform various tasks in a sheep production enterprise:

- Seasonal
- Permanent
- Casual

3.2.1 Identify from the above the type of labour that is employed to perform the following tasks:

(a) Feeding stud rams (1)

(b) Shearing sheep (1)

(c) Installation of water troughs on the farm (1)

3.2.2 Name TWO ways in which the farmer can improve the living conditions of farm labourers in this farming enterprise. (2)

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3.3 A legal binding document between the farmer and the farm worker must be signed on employment as per the requirement of labour legislation. Other legislation addresses the conditions of employment of farm workers, as listed below.

A Entitlement to tea, lunch breaks and leaves of absence
B Affiliation rights to labour unions
C Provision of protective gear when working with hazardous chemicals
D Compensation for injuries while on duty

3.3.1 Identify the letter (A–D) associated with the conditions above that is addressed by EACH of the following Acts:

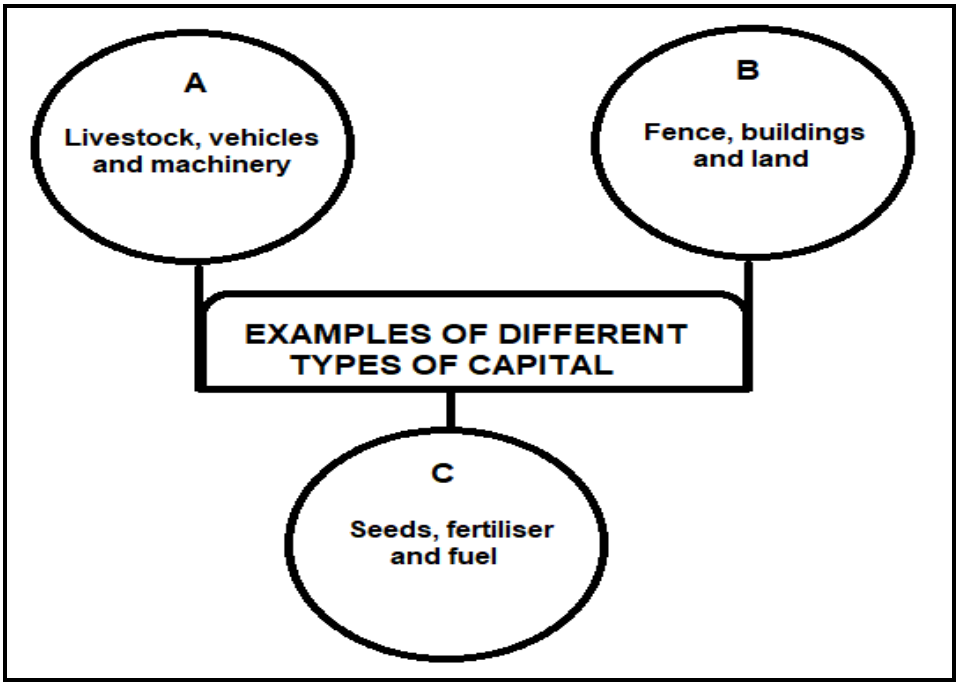
(a) Labour Relations Act, 1995 (Act 66 of 1995) (1)

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

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

3.3.2 Name the legal document that needs to be signed between the farmer and the farm worker. (1)

3.4 The diagram below shows examples of different types of capital commonly used in farming.



3.4.1 Identify the type of capital represented by **A**, **B** and **C** in the diagram above. (3)

3.4.2 State TWO methods of creating capital. (2)

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3.5 The table below represents a financial record in a farming enterprise.

MONTHS OF THE THIRD QUARTER	OCTOBER	NOVEMBER	DECEMBER
OPENING BALANCE	**R500**	**R10 150**	**R13 538**
Income (Receipts):			
Livestock sales	R3 500	R3 500	R2 000
Sales from crops	R4 300		
Capital	R5 500	R4 500	R2 200
TOTAL INCOME (RECEIPTS)	**R13 300**	**R8 000**	**R4 200**
Expenses (Payments):			
Transport	R2 800	R3 700	R4 600
Interest on amount owed	R350	R412	R674
Wages for labourers	R500	R500	R3 500
TOTAL EXPENSES (PAYMENTS)	**R3 650**	**R4 612**	**R8 774**
PROFIT/LOSS	**R9 650**	**R3 388**	**A**
CLOSING BALANCE	**B**	**R13 538**	

3.5.1 Identify the financial record in the table above. (1)

3.5.2 Give ONE reason for the answer to QUESTION 3.5.1 by referring to the table. (1)

3.5.3 Calculate the profit or loss for December represented by **A** in the table above. Include the formula and show ALL calculations. (3)

3.5.4 Calculate the closing balance represented by **B** in the table above. Show ALL calculations. (2)

3.6 Management is the effective combination and coordination of human, physical and financial resources to maximise profit.

3.6.1 Indicate the management principle applicable to EACH of the following statements:

(a) The manager puts different planned activities into action (1)

(b) Development of short- and long-term strategies based on available resources (1)

3.6.2 Name ONE example of EACH of the following:

(a) Internal force influencing farming businesses (1)

(b) External forces affecting farming businesses (1)

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QUESTION 4: BASIC AGRICULTURAL GENETICS

Start this question on a NEW page.

4.1 Mendel studied the characteristics of garden peas and concluded that there are two alleles for each characteristic, which separate from each other during gametogenesis to form the genetic makeup of an individual. Based on the findings, Mendel came up with the laws used by geneticists even today.

4.1.1 Give a term for the underlined words in the paragraph above. (1)

4.1.2 Deduce Mendel's Law of Inheritance illustrated in the paragraph above. (1)

4.1.3 Explain Mendel's Law of Independent Assortment. (2)

4.2 In pigs, red hair colour (R) is dominant over white colour (r). A white sow was mated with a red boar and all piglets in the F_1 were red.

4.2.1 Use the Punnett square method to determine the genotype of the F_1-generation. (4)

4.2.2 Calculate the percentage of homozygous red piglets. (2)

4.3 Assume that four pairs of genes control the height of pepper plants. The base height of a recessive plant (aabbccdd) is 40 cm. Each additive allele contributes 4 cm to the base height.

4.3.1 Calculate the height of a plant with an AaBbCcDD genotype. (2)

4.3.2 Determine EACH of the following:

(a) Genotype of a plant with a height of 68 cm (1)

(b) Phenotype of the shortest plant (1)

4.4 Streaked hairlessness is a disorder that results in streaks of missing hairs in Holstein cattle. It is caused by a dominant allele located on the X-chromosome.

4.4.1 Indicate whether the characteristic explained above is X-linked or Y-linked inheritance. (1)

4.4.2 Give a term that refers to characteristics that are located on the X- and Y-chromosomes. (1)

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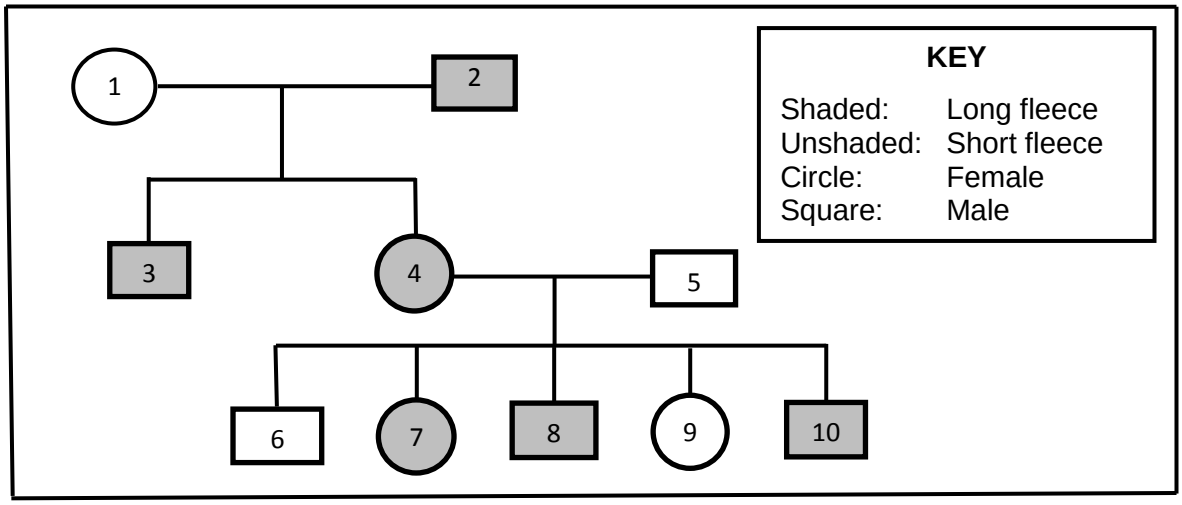
4.5 The pedigree diagram below shows the inheritance of fleece length in sheep. Long fleece is dominant (L) over short fleece (l).



4.5.1 From the data above, indicate a characteristic which is dominant. (1)

4.5.2 Determine the genotype of individual 5. (1)

4.5.3 Give the phenotype of individual 9. (1)

4.5.4 Indicate whether individual 8 is homozygous or heterozygous. (1)

4.5.5 Identify the number of female animals in the pedigree diagram that are homozygous recessive. (1)

4.6 Variation is the foundation for selection and breeding.

4.6.1 Define the term *variation.* (2)

4.6.2 State TWO causes of variation. (2)

4.6.3 Name ONE type of mutagen. (1)

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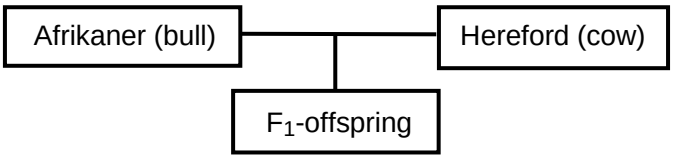
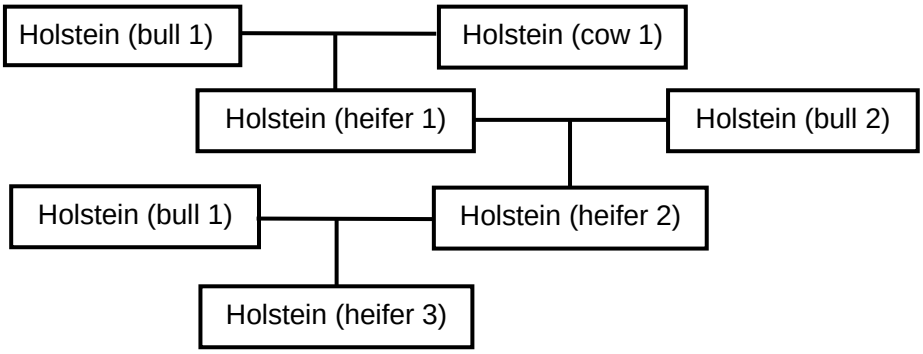
4.7 The schematic representation below shows different breeding systems in cattle.

Breeding system 1:



Breeding system 2:



4.7.1 Identify the breeding systems represented by EACH of the following:

(a) Breeding system 1 (1)

(b) The crossing of Holstein (bull 1) with Holstein (heifer 2) in breeding system 2 (1)

4.7.2 From the schematic representations above, identify the breeding system that promotes heterosis. (1)

4.7.3 State TWO disadvantages of inbreeding. (2)

4.8 Genetic modification is a technology used by plant and animal breeders to improve the performance of organisms.

4.8.1 State TWO health benefits of genetically modified crops. (2)

4.8.2 State TWO aims of genetic modification in animals. (2)
[35]

TOTAL SECTION B: 105
GRAND TOTAL: 150

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