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Basic Education
REPUBLIC OF SOUTH AFRICA

SENIOR CERTIFICATE EXAMINATIONS/ NATIONAL SENIOR CERTIFICATE EXAMINATIONS

AGRICULTURAL SCIENCES P2

2022

MARKS: 150

TIME: 2½ hours

This question paper consists of 16 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 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 numbers (1.1.1 to 1.1.10) in the ANSWER BOOK, e.g. 1.1.11 B.

1.1.1 A person who recognises a business opportunity and is willing to take a risk:

- A Labourer
- B Manager
- C Supervisor
- D Entrepreneur

1.1.2 ONE of the following statements regarding selling is NOT CORRECT:

- A Emphasis is on agricultural products
- B Marketing management is based on sales volume
- C Focus is on the needs of sellers
- D Planning is long-term, based on new products for the future

1.1.3 ... occurs at the point where the market supply and the market demand curves meet.

- A Market equilibrium
- B Market development
- C Surplus
- D Shortage

1.1.4 Cooperative marketing has the following advantages for farmers:

- (i) Provides better chances of negotiating a good price
- (ii) Ensures easy access to funding
- (iii) Prices of products fluctuate and producers are affected
- (iv) Markets are preserved for members

Choose the CORRECT combination:

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

1.1.5 An example of an internal force that affects a farming business:

- A Natural forces like hail and floods
- B Labour demands for higher wages
- C The drop of the milk price in the market
- D Changes of lifestyle choices

- 1.1.6 ONE of the following is NOT a function of land:
- A Acts as a store of wealth
 - B Depreciates over time
 - C Enables the production of food, fibre and fuel
 - D Provision of space and area
- 1.1.7 ... is the main component of a cash flow statement.
- A Income
 - B Net worth
 - C Assets
 - D Liabilities
- 1.1.8 The use of machinery to replace human labour:
- A Training
 - B Mechanisation
 - C Ploughing
 - D Supervision
- 1.1.9 An example of a qualitative characteristic in animals:
- A Weight gain
 - B Milk production
 - C Gender of offspring
 - D Growth rate
- 1.1.10 ... is the pattern of inheritance that controls the fur coat colour in rabbits with the alleles C, C^h, C^{ch} and c.
- A Co-dominance
 - B Polygenic inheritance
 - C Multiple alleles
 - D Atavism
- (10 x 2) (20)

- 1.2 Choose a term from COLUMN B that matches the description in COLUMN A. Write only the letter (A–H) 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	Cooperatives market their goods in large quantities for more bargaining powers	A	hedging
1.2.2	Entering into future contracts to ensure a secure market and price	B	qualitative
1.2.3	The value of assets increasing over time	C	motivation
1.2.4	Providing incentives and recognition of work done with rewards	D	quantitative
1.2.5	The genetic characteristics that give rise to a range of phenotypes from one extreme to the other	E	contract
		F	depreciation
		G	economy of scale
		H	appreciation

(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 measure of how much the supply or demand of a product changes with a change in price
- 1.3.2 The activity that involves the combination and co-ordination of human, physical and financial resources
- 1.3.3 The passing on of traits from generation to generation
- 1.3.4 Measuring genetic characteristics by using computer technology
- 1.3.5 The picking of individual cultivars based on the records of their respective offspring

(5 x 2)

(10)

1.4 Change the UNDERLINED WORD(S) in the following to make the statements TRUE. Write the appropriate word(s) next to the question numbers (1.4.1 to 1.4.5) in the ANSWER BOOK.

1.4.1 A marketing plan is a tool that helps a farmer to evaluate the business for future prospects.

1.4.2 Management refers to the physical endeavour performed in expectation of remuneration.

1.4.3 Prepotency refers to the expression of one gene that is controlled by another pair of genes.

1.4.4 A sudden change in the genetic composition of an organism is known as selection.

1.4.5 A gene is a thread-like structure made up of DNA molecules.

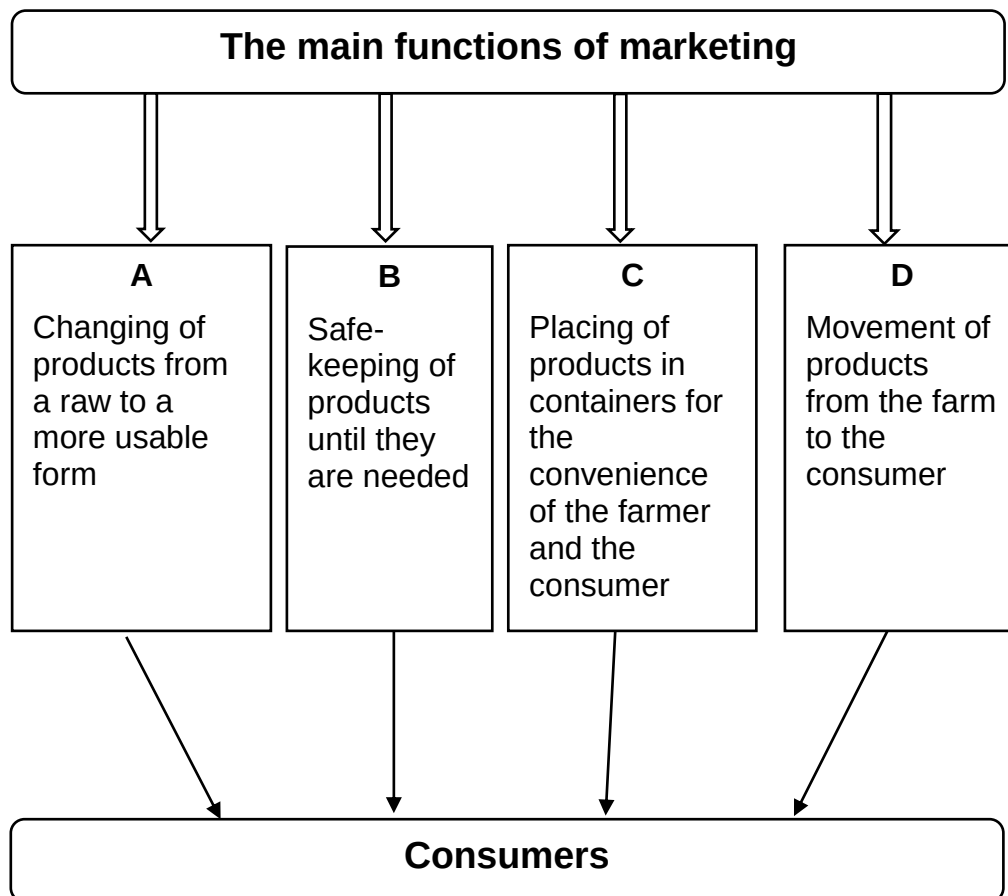
(5 x 1) (5)

TOTAL SECTION A: 45

SECTION B**QUESTION 2: AGRICULTURAL MANAGEMENT AND MARKETING**

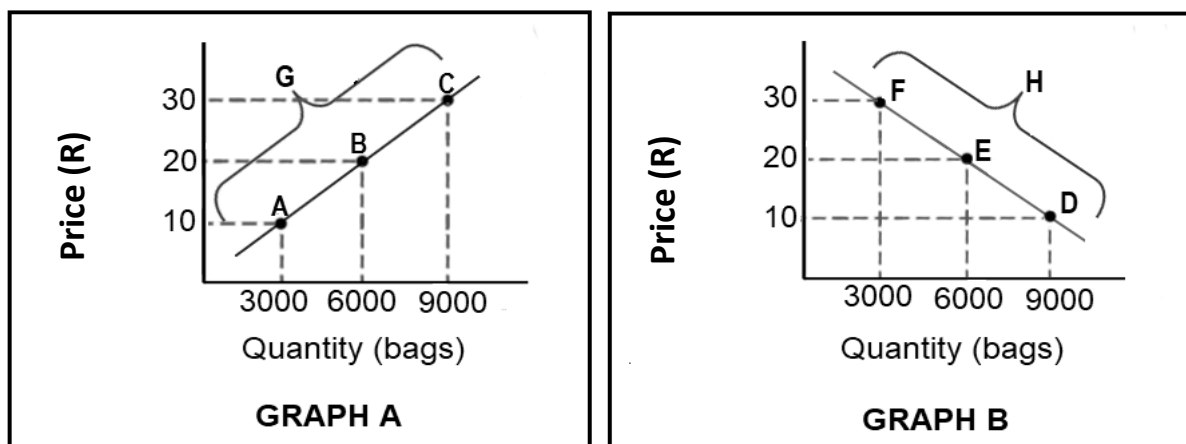
Start this question on a NEW page.

2.1 The schematic representation below shows marketing in agriculture.



- 2.1.1 Identify the functions of agricultural marketing represented by **B** and **D**. (2)
- 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 graphs below show the relationship between price and quantity of agricultural products.



2.2.1 Identify in graphs **A** and **B** above the curves that represent EACH of the following:

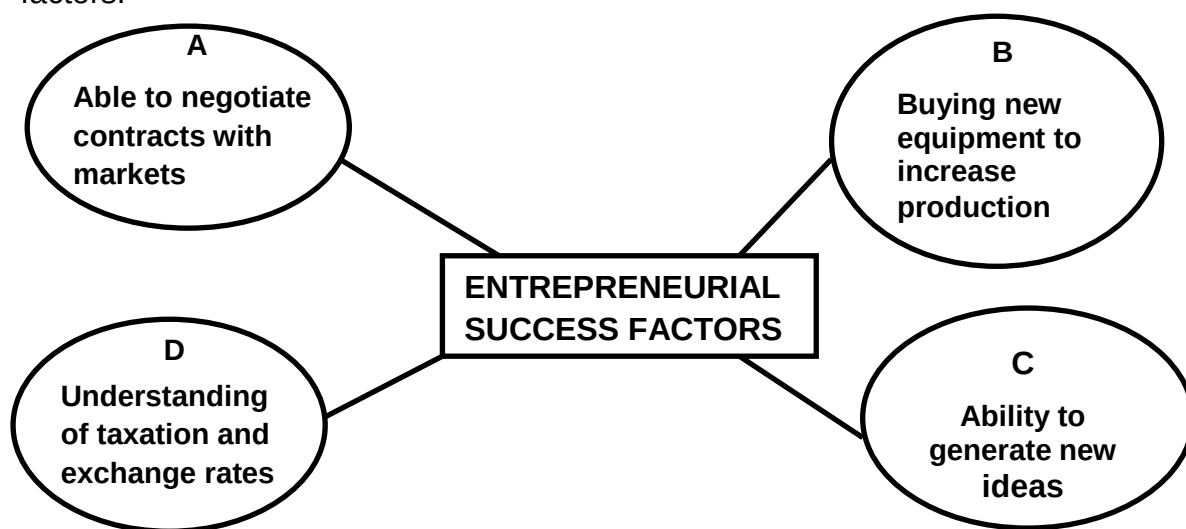
- (a) Demand (1)
- (b) Supply (1)

2.2.2 Give a reason for the answer to QUESTION 2.2.1(a). (2)

2.2.3 Name TWO factors that influence demand of agricultural products. (2)

2.2.4 Deduce the relationship between price and quantity from graph **A** above. (2)

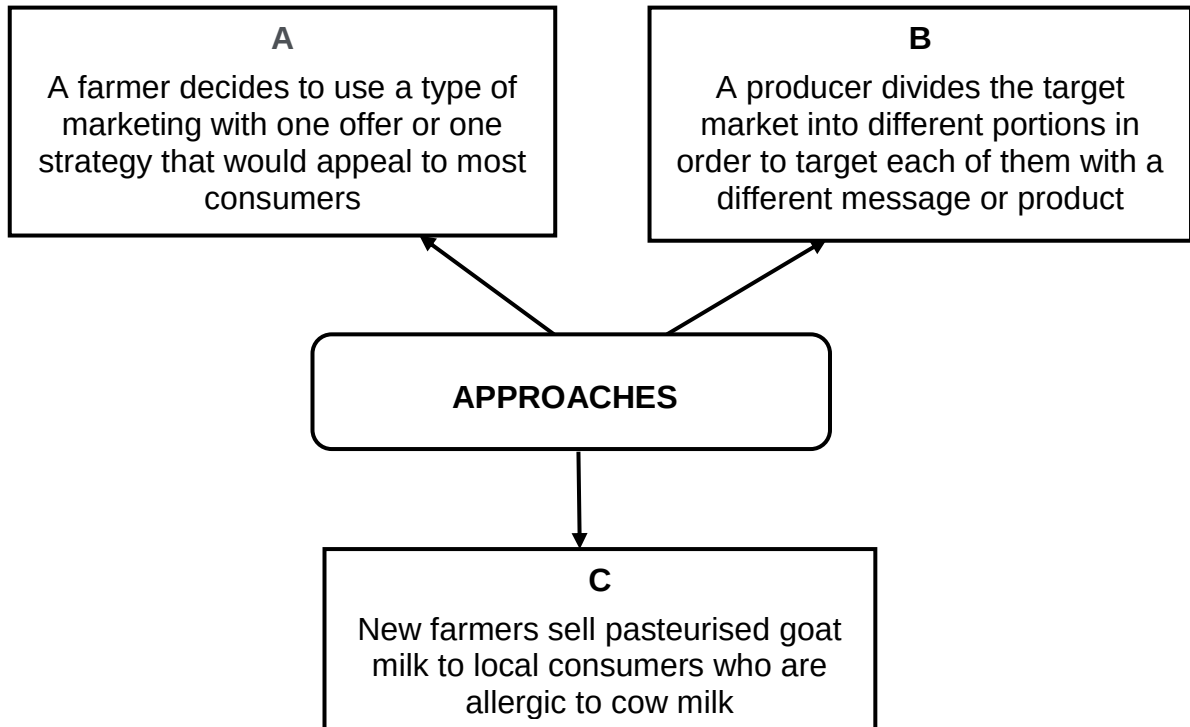
2.3 The schematic representation below shows different entrepreneurial success factors.



2.3.1 Write down the letter (A–D) that represents the following entrepreneurial success factors:

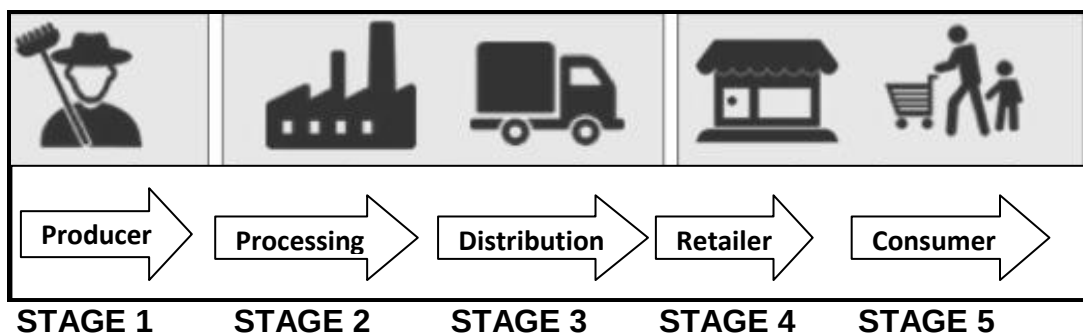
- (a) Innovation (1)
- (b) Interpersonal skills (1)
- (c) Risk taking (1)

2.4 The diagram below shows examples of different marketing approaches.



2.4.1 Identify the marketing approaches represented by **A**, **B** and **C** above. (3)

2.5 The flow chart below shows different stages in a marketing process.



2.5.1 Name the marketing process in the flow chart above. (1)

2.5.2 Indicate TWO costs visible in the flow chart above that might influence the high price at STAGE 4, except for production. (2)

2.5.3 Name TWO factors that could hamper the marketing of the product at STAGE 3. (2)

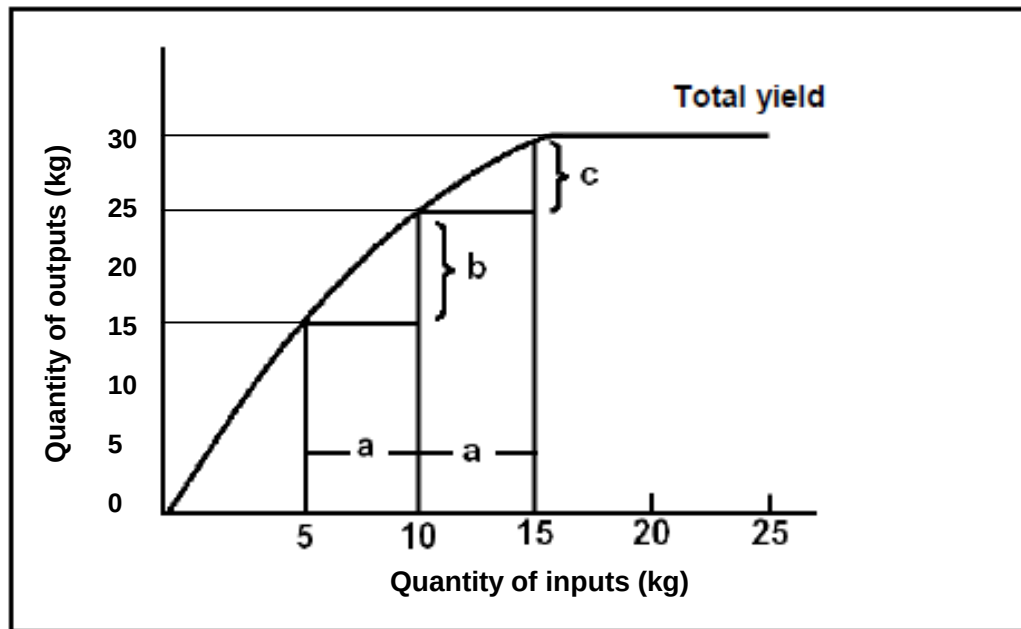
2.5.4 Indicate ONE way to streamline and improve the marketing process stated in QUESTION 2.5.1. (1)

- 2.6 Fresh produce markets are set up in large centres where farmers deliver their produce which is then sold through a market agent.
- 2.6.1 State TWO advantages of the marketing channel in the statement above for the farmer. (2)
- 2.6.2 The use of an agent increases the marketing cost for the farmer. Justify this statement. (1)
- 2.6.3 Name the marketing system that makes use of the channel above. (1)
- 2.7 Indicate TWO roles of legislation in agricultural marketing. (2)
- 2.8 A business plan is a document that describes a potential business, its goals and objectives.
- 2.8.1 Name the component of a business plan containing particulars of the business owner. (1)
- 2.8.2 Give TWO reasons for drawing up a business plan. (2)
- [35]**

QUESTION 3: PRODUCTION FACTORS

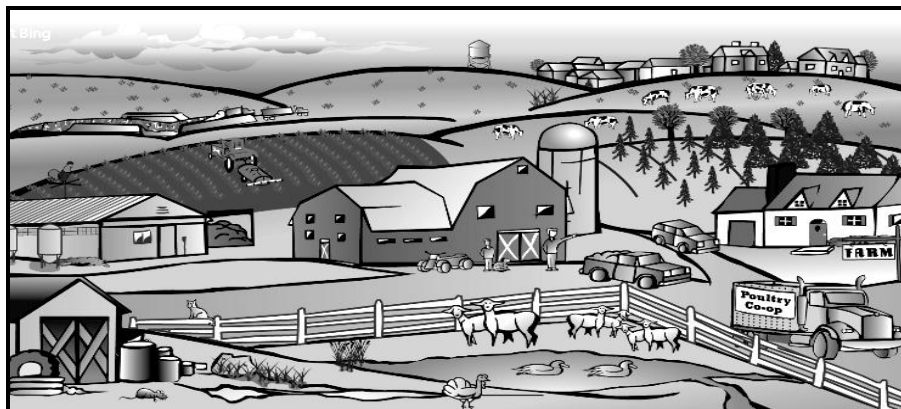
Start this question on a NEW page.

- 3.1 The graph below shows an economic characteristic common to land as a production factor with regard to inputs and outputs.



- 3.1.1 Identify the economic characteristic shown in the graph above. (1)
- 3.1.2 Describe the implication of the economic characteristic identified in QUESTION 3.1.1. (2)
- 3.1.3 Compare the output response with regard to the quantity of inputs that increases from 5 to 10 and from 10 to 15. (2)
- 3.1.4 Name TWO measures the farmer can take to improve the productivity of land. (2)

- 3.2 The picture below shows a farming enterprise.



- 3.2.1 Indicate the management strategy undertaken by the farmer to reduce the impact of risk shown in the picture above. (1)

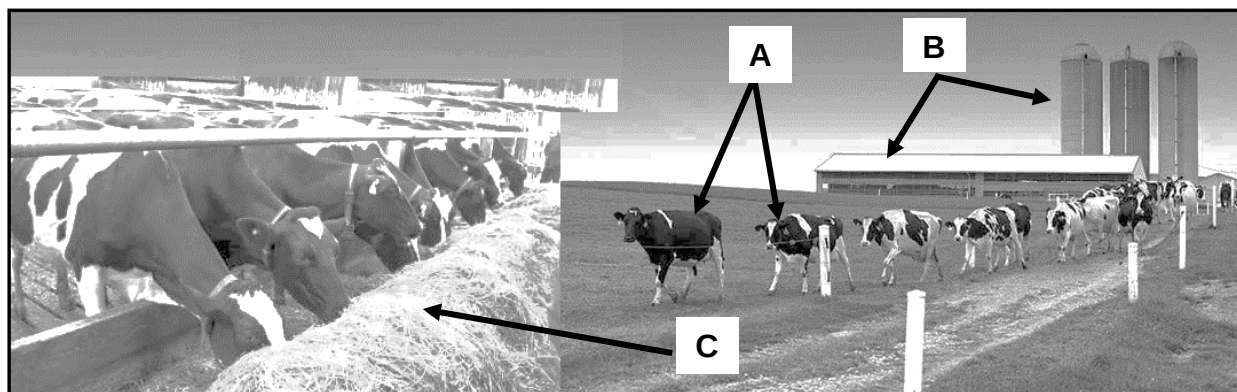
- 3.2.2 Give a reason for the answer to QUESTION 3.2.1. (1)
- 3.2.3 Name the risk management strategy when the cost of a farming enterprise is distributed equally among the group of farmers. (1)
- 3.2.4 Indicate the source of the risk that may be due to a disease outbreak. (1)
- 3.2.5 Name TWO management principles a farm manager could employ to deal with risks. (2)

3.3 Below is part of a contract between a farmer and a farm worker.

CONTRACT OF EMPLOYMENT	
1. <i>Particulars of employer:</i> Mybag Farms	
2. Name: TR Trevor	
3. ID: 5113110123187	
4. <i>Particulars of employee:</i>	
4.1 Name: MN Chukucha	
4.2 ID: 9613259876087	
5. <i>Job title:</i> Machine Operator	
6. <i>Payment details:</i>	
6.1 Mode of payment: Monthly cheque	
6.2 Amount: R2 300	
7. <i>Terms of employment:</i>	
7.1 Duration of contract: 2 January 2021 to retirement	
7.2 Working hours: 06:00 to 18:00	
7.3 Leave: Five days paid leave per annum	
8. <i>Protective clothing:</i> None	
<i>Employee's signature:</i>	Date: 02/01/2021
<i>Employer's signature:</i>	Date: 02/01/2021

- 3.3.1 Define the term *contract*. (2)
- 3.3.2 Indicate the type of farm worker who has to sign the contract above based on the term of employment. (1)
- 3.3.3 Give a reason to support the answer to QUESTION 3.3.2. (1)
- 3.3.4 Name the labour legislation that has been violated by the employer in EACH of the following sections of the contract above:
- (a) Number 7 (1)
- (b) Number 8 (1)
- 3.3.5 Identify, in the contract above, TWO reasons that may lead to the movement of farm workers from the farm to other industries. (2)

3.4 The picture below shows a farm with different types of capital.



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

3.4.2 Indicate TWO methods by which a farmer can create more capital. (2)

3.4.3 Name TWO problems associated with capital as a production factor. (2)

3.5 The table below shows assets and liabilities of a farming business for the year ending on 28 February 2021.

ASSETS	VALUE (R)	LIABILITIES	VALUE (R)
A		CURRENT LIABILITIES	
Positive bank balance	10 000	Sundry creditors	20 000
Farm produce sold	15 000	Production loans	35 000
Growing crops	6 000		
Subtotal	31 000	Subtotal	55 000
Medium-term assets		Medium-term liabilities	
Vehicles and Machinery	420 000	Vehicle finance	280 000
Livestock	60 000	Loan repayment	60 000
Subtotal	480 000	Subtotal	340 000
Long-term assets		Long-term liabilities	
Farm land	950 000	Bond repayment	450 000
Buildings	400 000	Loans	120 000
Subtotal	1 350 000	Subtotal	570 000
TOTAL ASSETS	1 861 000	TOTAL LIABILITIES	B

3.5.1 Name the financial statement above. (1)

3.5.2 Identify **A** in the financial statement above. (1)

3.5.3 Calculate the value of **B** in the financial statement above. Show ALL calculations. (2)

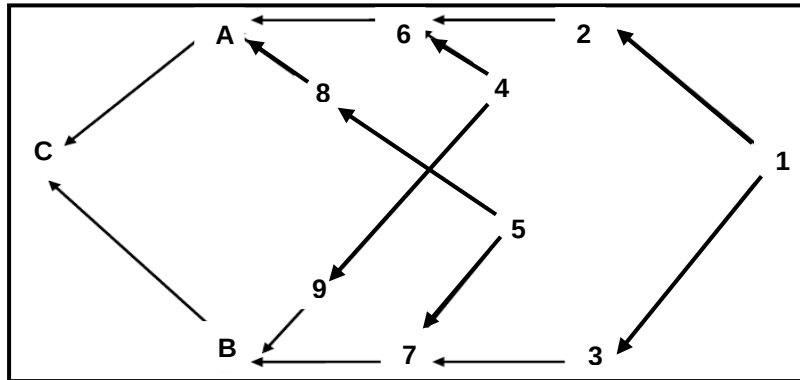
3.5.4 Calculate the net worth of the farming business above. Include the formula. (3)

[35]

QUESTION 4: BASIC AGRICULTURAL GENETICS

Start this question on a NEW page.

4.1 The flow chart below shows a schematic representation of line breeding.



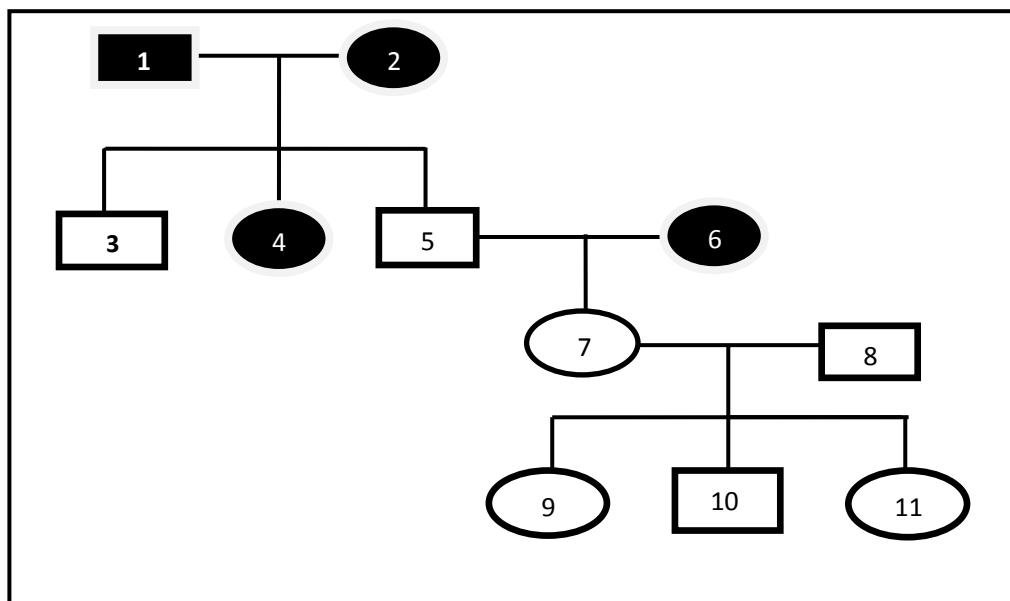
4.1.1 Identify, in the flow chart above, TWO common ancestors of individuals **A** and **B**. (2)

4.1.2 Indicate the relationship between individuals **2** and **3**. (1)

4.1.3 Name TWO advantages of line breeding. (2)

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

KEYS Unshaded (White) = d  = Male
Shaded (Dark) = D  = Female



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

- 4.2.2 Indicate the number of white male individuals in the pedigree diagram in QUESTION 4.2. (1)
- 4.2.3 Determine the genotypes of EACH of the following individuals:
- (a) 1 (1)
- (b) 5 (1)
- 4.2.4 Refer to the pedigree diagram in QUESTION 4.2 and indicate whether the following individuals are homozygous or heterozygous:
- (a) 6 (1)
- (b) 10 (1)
- 4.2.5 Give a reason for the answer to QUESTION 4.2.4(b). (2)
- 4.3 Indicate the sex chromosomes in EACH of the following:
- 4.3.1 Male cattle (1)
- 4.3.2 Female cattle (1)
- 4.4

In certain species of plants blue flower colour (B) is dominant over purple (b). A plant with heterozygous blue flowers was crossed with a homozygous purple-flowered plant.
- Draw a Punnett square to indicate the result of a cross between the two plants. (4)
- 4.5

Traditionally subsistence farmers used a selection and breeding method whereby the genetically best bulls for growth, health and fertility were shared between family and friends. They also cared for their animals by utilising the best available pastures and keeping them away from wet and muddy areas.
- 4.5.1 Identify the type of selection illustrated in the passage above. (1)
- 4.5.2 Give ONE animal production characteristic used by subsistence farmers in the passage above for selection purposes. (1)
- 4.5.3 Indicate how the following aspects were used by the subsistence farmers in the scenario above to improve EACH of the following phenomena on a farm:
- (a) Genetic variation (1)
- (b) Environmental variation (1)

- 4.6 The table below provides data on an experiment conducted with a dihybrid crossing in plants.

CHARACTERISTIC	NUMBERS OBTAINED (thousands)	NUMBERS EXPECTED (thousands)
Large + tall (L+T)	10	9
Large + short (L+S)	3	3
Small + tall (S+T)	2	3
Small + short (S+S)	1	1

- 4.6.1 Draw a combined bar graph of the different characteristics with the numbers obtained and numbers expected. (6)

- 4.6.2 Deduce, from the graph, the trend of the obtained numbers. (1)

- 4.7 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.

- 4.7.1 Identify the technique used in the passage above to modify the maize cultivar genetically. (1)

- 4.7.2 State TWO potential benefits of genetically modified crops to the environment. (2)

- 4.7.3 Name TWO potential risks of genetically modified crops. (2)
[35]

TOTAL SECTION B: 105
GRAND TOTAL: 150