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Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

SENIOR CERTIFICATE/ NATIONAL SENIOR CERTIFICATE

GRADE 12

AGRICULTURAL SCIENCES P2

NOVEMBER 2020

MARKS: 150

TIME: 2½ hours

This question paper consists of 13 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 free marketing channel where goods are sold to the highest bidder is known as ... marketing.

- A farm gate
- B direct sale
- C internet
- D stock sale

1.1.2 Which ONE of the following elements of a SWOT analysis is a strength of a business?

- A Consumers cannot easily access the market
- B Production of high-quality products
- C High demand for a product
- D Many producers selling a product

1.1.3 This process involves the production of the product and moving it to consumers:

- A Marketing
- B Processing
- C Standardisation
- D Grading

1.1.4 Oversupply in a market can be avoided by the following:

- (i) Converting excess produce to other consumable products
- (ii) Entering into future contracts with wholesalers
- (iii) Increasing the price of the produce
- (iv) Having a storage facility

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 The following represents a fixed capital item:

- A A tractor
- B A dam
- C Fuel
- D Seed

- 1.1.6 A production factor that is also regarded as capital:
- A Land
 - B Labour
 - C Management
 - D Money
- 1.1.7 A number of different production enterprises on a farm is referred to as ...
- A specialisation.
 - B flexibility.
 - C diversification.
 - D hedging.
- 1.1.8 The creation of capital by borrowing from financial institutions is called ...
- A credit.
 - B a grant.
 - C capital.
 - D debt.
- 1.1.9 The following are the main types of gene mutation:
- (i) Insertion
 - (ii) Duplication
 - (iii) Inversion
 - (iv) Deletion
- Choose the CORRECT combination:
- A (ii), (iii) and (iv)
 - B (i), (iii) and (iv)
 - C (i), (ii) and (iv)
 - D (i), (ii) and (iii)
- 1.1.10 ONE of the following is NOT Mendel's law of inheritance:
- A Law of dominance
 - B Law of diminishing returns
 - C Law of segregation
 - D Law of independent assortment
- (10 x 2) (20)

- 1.2 Choose a term/phrase from COLUMN B that matches a 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 | Method of promotion whereby consumers are allowed to taste a product | A | price fixing |
| | | B | inventory |
| 1.2.2 | A condition where a price is held constant regardless of the cost of production | C | in-store promotion |
| | | D | net worth |
| 1.2.3 | A list of all the capital goods on a farm | E | budget |
| | | F | dominant |
| 1.2.4 | The difference between assets and liabilities | G | recessive |
| | | H | advertising |
| 1.2.5 | An allele that is not expressed in the phenotype of a heterozygous organism | | |

(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 situation in a market where the quantity of products supplied is exactly equal to the quantity demanded
- 1.3.2 The type of labour employed to build a kraal
- 1.3.3 Form of biotechnology that produces a genetically modified organism
- 1.3.4 The crossing of farm animals from different species
- 1.3.5 The degree to which a characteristic is determined more by genes than by environmental factors

(5 x 2) (10)

1.4 Change the UNDERLINED WORD 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 Multi-segment is a marketing approach where products are responded to and marketed in an environmentally sensitive way.

1.4.2 A permit is a legally binding document between two parties.

1.4.3 The selection of animals based on the performance of their siblings is known as mass selection.

1.4.4 An estimate of how much better or less than average an offspring will be for a particular characteristic is known as breeding.

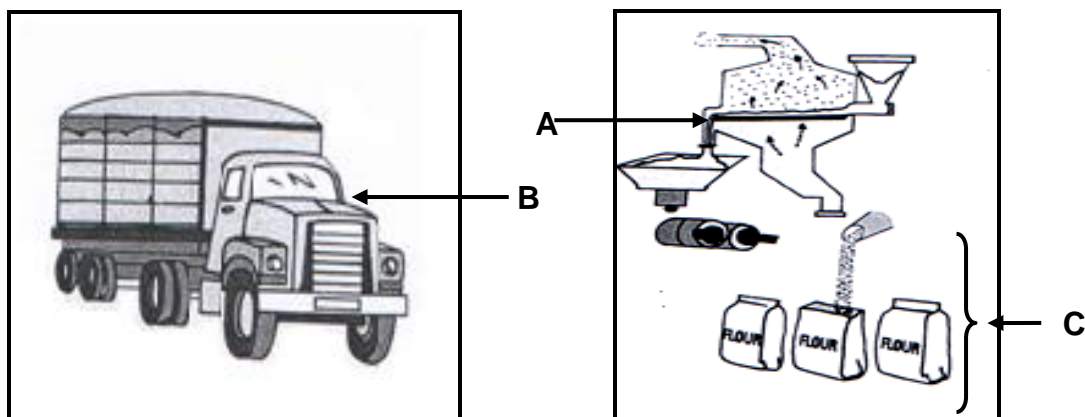
1.4.5 Atavism is when one parent has greater than usual ability to transfer traits to the offspring. (5 x 1) (5)

TOTAL SECTION A: 45

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

Start this question on a NEW page.

2.1 The pictures below illustrate the functions of marketing.



2.1.1 Identify the marketing functions illustrated in **B** and **C**. (2)

2.1.2 State TWO guidelines for the marketing function in **C**. (2)

2.1.3 Name TWO advantages of the marketing function in **A**. (2)

2.2 The table below shows the demand of two products at different prices.

| PRICE PER BAG (R) | QUANTITY DEMANDED (kg) | |
|-------------------|------------------------|-----------|
| | PRODUCT 1 | PRODUCT 2 |
| R5 | 600 | 2 500 |
| R10 | 500 | 2 300 |
| R15 | 400 | 2 000 |
| R20 | 300 | 2 000 |
| R25 | 200 | 2 000 |
| R30 | 100 | 2 000 |

2.2.1 Draw a line graph showing the quantity of PRODUCT 1 demanded at the different prices. (6)

2.2.2 Identify the product (1 or 2) in the table that reflects the law of demand. (1)

2.2.3 Justify the answer to QUESTION 2.2.2. (1)

2.2.4 Name the form of elasticity displayed in PRODUCT 1 and PRODUCT 2. (2)

2.2.5 Give a reason for the answer to QUESTION 2.2.4 for EACH of the products. (2)

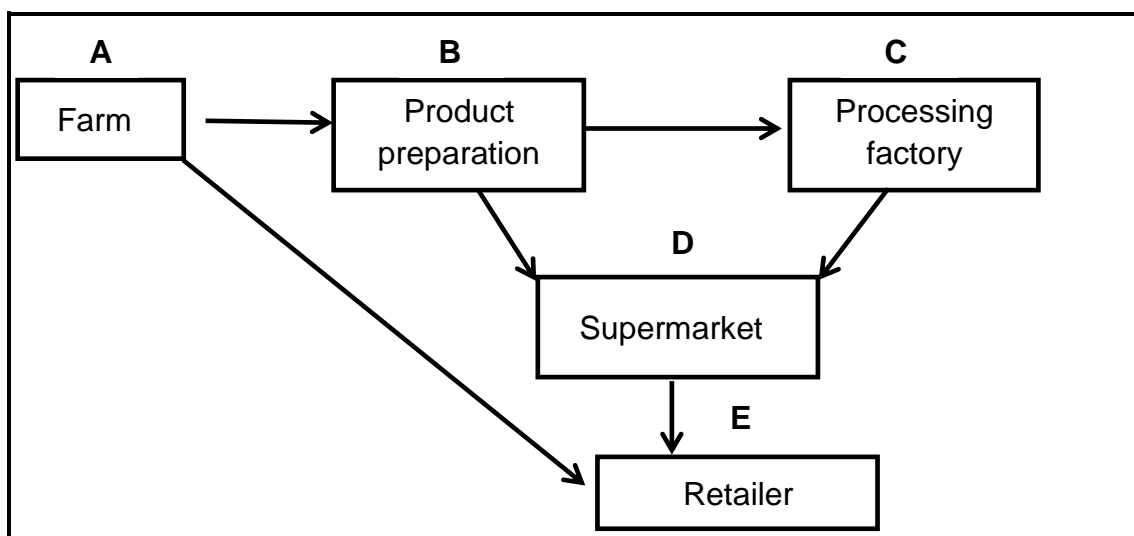
2.3 In a free-market system, producers sell their produce whenever and wherever they want at a price agreed upon by both the buyer and the seller.

2.3.1 Identify an advantage of a free-market system for the consumer. (1)

2.3.2 Name TWO disadvantages of a free-market system for the producer. (2)

2.3.3 State TWO marketing channels which the producers in a free-market system can use to market their produce. (2)

2.4 The flow chart below represents a marketing chain.



2.4.1 Identify the marketing chain illustrated above. (1)

2.4.2 Name the factor that may hamper the marketing at stage **E** if fewer products are sold. (1)

2.4.3 Indicate TWO ways to improve the agribusiness chain between stage **A** and stage **E**. (2)

2.5 The following are personal characteristics that make an entrepreneur succeed in a business.

perseverance; innovation; risk-taking;
confidence; interpersonal skills

2.5.1 Choose a personal characteristic of an entrepreneur above that matches EACH of the following statements:

- (a) Finding ways of generating new ideas to overcome challenges (1)
- (b) Ability to interact with people (1)
- (c) Does not give up easily even in difficult times (1)
- (d) Buying new equipment hoping that it will increase production (1)

2.5.2 Name TWO phases of the entrepreneurial process. (2)

2.5.3 State TWO problems that the entrepreneur may encounter when drawing up a business plan. (2)

[35]

QUESTION 3: PRODUCTION FACTORS

Start this question on a NEW page.

3.1 An Agricultural Sciences graduate wanted money to buy a farm and start a farming enterprise. The graduate managed to get money on credit.

3.1.1 Indicate the type of credit obtained to buy the farm. (1)

3.1.2 Explain the type of credit indicated in QUESTION 3.1.1. (2)

3.1.3 Identify TWO problems with capital that the graduate may experience. (2)

3.1.4 State TWO other ways of creating capital. (2)

3.2 Farming is a business that requires management as a production factor to manage it effectively.

3.2.1 Define the term *management*. (2)

3.2.2 List THREE main components of management. (3)

3.3 The following are external forces that affect a business.

| | |
|----------------------|----------------------|
| Environmental forces | Economic forces |
| Legal forces | |
| Technological forces | Sociocultural forces |

Match the external forces above with the descriptions below.

3.3.1 Affects a farming business through the inflation rate (1)

3.3.2 The way a farming business provides working conditions for its labour force (1)

3.3.3 A change in the population demographics, such as age, race and gender, can affect customers' needs and wants (1)

3.3.4 The impact of drought and flooding on a farming business (1)

3.3.5 The effect of infrastructure and telecommunications on a farming business (1)

3.4 LABOUR LEGISLATION

3.4.1 Name THREE aspects in the contract of a farm worker that address the Basic Conditions of Employment Act, 1997 (Act 75 of 1997). (3)

3.4.2 Indicate the legislation that makes provision for farm workers to do the following:

(a) Wear gumboots and overalls during the milking process (1)

(b) The right to strike and unfair labour practices (1)

3.5 Soil may be damaged, but cannot be destroyed.

3.5.1 Indicate an economic characteristic of land represented by the statement above. (1)

3.5.2 State any THREE other economic characteristics of land. (3)

3.5.3 Name TWO methods that can be used to improve soil productivity. (2)

3.6 The table below shows a broiler production budget.

| EXPENDITURE ITEMS (RAND) | | INCOME (RAND) | |
|-------------------------------------|--------|-------------------------|--------|
| Cost price of 1 500 broilers | 1 500 | Sales of 1 450 broilers | 79 750 |
| Feed (starter, grower and finisher) | 45 000 | Sales of manure | 3 700 |
| Electricity and water | 6 000 | | |
| Vaccines | 800 | | |
| Saw dust | 700 | | |
| Wages | 1 600 | | |
| Insurance | 800 | | |
| Total: | | | |

3.6.1 Identify, in the table above, an example of:

(a) Fixed costs (1)

(b) Variable costs (1)

3.6.2 Calculate the profit/loss of the budget above. (3)

3.6.3 Name TWO types of budgets on a farm. (2)

[35]

QUESTION 4: BASIC AGRICULTURAL GENETICS

Start this question on a NEW page.

- 4.1 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.

- 4.1.1 Determine the genotype of the cow. (1)
- 4.1.2 Draw a Punnett square to determine the phenotype of the F_1 -generation. (4)
- 4.1.3 Name the type of dominance that occurs in Nguni cattle. (1)
- 4.1.4 Give a reason to motivate the answer to QUESTION 4.1.3. (1)

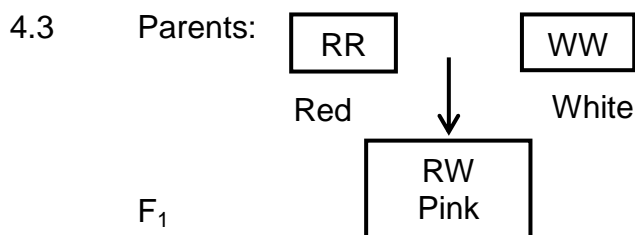
- 4.2 Fruit colour in plants is controlled by two alleles, black (B) and red (b). Fruit shape is controlled by two alleles, round (R) and wrinkled (r). Black and round are dominant over red and wrinkled respectively. Two plants, heterozygous for both characteristics, were crossed.

| | |
|-----------------------------------|---------------------|
| 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 |

- 4.2.1 Identify the type of crossing represented above. (1)
- 4.2.2 Give a reason for the answer to QUESTION 4.2.1. (1)
- 4.2.3 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. (1)



4.3.1 Indicate whether the parents are homozygous or heterozygous. (1)

4.3.2 Give a reason for the answer to QUESTION 4.3.1. (1)

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

(a) The phenotypic ratio of the F₂-generation (1)

(b) The percentage of red offspring (1)

4.4 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 |

4.4.1 Indicate the genetic phenomenon illustrated in the table above. (1)

4.4.2 Define the *genetic phenomenon* in QUESTION 4.4.1. (2)

4.4.3 Name THREE environmental factors that may have contributed to the difference in height of the maize plants. (3)

4.4.4 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. (1)

4.4.5 Name the type of breeding system given in the statement in QUESTION 4.4.4. (1)

4.5 The height of a tomato plant is controlled by two pairs of genes. The base height of a recessive plant (aabb) is 30 cm. Each additive allele contributes 10 cm to the base height.

4.5.1 Define the concept *polygenic inheritance*. (2)

4.5.2 Determine the height of an AABB tomato plant. (2)

4.5.3 Name the THREE different genotypes of a 50 cm tomato plant. (3)

4.6 GENETIC MODIFICATION

- 4.6.1 Name TWO techniques that can be used to modify plants. (2)
- 4.6.2 State TWO advantages of GM crops. (2)
- 4.6.3 Indicate TWO disadvantages of GM crops. (2)
- [35]**

TOTAL SECTION B: 105
GRAND TOTAL: 150