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SENIOR CERTIFICATE EXAMINATIONS

AGRICULTURAL SCIENCES P2

2017

MARKS: 150

TIME: 2½ hours

This question paper consists of 12 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. Write down the question number (1.1.1–1.1.10), choose the answer and make a cross (X) over the letter (A–D) of your choice in the ANSWER BOOK.

EXAMPLE:

1.1.11

☐ A☐ B☐ C☒ D

- 1.1.1 The process whereby products are moved from the farm to the consumer:
- A Grading
 - B Processing
 - C Buying
 - D Marketing
- 1.1.2 ONE of the following factors will influence both the supply and the demand of a product:
- A Increase in the supply of a product
 - B Range of products available
 - C Price of a product
 - D Attitude and values of consumers
- 1.1.3 A weakness that an entrepreneur has to consider when evaluating a farming business using a SWOT analysis:
- A Strong financial position
 - B Use of out-dated machinery with high maintenance costs
 - C New markets open up to sell the produce
 - D Use a skilled workforce
- 1.1.4 ONE of the following is NOT an entrepreneurial success factor:
- A Innovation
 - B Commitment
 - C Perseverance
 - D Inconsistent
- 1.1.5 The economic characteristic of land referred to as a fixed production factor:
- A Found in a specific location
 - B Unlimited, provided it is correctly used
 - C Needs to be combined with other factors to produce
 - D Provides raw materials

1.1.6 Records of the farm assets are kept in the ...

- A enterprise Budget.
- B Balance Sheet.
- C Inventory.
- D Cash Flow Budget.

1.1.7 The Employment Equity Act, 1998 (Act 55 of 1998) addresses the following aspects in the agricultural industry:

- (i) Affirmative action at the workplace
- (ii) Only male labourers should be employed as tractor drivers
- (iii) Men and women are equally represented
- (iv) Equal treatment of all workers irrespective of gender, race and economic background

Choose the CORRECT combination:

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

1.1.8 An internal force that affects the farming business:

- A Participation of the farmer in politics
- B Legislation regulating labour practices
- C Consumer needs
- D Financial position of the farmer

1.1.9 The proportion of observable differences between individuals caused by the genes:

- A Atavism
- B Polygene
- C Mutation
- D Heritability

1.1.10 DNA altered by inserting a gene from another organism:

- A Mutant DNA
- B Recombinant DNA
- C Genetically modified DNA
- D Genetically engineered DNA

(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–J) next to the question number (1.2.1–1.2.5) in the ANSWER BOOK, for example 1.2.6 K.

COLUMN A		COLUMN B	
1.2.1	A condition in a market where the quantity supplied is less than the quantity demanded	A	perishability
		B	selection
1.2.2	Agricultural products have a large volume per unit mass	C	overcapitalisation
		D	seasonal labourer
1.2.3	Buying more tractors which are not utilised productively	E	shortage
1.2.4	Labourer employed only to harvest fruits	F	undercapitalisation
		G	surplus
1.2.5	Choosing an animal with favourable characteristics to produce an offspring	H	inbreeding depression
		I	casual labourer
		J	bulkiness

(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 number (1.3.1–1.3.5) in the ANSWER BOOK.

- 1.3.1 The condition where the price of a product is kept constant regardless of the cost of production
- 1.3.2 A production factor that involves the effective combination and co-ordination of all resources to maximise profit
- 1.3.3 Type of mutation where a piece of a chromosome turns over before re-joining the rest of chromosomes
- 1.3.4 Type of inheritance where two or more genes have an influence on the phenotype of an organism
- 1.3.5 Crossing of a line-bred farm animal with another animal of an unrelated breed

(5 x 2) (10)

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 number (1.4.1–1.4.5) in the ANSWER BOOK.

1.4.1 A marketing chain is the process of dividing the market into smaller groups of buyers with similar characteristics and needs.

1.4.2 The amount of cash available at the end of each month that is made up of the opening balance plus the profit, is known as expenditure.

1.4.3 The type of variation where there is a complete range of characteristics from one extreme to another, is called discontinuous variation.

1.4.4 Prepotency is the use of statistics to analyse the genetic data of an individual in order to determine breeding value.

1.4.5 Heredity causes a large increase in the growth and productivity of the offspring produced by crossing genetically different parents.

(5 x 1)

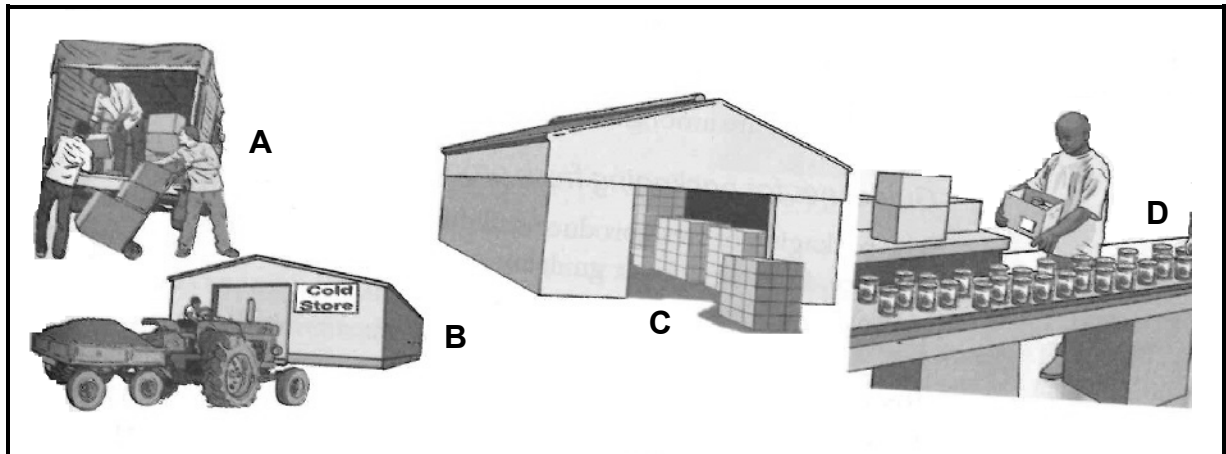
(5)

TOTAL SECTION A: 45

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

Start this question on a NEW page.

2.1 The picture below shows the functions of marketing.



2.1.1 Identify EACH of the functions in the picture above. Write down only the letter (**A–D**) next to the question number ((a)–(d)).

- | | |
|--|-----|
| (a) Products packed in containers and stored in a warehouse | (1) |
| (b) Products preserved to give them a long shelf-life | (1) |
| (c) Products altered from their raw form into a form that is easier to use | (1) |
| (d) Products distributed to the market | (1) |

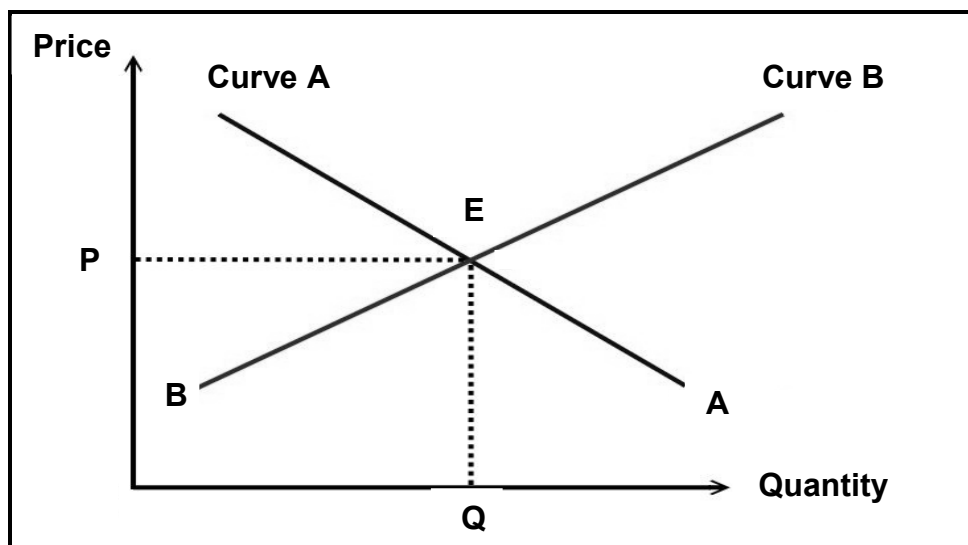
2.1.2 Name THREE advantages of processing agricultural products. (3)

2.2 Match the marketing channels below with ONE term in the list below. Write down only the term next to the question number (2.2.1–2.2.5).

Internet marketing; fresh produce market; stock auction; contract market; farm-gate marketing

- | | |
|--|-----|
| 2.2.1 A farmer sells cabbage directly from the farm | (1) |
| 2.2.2 Goats, sheep and cattle are sold at an auction to the highest bidder | (1) |
| 2.2.3 An agreement by the farmer to sell directly to wholesalers | (1) |
| 2.2.4 Mangoes and apples are graded and weighed. Everything is purchased and delivered to markets immediately. | (1) |
| 2.2.5 Goods are advertised and sold electronically | (1) |

- 2.3 The graph below shows the equilibrium price for a particular agricultural product.



- 2.3.1 Identify curves **A** and **B**. (2)
- 2.3.2 Name THREE factors that affect curve **A**. (3)
- 2.3.3 Define the term represented by **E**. (2)
- 2.3.4 Explain the relationship between the price and the quantity demanded. (2)
- 2.4 The table below shows the number of bags of potatoes that were bought at different prices at a local store per week.

PRICE (RAND PER BAG)	NUMBER OF BAGS
10	400
20	300
30	250
40	200
50	150
60	100
70	50

- 2.4.1 Use the data in the table above and draw a line graph to show the number of bags of potatoes bought at different prices. (6)
- 2.4.2 Refer to the line graph and identify the price at which most bags of potatoes were bought. (1)
- 2.4.3 Give a reason for the answer to QUESTION 2.4.2. (1)
- 2.5 State any THREE problems that may be encountered when drawing up a business plan. (3)
- 2.6 Name any THREE elements of the SWOT analysis. (3)

[35]

QUESTION 3: PRODUCTION FACTORS

Start this question on a NEW page.

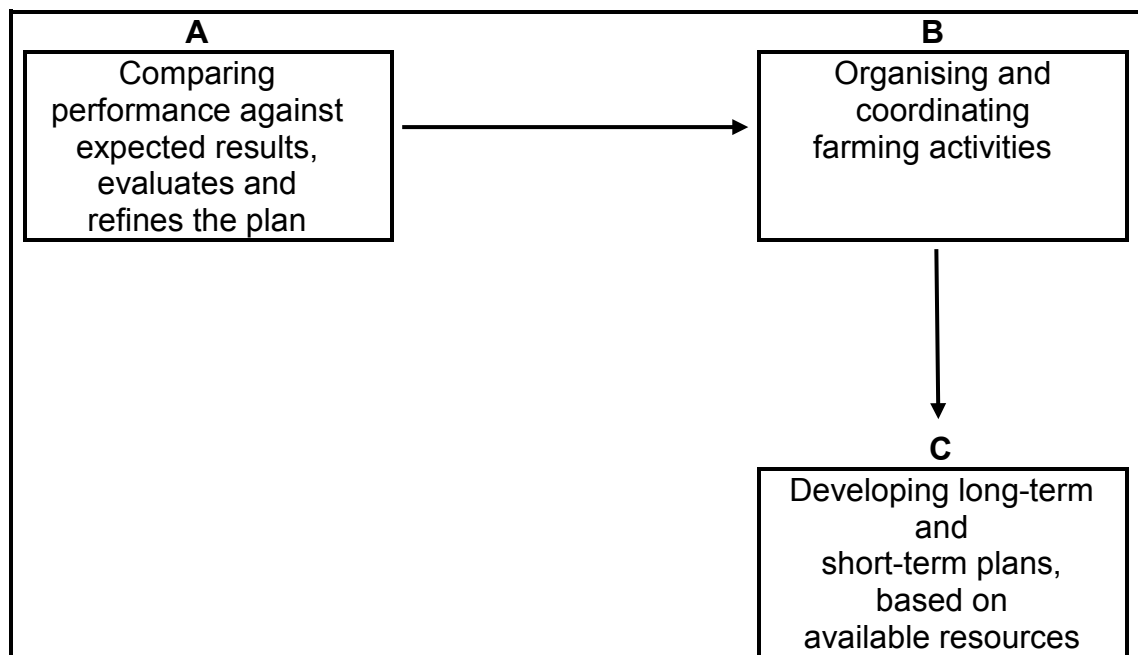
- 3.1 The table below shows the budget of an emerging farmer for a period of a year.

ITEM	COSTS (R)	ITEM	INCOME (R)
Electricity	R12 000	Sales to the local market	R200 000
Water	R500	Sales to hostels	R120 000
Labour	R20 000		
Seedlings	R5 000		
Loan (Tractor)	R205 000		
Pesticides and fertilisers	R10 000		
Total cost		Total income	

- 3.1.1 Identify ONE cost item that can be repaid over a period of five years. (1)
- 3.1.2 Give a reason for the answer to QUESTION 3.1.1. (1)
- 3.1.3 Refer to the data above and calculate the highest income generated. (2)
- 3.1.4 Indicate, in the budget above, TWO problems that can be associated with this medium-term asset. (2)
- 3.1.5 Use a formula to calculate the profit of this enterprise. Show ALL calculations. (3)
- 3.2 Identify the legislation that regulates EACH of the following:
- 3.2.1 Working conditions of farm workers (1)
- 3.2.2 Training of workers (1)
- 3.2.3 Handling of dangerous chemicals and equipment (1)
- 3.3

A farmer employed four permanent labourers for the day-to-day tasks. During harvesting, ten additional labourers were employed for a period of a month.
- 3.3.1 What type of temporary labourers were employed for a period of a month? (1)
- 3.3.2 Distinguish between the type of labourers named in QUESTION 3.3.1 and a permanent labourer on the basis of the period of employment. (2)
- 3.4 State THREE challenges associated with labour as a production factor. (3)
- 3.5 Calculate the wage of a labourer working for one public holiday if he/she earns R150 per day. (2)

3.6 The schematic representation below shows the main management principles.



3.6.1 What management principles do **A**, **B** and **C** represent? (3)

3.6.2 State THREE business managerial skills that will enable the farm manager to perform the duties at **C**. (3)

3.7 Identify the method of increasing land productivity represented by EACH of the statements below:

3.7.1 Having one field that is big enough to use a tractor rather than having a number of small fields prepared by hand (1)

3.7.2 Combining grain and legume crops (1)

3.7.3 Constructing contours to prevent further erosion (1)

3.7.4 Reducing the speed and movement of water by constructing a catchment area (1)

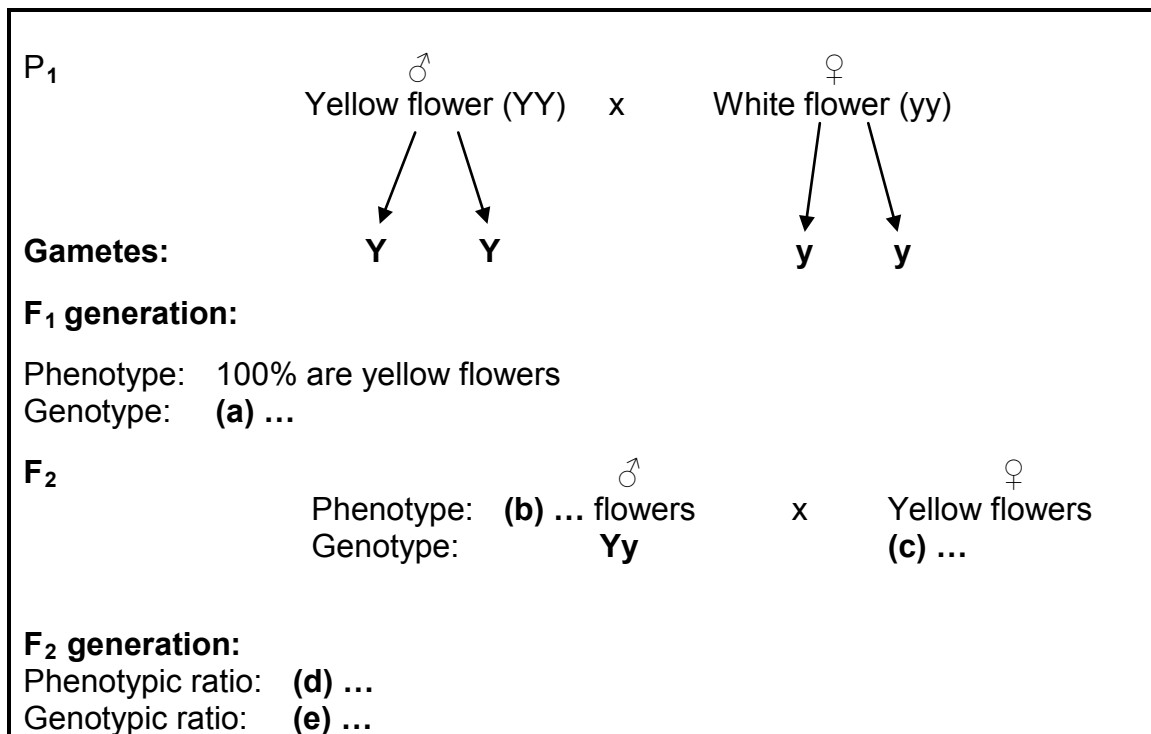
3.8 Explain, by means of an example, the law of diminishing returns. (3)

3.9 State TWO functions of land as a production factor. (2)
[35]

QUESTION 4: BASIC AGRICULTURAL GENETICS

Start this question on a NEW page.

- 4.1 A plant with yellow flowers (**Y**) is crossed with a plant with white (**y**) flowers. The crossing of **F**₁ and the **F**₂ generations is shown below.



- 4.1.1 Identify (a), (b), (c), (d) and (e). (5)
- 4.1.2 Indicate the type of dominance in the crossings above. (1)
- 4.1.3 Give a reason for the answer to QUESTION 4.1.2. (1)
- 4.2 The table below shows information on two different crosses in the **F**₁ generation.

	FIRST CROSSING	SECOND CROSSING
Parents' genotype	(a) ...	BB x bb
Parents' phenotype	(B) Black (b) white	(B) Black (b) white
Genotype % of the offspring	50% Bb 50% bb	(b) ...

- 4.2.1 Indicate whether the crossings in the table above are monohybrid or dihybrid. (1)
- 4.2.2 Give a reason for the answer to QUESTION 4.2.1. (1)
- 4.2.3 Predict the genotype of the parents in the first crossing (a). (2)
- 4.2.4 Use the Punnet square method to determine the genotypic percentage of the offspring in the second crossing. (4)
- 4.2.5 Calculate the phenotypic percentage of the offspring in the second crossing (b). (2)

- 4.3 A cotton farmer realises that production is decreasing annually because of a bollworm contamination. The crop is sprayed for bollworm at least six times a season. The farmer is advised to use genetically modified seeds as an alternative. As a result, the need to spray for bollworm is reduced to once a season and the yield doubles during the first harvest.
- 4.3.1 Refer to the scenario above and identify the advantage of using genetically modified (GM) seeds over traditional seeds. (1)
- 4.3.2 State TWO possible techniques that are used to modify the cotton seed. (2)
- 4.3.3 State TWO economic benefits of using the genetically modified cotton seeds based on the scenario. (2)
- 4.3.4 Name TWO effects of using the genetically modified cotton seeds with regard to EACH of the following:
- (a) Environmental impacts (2)
- (b) Negative economic impacts for farmers (2)
- 4.4 Indicate the breeding system applicable to EACH of the situations below:
- 4.4.1 Results in a large increase in the performance of the offspring (1)
- 4.4.2 Leads to a gradual decrease in the performance of the offspring from generation to generation (1)
- 4.4.3 New breed is gradually brought into a new environment with fewer adaptation problems (1)
- 4.4.4 Gives rise to sterile progeny (1)
- 4.5 A bull has a breeding value (BV) of +16 for weaning weight; a cow has a BV of +6. These parents will each contribute half of their characteristics to the progeny.
- 4.5.1 Calculate the weaning weight of the progeny in kilograms. Show ALL calculations. (3)
- 4.5.2 Interpret the figure in QUESTION 4.5.1 with reference to the average herd. (2)
- [35]**
- TOTAL SECTION B: 105**
- GRAND TOTAL: 150**