



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

SENIOR CERTIFICATE EXAMINATIONS

AGRICULTURAL SCIENCES P2

2016

MARKS: 150

TIME: 2½ hours

This question paper consists of 15 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 formula, 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 number (1.1.1–1.1.10) in the ANSWER BOOK, for example 1.1.11 A.

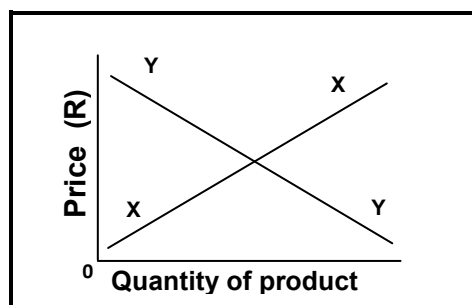
1.1.1 The first step in the development of a strategic management plan:

- A Setting goals and objectives
- B Developing the vision
- C Evaluation
- D Developing the mission

1.1.2 The law of demand of agricultural products states the following:

- A The higher the price, the fewer the products offered for sale.
- B The higher the price, the more the products bought.
- C The lower the price, the more the products bought.
- D The lower the price, the fewer the products sold.

1.1.3 The straight line (Y) represents the ... of a product.



- A market equilibrium
- B shortage
- C demand
- D supply

1.1.4 Niche marketing focuses on:

- (i) Selling to a small segment
- (ii) Supplying potatoes to a school for nutrition
- (iii) Fulfilling the needs not met by the mainstream markets
- (iv) Promoting the same product differently to consumers

Choose the correct combination:

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

- 1.1.5 Production factors reflected on a farm whereby workers are cultivating the land:
- A Land and labour
 - B Land and capital
 - C Only labour
 - D Land, labour and capital
- 1.1.6 The value of this production factor appreciates over time:
- A Equipment
 - B Farm land
 - C Machinery
 - D Money
- 1.1.7 The economic characteristic of land regarded as a sound investment:
- A Production potential
 - B Erodibility
 - C Chemical composition
 - D Fixed location
- 1.1.8 The net worth of a business is defined as the total ...
- A assets of the business minus the liabilities.
 - B liabilities of the business minus the assets.
 - C expenditure of the business minus the income.
 - D income of the business minus the expenditure.
- 1.1.9 The phenotype of an animal could be described as the ...
- A length and depth of the animal body.
 - B environmental conditions.
 - C genetic variation.
 - D total gene count.
- 1.1.10 A heterozygous Brahman bull (Bb) is mated with a heterozygous cow (Bb). What will the expected genotypic ratio in the F₁ generation be?
- A 1 : 3 : 1
 - B 1 : 1
 - C 3 : 1
 - D 1 : 2 : 1
- (10 x 2) (20)

- 1.2 Choose a term 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	Formulation of a vision and a mission	A	dominant characteristic
1.2.2	Ability and desire to buy goods and services	B	supply
1.2.3	AgriSETA drives the initiative of improving the agricultural workforce	C	strategic planning
1.2.4	Document that provides the expected income and expenditure of a farm for a given period	D	business plan
1.2.5	Characteristic that overshadows another characteristic	E	recessive characteristic
		F	skills development
		G	demand
		H	contract
		I	job opportunities
		J	budget

(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 People who recognise opportunities and are willing to take the risk of starting their own businesses
- 1.3.2 A legally binding agreement between the employer and the employee
- 1.3.3 The proportion of physically visible differences that is passed on to offspring from parents
- 1.3.4 A sudden change in the genetic material
- 1.3.5 A form of biotechnology, which involves highly advanced scientific techniques, to obtain a desired characteristic through a process of genetic manipulation

(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 number (1.4.1–1.4.5) in the ANSWER BOOK.

1.4.1 Selling is customer-orientated.

1.4.2 The Basic Conditions of Employment Act addresses issues such as minimum wages, hours of work, overtime, leave, working on Sundays and Mondays.

1.4.3 Heritability is the foundation of selection in terms of desirable characteristics in farm animals.

1.4.4 The purposeful method of breeding by identifying plants and animals to accomplish specific characteristics is called epistasis.

1.4.5 Mutants is a group of genes and each adds to the value of certain phenotypic characteristics. (5 x 1) (5)

TOTAL SECTION A: 45

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

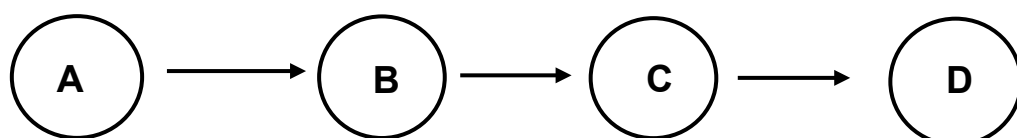
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- 2.1 The table below shows the differences between the producer price and the consumer price of commodities.

COMMODITY	PRODUCER PRICE PER kg/ℓ	CONSUMER PRICE PER kg/ℓ	DIFFERENCE IN PRICE
Chicken	R20	R32	R12
Mutton	R80	R94	R14
Processed meat	R74	R90	R16
Maize	R4	R8	R4
Wheat grain	R5	R9	R4
Sunflower	R6	R12	R6

- 2.1.1 Identify the commodity with the highest difference in price. (1)
- 2.1.2 Give ONE reason for the higher price difference in QUESTION 2.1.1. (1)
- 2.1.3 Give ONE possible reason for the small price difference for wheat grain. (1)
- 2.1.4 Name the main problem in marketing plant or animal products with regard to: (1)
- (a) Value (1)
- (b) Transportation (1)
- (c) Perishability (1)
- 2.1.5 Suggest THREE factors that may have led to the difference between the producer price and the consumer price. (3)

- 2.2
- starting and managing the enterprise; developing the business plan;
identifying and evaluating the opportunities;
determining the resources required



Use the information above and complete the flow diagram (A–D) representing the phases of the entrepreneurial process. (4)

2.3 A group of beef farmers identified the following possible markets for their products:

- Small butcheries
- Large supermarket chains
- Local people who buy directly from the farm
- Auctions/Stock sale

2.3.1 Refer to the list above and identify the market with the highest security risk for the beef farmers. (1)

2.3.2 From the list above, indicate the market best suited for the marketing of prime beef. Give a reason to support the answer. (2)

2.3.3 Define the term *livestock auction sales*. (2)

2.3.4 State THREE advantages of marketing to small butcheries. (3)

2.4 Dairy farmers operating under severe financial constraints are now looking for alternative options to improve their financial situations. Black wattle trees growing in large numbers and threatening green pastures, are now seen as an alternative business. These dairy farmers are now considering starting a service by cutting down the trees at a minimal cost.

Give an appropriate term for each of the following descriptions:

2.4.1 The felling of the black wattle trees may be considered to be a new business venture.

2.4.2 A few clients prefer wood cut into a specific size and they are willing to pay more for this specific cut.

2.4.3 Dairy farmers saw an opportunity to sell the wood offcuts to the local municipality to use as an alternative energy source.

2.4.4 The dairy and the wood factory are parallel enterprises that support each other.

2.4.5 Measures are in place to prevent the enterprise from losing money. (5)

- 2.5 The table below shows the quantities of oranges that were sold per week at different prices.

PRICE (R/BAG)	QUANTITY OF ORANGES SOLD PER WEEK (BAGS)	TOTAL REVENUE (R)
5	2 500	12 500
10	1 000	10 000
15	500	7 500
20	300	6 000
25	20	1 000
30	15	450

- 2.5.1 Draw a line graph to illustrate the price and quantities of oranges sold per week. (6)

- 2.5.2 Compare the demand for oranges with the supply of oranges with reference to the price. (3)

[35]

QUESTION 3: PRODUCTION FACTORS

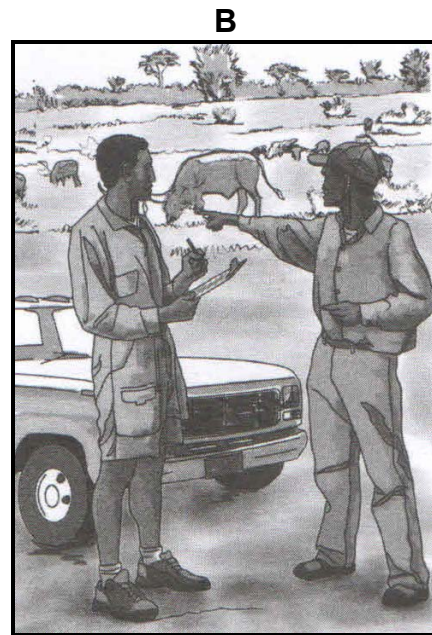
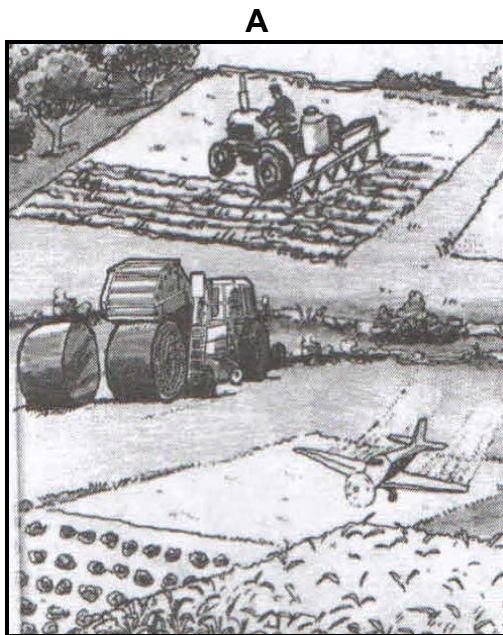
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- 3.1 The table below shows a budget for a rose production enterprise. It shows estimates for the 2015/16 financial year.

ESTIMATED COSTS		ESTIMATED RETURNS	
ITEM	AMOUNT (IN RAND)	ITEM	AMOUNT (IN RAND)
Water	10 300	Roses to shops	350 000
Manure	22 345	Roses to nurseries	120 000
Labour	24 500	Compost	7 500
Electricity	13 308		
Potting soil	8 800		
Vegetation material	45 555		
Chemicals	18 756		
TOTAL COSTS		TOTAL RETURNS	

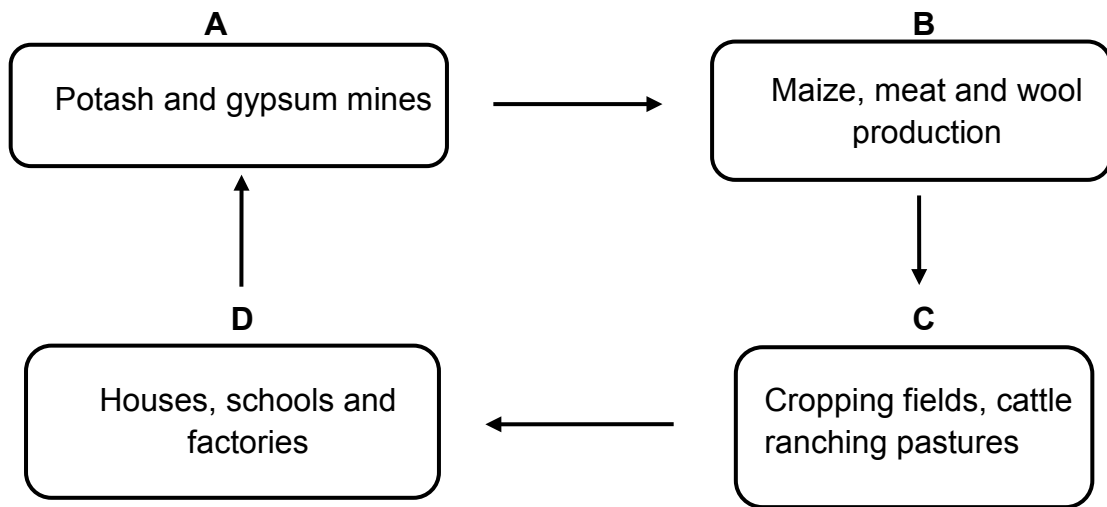
- 3.1.1 State the management principle addressed by the budget above. (1)
- 3.1.2 Use a formula and calculate the profitability of this enterprise. (3)
- 3.1.3 Explain why the enterprise could or could not be recommended based on the calculations in QUESTION 3.1.2. (2)
- 3.1.4 State ONE measure this farmer can put in place to make this enterprise more environmentally friendly. (1)
- 3.2
- A farmer realises that farm workers' social and financial problems have an influence on productivity. The farm workers are paid low wages, they have long working hours and most of them are not skilled; all factors leading to a low morale. He has appointed a full-time nurse for primary health care and a social worker to deal with the emotional burdens of these workers. He established a training centre to address the training and educational needs of workers. He also provided improved wages and sufficient housing.
- 3.2.1 Identify TWO labour challenges in the case study above. (2)
- 3.2.2 Identify, in the case study above, the issues relating to the following legislation:
- (a) Basic Conditions of Employment Act (1)
- (b) Skills Development Act (1)
- 3.2.3 Refer, in the case study above, to THREE aspects that the farmer addressed to motivate his employees. (3)

3.3 The pictures below represent management in a farming enterprise.



- 3.3.1 Indicate the management skill represented in PICTURE B. (1)
- 3.3.2 Justify the answer to QUESTION 3.3.1. (1)
- 3.3.3 Identify the risk management strategy represented in PICTURE A. (1)
- 3.3.4 Identify TWO reasons in PICTURE A to support the answer to QUESTION 3.3.3. (2)
- 3.3.5 State TWO principles that will enable the farm manager to run the farming business successfully. (2)

3.4 The flow chart below represents the characteristics of land as a production factor.



3.4.1 Name FOUR functions of land represented by **A**, **B**, **C** and **D**. (4)

3.4.2 State TWO measures a farmer can take to improve the productivity of land. (2)

3.5

Below is a list of activities on a farm:

- Wool shearing
- Construction of tunnels for vegetable production
- Cultivation of field with a tractor

Identify the activity that needs to be done by each of the following labourers:

3.5.1 Casual labourer (1)

3.5.2 Permanent labourer (1)

3.5.3 Seasonal labourer (1)

3.6 Farmers can obtain credit from various sources. Tabulate TWO forms of credit and the purpose of each form. (5)

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QUESTION 4: BASIC AGRICULTURAL GENETICS

Start this question on a NEW page.

- 4.1 The schematic representation below indicates a cross between a heterozygous black cow with a homozygous recessive white bull. Black (B) is the complete dominant characteristic.

PARENTS (P)			
Phenotype:	Black cow	X	White bull
Genotype:	Unknown	X	Unknown
OFFSPRING (F₁ GENERATION)			
Phenotype:	50% is black and 50% is white		
Genotype:	Unknown		

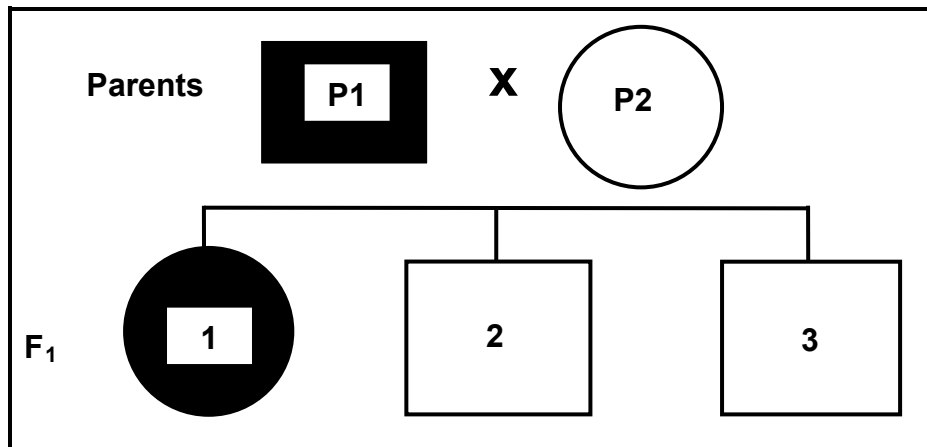
- 4.1.1 Identify the genotype of the:
- (a) Parent black cow (1)
- (b) Parent white bull (1)
- 4.1.2 If the group of white heifers in the F₁ generation is crossed with the parent bull, determine the phenotype of the F₂ offspring. (1)
- 4.1.3 Use the Punnett square method to illustrate the genotype of the F₁ generation. (4)

- 4.2 Below is a schematic representation of plants with red (R) flowers that are crossed with plants with white (W) flowers.

		Female	Male				
Parent generation	Genotype:	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px 5px;">R</td> <td style="padding: 2px 5px;">R</td> </tr> </table>	R	R	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px 5px;">W</td> <td style="padding: 2px 5px;">W</td> </tr> </table>	W	W
R	R						
W	W						

- 4.2.1 Indicate, from the schematic representation above, the parent with red flowers. Give a reason for the answer. (2)
- 4.2.2 Determine, from the schematic representation above, the phenotypic percentages in the F₂ generation. (3)
- 4.2.3 Identify the type of dominance represented by the schematic representation above. (1)
- 4.2.4 Justify the answer to QUESTION 4.2.3. (1)

- 4.3 The schematic representation below illustrates the crossing between parents with different characteristics. Colour is represented by black and white while shape is represented by squares and circles.



- 4.3.1 Identify the type of crossing illustrated by the representation above. (1)
- 4.3.2 Determine the characteristics received by each offspring from parent 1. (3)
- 4.3.3 Indicate the characteristics that are dominant in the offspring. (2)
- 4.3.4 Name the percentage of genetic material that offspring 2 received from each parent. (1)
- 4.4 The table below shows the yields obtained by two maize farmers in a typical maize growing area. Farmer A used conventional hybrid seed and Farmer B changed and used the latest available GM seed.

YEAR	YIELD (t/ha) (FARMER A)	YIELD (t/ha) (FARMER B)
2010	10	10,2
2011	10,8	10,6
2012	9,6	12,0
2013	11,0	13,0
2014	10,4	15,0
2015	10,8	16,5

- 4.4.1 Refer to the data in the table above and identify the year when Farmer B changed to GM crops. Give a reason for the answer. (2)
- 4.4.2 Name ONE advantage that Farmer B gained from using GM maize seed based on the data in the table above. (1)
- 4.4.3 Support the answer to QUESTION 4.4.2 and state THREE important characteristics of GM maize cultivars that could be responsible for the advantage that Farmer B gained. (3)
- 4.4.4 Give the main reason for general resistance against the use of GM cultivars. (1)

4.5

Farmer A farms with a cattle breed that produces heavy early weaners. Farmer B farms with a different breed which produces smaller calves that do not grow as fast as those of Farmer A, but are more resistant to local diseases than the cattle of Farmer A.

The old and non-fertile cows are sold to communities to be slaughtered for cultural ceremonies.

Farmer B buys bulls from Farmer A and crosses them with his best heifers. After five years Farmer B realised that his animals are heavier and more fertile than before.

- 4.5.1 Identify the animal breeding system applied by Farmer B. Substantiate the answer. (2)
- 4.5.2 State TWO advantages of outcrossing. (2)
- 4.5.3 Give TWO reasons for the selling of old and non-fertile cows. (2)
- 4.5.4 Name the breeding system that will be applicable once Farmer B starts using his own outstanding bulls. (1)

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TOTAL SECTION B: 105
GRAND TOTAL: 150