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GRADE 12

AGRICULTURAL SCIENCES P2

NOVEMBER 2015

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. 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 ONE of the following is an advantage of processing raw agricultural products:

- A A decrease in job opportunities
- B An increase in wages
- C A way to overcome an oversupply of products
- D A decrease in the value of the product

1.1.2 The most important document an entrepreneur needs to source funding for a new business venture is a ...

- A SWOT analysis.
- B balance sheet.
- C marketing chain.
- D business plan.

1.1.3 The law of supply implies ONE of the following:

- A The higher the price, the fewer people will buy a certain product.
- B The higher the price, the more people will buy a certain product.
- C The higher the price, the more products producers will sell.
- D The higher the price, the fewer products producers will sell.

1.1.4 Which of the following statements apply to the marketing of agricultural products?

- (i) Marketing management is profit-oriented.
- (ii) Agribusiness determines consumer needs and decides how to produce and supply accordingly.
- (iii) It focuses on the needs of the seller.
- (iv) Planning is long-term, based on new products and future growth.

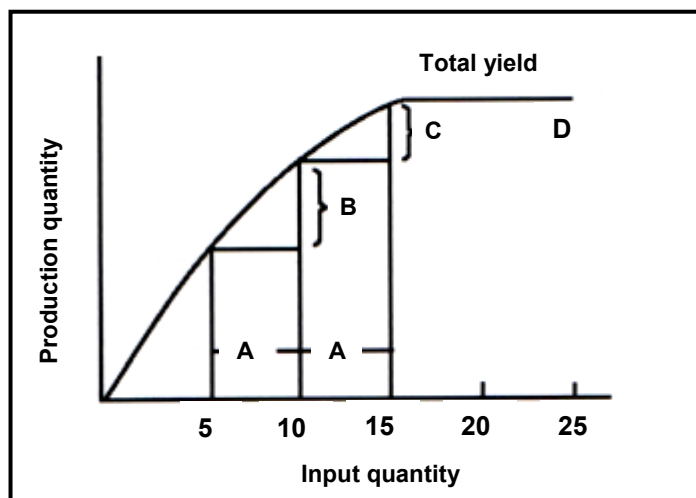
Choose the correct combination:

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

1.1.5 Farm workers who only come to the farm for recurring duties, like harvesting oranges, are known as ... labourers.

- A seasonal
- B casual
- C permanent
- D fixed

1.1.6 The graph below represents a problem associated with land as a production factor.



Which of the following statements apply to the graph?

- (i) Input is indirectly proportional to output.
- (ii) The yield at B is smaller than at C.
- (iii) The more fertiliser is used, the less the production will be at D.
- (iv) The yield increased at B but decreased at C at similar input.

Choose the correct combination:

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

1.1.7 The budget that a farmer draws up for all operations on the farm for a specific period:

- A Cash Flow Statement
- B Farm Asset Record
- C Enterprise Budget
- D Whole-farm Budget

1.1.8 ONE of the expenditures below is NOT limited to one particular enterprise:

- A Fixed costs
- B Overhead costs
- C A milker's wage
- D Variable costs

1.1.9 The following represents a heterozygous genotype in sheep:

- A Aa
- B AA
- C aa
- D BB

1.1.10 The visible characteristic produced by an individual's genotype:

- A Dominant allele
- B Recessive allele
- C Genotype
- D Phenotype

(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	Cheaper products enter the market, forcing the farmer to reduce production	A	movable capital
1.2.2	Land, boreholes and a farmstead	B	complementary products
1.2.3	The transfer of characteristics from parents to offspring	C	pedigree selection
1.2.4	Selection based on characteristics of a related ancestor	D	competitive products
1.2.5	The action of one gene is modified or controlled by one or several other genes	E	epistasis
		F	heredity
		G	fixed capital
		H	family selection
		I	genes
		J	chromosomes

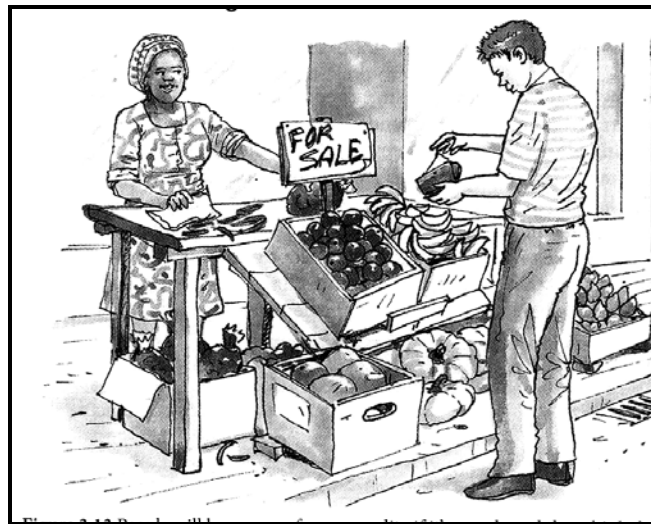
(5 x 2) (10)

- 1.3 Give ONE term for each of the following descriptions. Write only the term next to the question number (1.3.1–1.3.5) in the ANSWER BOOK.
- 1.3.1 The management action where short-term and long-term strategies are developed for a farm business
- 1.3.2 The process of attracting public attention to a specific agricultural product or business through various forms of communication
- 1.3.3 A summary of all income and expenditure showing how revenue from the sale of products and services is changed to net profit
- 1.3.4 A gradual decrease in performance from generation to generation due to continual inbreeding
- 1.3.5 The phenomenon where the alleles on a homologous chromosome pair are the same (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 The quantity of produce that consumers will be willing and able to buy is called supply.
- 1.4.2 Labour control is a measurement used by farm managers to refer to the output of the labour force.
- 1.4.3 The term fixed capital is used to describe the type of capital, such as money, that is available to run a business on a daily basis.
- 1.4.4 Analytical skills allow a manager to reflect on changes in the industry and to develop strategies to cope with them.
- 1.4.5 Prepotency refers to the reappearance of a characteristic after its apparent absence for a few generations. (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 illustrates a type of marketing commonly used in the agricultural sector.



- 2.1.1 Identify the type of marketing illustrated in the picture above. (1)
- 2.1.2 Give a reason for the answer to QUESTION 2.1.1. (2)
- 2.1.3 Name the channel of marketing illustrated in the picture above. (1)
- 2.1.4 State TWO advantages of the marketing channel in QUESTION 2.1.3 for the consumer. (2)
- 2.1.5 Suggest THREE problems that may hamper the type of marketing in the picture above. (3)

- 2.2 The table below shows the price, supply and demand of pockets of oranges over a five-week period.

	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5
Price (in rand)	10	15	20	25	30
Supply	5	10	15	20	25
Demand	25	20	15	10	5

- 2.2.1 Refer to the table above and explain the relationship between the price, supply and demand. (3)
- 2.2.2 Draw a line graph to illustrate the supply and demand of oranges. (6)
- 2.2.3 Explain why there was a higher demand for oranges in Week 1 than in Week 5. (2)

- 2.3 An agribusiness plan is a document that describes the business to be started and states its goals and objectives.

State THREE problems normally encountered when drawing up an agribusiness plan. (3)

- 2.4 Legislation plays an important role in the marketing of agricultural products.

State the legislation that will apply to each of the following:

2.4.1 It ensures the quality of ostrich meat and regulates the levels of chemicals in fruit (1)

2.4.2 Examines meat that is prepared and sold in local butcheries and abattoirs for irregularities (1)

2.4.3 Protects consumers against exploitation and allows for plain and clear information about the product (1)

2.4.4 Controls the export of perishable products from South Africa (1)

- 2.5 A teacher at a local school started a catering business using a donation from the local municipality. The business venture started with 20 interested learners. They cater mainly for schools, churches and community activities. The business expanded and within two years they started training local residents. Over 150 youths who have finished school have already been trained to start their own businesses.

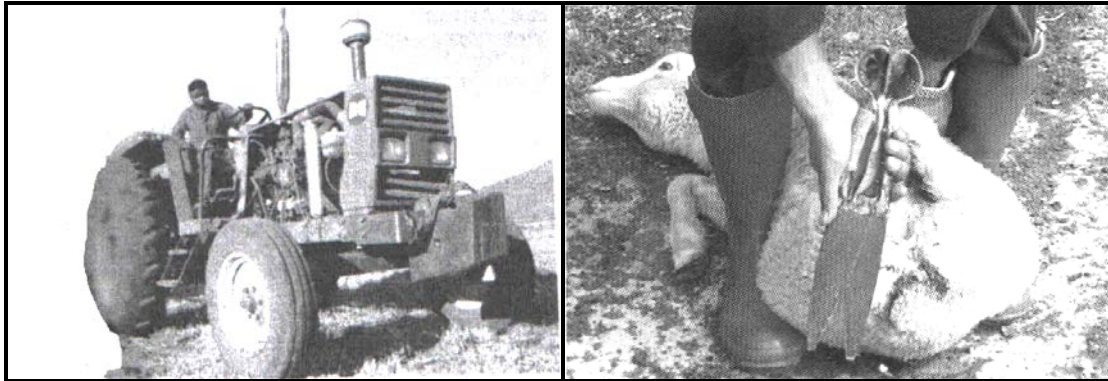
2.5.1 Identify FOUR entrepreneurial qualities displayed by the teacher in the case study. (4)

2.5.2 Briefly explain each of the qualities identified in QUESTION 2.5.1 using the information in the case study. (4)
[35]

QUESTION 3: PRODUCTION FACTORS

Start this question on a NEW page.

3.1 The photographs below show different types of labourers who work on a farm.

**PHOTOGRAPH A****PHOTOGRAPH B**

- 3.1.1 Identify the type of farm labourer represented by PHOTOGRAPHS A and B. (2)
- 3.1.2 Motivate the answer to QUESTION 3.1.1. (2)
- 3.1.3 State TWO challenges associated with farm labour that may cause the farm labourer in PHOTOGRAPH A to look for work in other industries. (2)
- 3.1.4 Explain how the farmer could address the challenges in QUESTION 3.1.3. (2)
- 3.1.5 State the labour legislation that regulates the safety of the labourer in PHOTOGRAPH A. (1)
- 3.1.6 Identify TWO types of capital in PHOTOGRAPH A. (2)
- 3.2 Land as a production factor has economic characteristics that need to be considered to ensure productivity.
- 3.2.1 Identify the economic characteristic of land associated with each of the following:
- (a) A housing scheme built on land previously used for maize production (1)
 - (b) Increased application of green manure which is not proportional to the yield (1)
 - (c) A farmer still produces cotton on land that was used for the same purpose by his great grandfather (1)
 - (d) A farmer experienced a drop in yield due to monoculture and after changing to conservation farming, the yield increased (1)
- 3.2.2 Suggest TWO ways in which a farmer may improve the productivity of land. (2)

3.3 A farm manager may experience an oversupply of produce to the market if there is a similar supply of produce by other farmers. This may lead to a drop in the price of the produce and a subsequent loss of profit.

3.3.1 Identify the external force that may lead to the situation in the scenario above. (1)

3.3.2 State the type of risk that may be encountered by the manager in the scenario above. (1)

3.3.3 Give a reason for the answer to QUESTION 3.3.2 by referring to the information in the scenario above. (2)

3.3.4 State TWO management strategies that this manager could apply to lower the risk in QUESTION 3.3.2. (2)

3.3.5 Suggest TWO main components of management that could make the farm manager in the scenario successful. (2)

3.4 The table below indicates a list of capital items and costs for a livestock enterprise.

ITEM	COST (IN RAND)
Cattle sales	110 500
Marketing levy	42 350
Telephone bill	22 500
Sheep sales	80 900
Electricity	20 000
Grain feed	12 500

3.4.1 Classify the items in the table above under the following headings:

(a) Income (2)

(b) Variable costs (2)

(c) Overhead costs (2)

3.4.2 Use a formula to calculate the net income of this enterprise. (4)
[35]



QUESTION 4: BASIC AGRICULTURAL GENETICS

Start this question on a NEW page.

- 4.1 A homozygous brown-coloured ewe was mated with a homozygous white-coloured ram in a breeding programme. The brown colour (A) is dominant over white colour (a). The ewe produced brown lambs and in the second generation the ewes produced white lambs.

- 4.1.1 Indicate the phenotypes of the parents. (2)
- 4.1.2 Indicate the genotypes of the parents. (2)
- 4.1.3 Name the type of dominance demonstrated in this crossing. (1)
- 4.1.4 Give a reason for the answer to QUESTION 4.1.3. (2)
- 4.1.5 Indicate the possible genotypes of the first crossing with a Punnett square. (4)

- 4.2 The table below gives information on an unknown breed of cows that were mated with pure-bred Bonsmara bulls. The female offspring of the cows were always bred with a pure-bred Bonsmara bull, as shown in the results below.

	 COW	 BULL	PERCENTAGE (%) PURE-BRED CHARACTERISTICS OF OFFSPRING
1st crossing	Unknown	100%	50% (F ₁)
2nd crossing	50%	100%	75%
3rd crossing	75%	100%	—
4th crossing	87,5%	100%	93,75%
5th crossing	93,75%	100%	96,87%
6th crossing	96,87%	100%	98,44%
7th crossing	98,44%	100%	99,22%
8th crossing	99,22%	100%	99,61%

- 4.2.1 Identify this type of breeding system. (1)
- 4.2.2 State TWO disadvantages of this type of breeding system. (2)
- 4.2.3 Determine the number of crosses needed before the first pure-bred Bonsmara calves can be registered. (1)
- 4.2.4 Calculate the percentage of pure-bred characteristics in the offspring in the third crossing. (4)

4.3 The table below indicates values of heredity in sheep.

	BIRTH WEIGHT	POST-WEANING WEIGHT GAIN	FLEECE WEIGHT
Heritability	60%	33%	50%

A lamb's birth weight is 3 kg and the average birth weight for the flock is 1,8 kg.

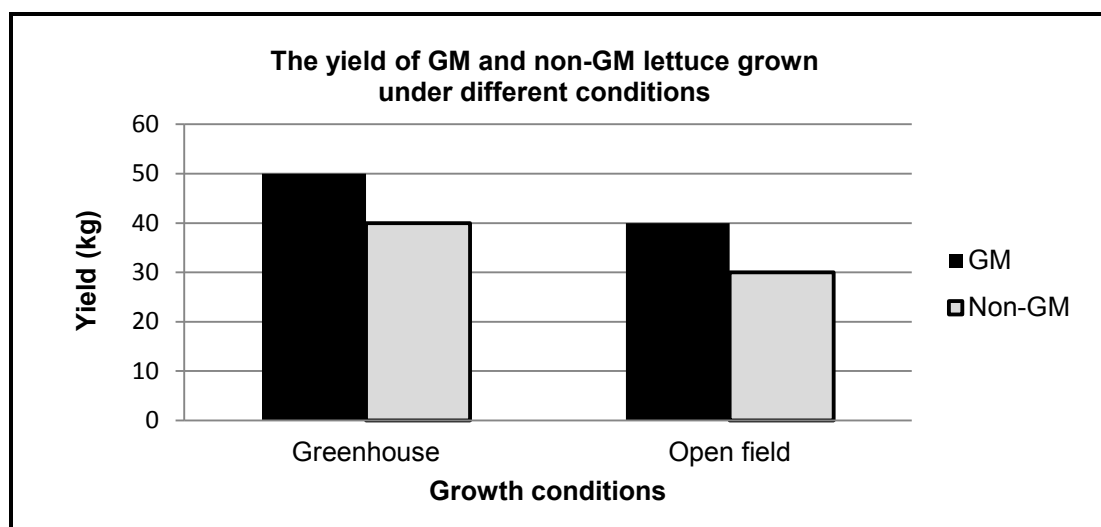
4.3.1 Determine the estimated breeding value (EBV) for birth weight. (3)

4.3.2 What is the implication of the value in QUESTION 4.3.1? (2)

4.3.3 What is the heritability of the fleece weight of a lamb? (1)

4.3.4 Give TWO reasons why the post-weaning weight gain in the table above cannot be recommended for breeding purposes. (2)

4.4 GM lettuce with a high yield was produced using a gene from a water plant. An experiment was conducted to test the effects of this genetic modification on lettuce plants. Scientists grew one group of plants consisting of GM lettuce and non-GM lettuce in a greenhouse and a second group in an open field. The results of the experiment are given in the bar graph below.



4.4.1 Explain the difference in yield of GM lettuce and non-GM lettuce grown in the greenhouse and open field respectively. (2)

4.4.2 Deduce, from the graph, ONE advantage of GM lettuce for the farmer under both growing conditions. (1)

4.4.3 Identify THREE benefits of genetic engineering over traditional methods as depicted in the scenario above. (3)

4.4.4 Suggest TWO potential environmental risks posed by genetically modified plants. (2)
[35]

TOTAL SECTION B: 105
GRAND TOTAL: 150