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GRADE 12

AGRICULTURAL SCIENCES P2

NOVEMBER 2014

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. Non-programmable calculators may be used.
6. Show ALL your 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 Using cultural values would be the most effective way for maize producers to increase the market for their produce in a country with strong cultural groupings. This is applicable to ...

- A a pig producer using more maize meal for feed mixtures.
- B communities eating more indigenous dishes made from maize meal.
- C vegetarians eating more products made from maize.
- D a dairy farmer utilising more maize meal to prepare a dairy ration.

1.1.2 The statements below are applicable to a niche market:

- (i) Selling to a small segment of the market
- (ii) Not served by mainstream suppliers
- (iii) Promoting the same product in different ways to different groups of consumers
- (iv) Low transport costs due to direct sales to consumers

Choose the correct combination:

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

1.1.3 In rural communities women cut thatching grass and sell it to either traders in urban areas or to rural people who use it as roofing material. This form of marketing is called ...

- A free marketing.
- B controlled marketing.
- C cooperative marketing.
- D pool marketing.

1.1.4 The following are challenges experienced when marketing agricultural products:

- (i) High volume in relation to value
- (ii) Perishability
- (iii) Constant supply of produce
- (iv) Fluctuations in production that occur in the long term

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 Movable capital is usually invested in medium-term assets. Examples of these capital items are ...

- A fertiliser and sheep.
- B a windmill and a dam.
- C equipment and tractors.
- D land and pesticides.

1.1.6 Farm labour unrest has been common in recent years and the strikes that followed were the result of dissatisfaction about low wages and poor conditions of service. The following Acts are applicable to this statement:

- (i) Skills Development Act, 1998 (Act 97 of 1998)
- (ii) Basic Conditions of Employment Act, 1997 (Act 75 of 1997)
- (iii) Freedom of Association Act, 1995 (Section 18: Bill of Rights 1995)
- (iv) Labour Relations Act, 1995 (Act 66 of 1995)

Choose the correct combination:

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

1.1.7 HIV/Aids can impact negatively on the productivity of any farming enterprise. This impact can be limited by ...

- A ensuring good nutrition and poor working conditions.
- B talking harshly to infected workers to demoralise them.
- C encouraging multiple sexual partners and good nutrition.
- D providing good nutrition and proper medication.

- 1.1.8 Some parent animals have more homozygous dominant alleles than other parent animals and therefore they have a greater ability to transmit their characteristics to their progeny. This capability is called ...
- A dominance.
 - B prepotency.
 - C atavism.
 - D progeny inheritance.
- 1.1.9 Animal A and animal B are progeny from a proven Jersey bull and a tested Brahman cow, while animal C and animal D are progeny from the same Jersey bull and a Jersey cow. Animal A and animal C are therefore called ...
- A cross-breeds.
 - B siblings.
 - C half-siblings.
 - D pure breeds.
- 1.1.10 The sequence from the simpler to the most complex structure that carries the genetic information could be represented as follows:
- A gene → chromatid → DNA → chromosome
 - B DNA → gene → chromatid → chromosome
 - C chromosome → chromatid → gene → DNA
 - D chromatid → chromosome → gene → 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	Agricultural produce packaged according to guidelines specified by the relevant authorities	A	phenotype
		B	heredity
1.2.2	Strategies that are put in place to make and keep a farm productive and profitable	C	interest
		D	risk
1.2.3	A production factor which is lost to industries due to competition	E	fertile land
		F	XY chromosome
1.2.4	Passing on the characteristics from one generation to the next	G	standardisation
1.2.5	It determines the gender of heifers	H	skilled labour
		I	XX chromosome
		J	management

(5 x 2)

(10)

- 1.3 Give ONE word/term/phrase for each of the following descriptions. Write only the word/term/phrase next to the question number (1.3.1–1.3.5) in the ANSWER BOOK.

- 1.3.1 A document indicating the expected income and expenditure of a farming business over a period of time in the future
- 1.3.2 A form of asset used as surety to the lender in order to obtain a fixed capital item
- 1.3.3 The overall potential threat that any farmer covers when insurance is utilised in the farming business
- 1.3.4 A form of technology that involves highly advanced scientific techniques of manipulation/insertion of genes to obtain a desired characteristic
- 1.3.5 The type of characteristics that are determined by a large number of genes and which are responsible for the continuous variation in the phenotypes

(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 Controlled marketing is a system where two or more independent organisations work together to meet their common economic, social and cultural needs.

1.4.2 Hedging is a form of marketing where goods are exchanged for other goods or services.

1.4.3 A manager is a person who identifies a unique business opportunity, gathers resources and is willing to take the risk of setting up the business.

1.4.4 Scarcity is when capital goods lose their value as a result of becoming outdated and inefficient due to wear and tear.

1.4.5 Heritability makes it possible to identify individuals in a population for the selection of animals for breeding programmes. (5 x 1) (5)

TOTAL SECTION A: 45

SECTION B

Start this question on a NEW page.

QUESTION 2: AGRICULTURAL MANAGEMENT AND MARKETING

- 2.1 The table below represents the price of lamb and the number of lambs sold by a farmer in a period of six months. Lambs are marketed at a slaughtering mass of 27 kg.

	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.
Price (R/kg)	79	81	87	110	75	79
Number of lambs available to be sold	55	60	65	45	50	35

- 2.1.1 Draw a line graph to show the relationship between the number of lambs sold in a period of six months and the months of the year. (6)
- 2.1.2 Deduce the month in which the farmer had the highest income from the sale of lambs. (2)
- 2.1.3 Refer to the table above and suggest a marketing strategy this farmer could adopt to increase the income possibilities. (1)
- 2.1.4 Calculate the price per lamb for the following months:
- (a) October (2)
- (b) December (2)
- 2.1.5 Suggest an economic reason for the decrease in the supply of lambs by the farmer in February. (1)
- 2.2 Two groups of learners used different strategies to promote and market their produce from the school garden.

GROUP 1	GROUP 2
<ul style="list-style-type: none"> Sold vegetables to the local supermarket at a fixed price Vegetables from each individual in this group were combined into one stockpile for marketing 	<ul style="list-style-type: none"> Sold vegetables from door to door at their own price Each individual in the group was responsible for selling their own produce

- 2.2.1 Identify the marketing system used by GROUP 2. (1)
- 2.2.2 Refer to the table above and justify with TWO reasons why the marketing system identified in QUESTION 2.2.1 was chosen. (2)

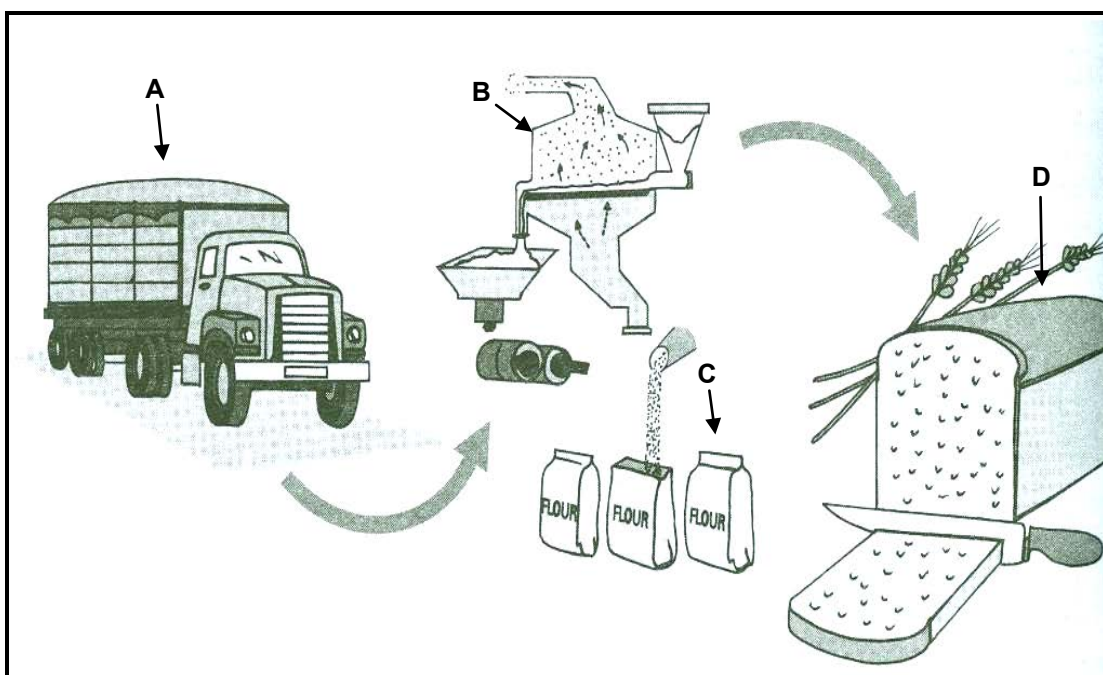
2.2.3 Indicate the group that used the following marketing strategies:

(a) Selling on a contract (1)

(b) Direct sales (1)

2.2.4 GROUP 1 utilised a pool system for marketing. Give a reason to support this statement by referring to the table on the previous page. (1)

2.3 The diagram below represents some of the marketing procedures for an agricultural product.



2.3.1 Identify the marketing function represented by **A**, **B** and **C** in the diagram above. (3)

2.3.2 Distinguish between the prices of the agricultural product at **A** and at **D** respectively. (2)

2.3.3 The business represented by **B** evaluated the enterprise using a SWOT analysis. State TWO aspects that would be covered in such an analysis. (2)

2.3.4 A farmer is considering starting a business similar to **B** on his/her farm. Indicate TWO aspects that should be included in a feasibility study for this business. (2)

- 2.4 The following is a list of activities that are related to the production and marketing of agricultural products.

<ul style="list-style-type: none">• Sales to consumers• Planning for production• Soil preparation and planting	<ul style="list-style-type: none">• Distribution• Storage• Grading
--	--

- 2.4.1 Select and arrange any THREE items in the list above in the correct order in an agri-business chain. (3)
- 2.4.2 Identify TWO problems with the marketing of agricultural products that are related to the distribution process. (2)
- 2.4.3 Indicate an activity in the list above that is related to the standardisation of agricultural products. (1)
- [35]**

QUESTION 3: PRODUCTION FACTORS

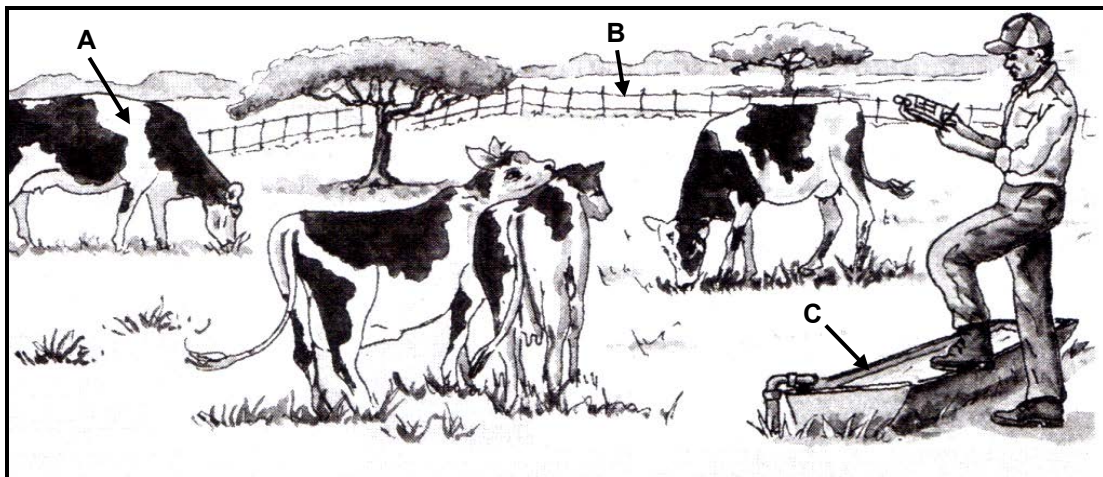
Start this question on a NEW page.

- 3.1 Below is an extract from a contract of employment between a farmer and a farm worker:

CONTRACT OF EMPLOYMENT	
1. Particulars of employer:	ELNINO FARMS
2. Name:	TR ELNINO
3. ID:	5011016908186
4. Particulars of employee:	
4.1 Name:	V JIVE
4.2 ID:	6901013206181
5. Job title:	SPRAY OPERATOR
6. Duration of contract:	1 February 2011 to retirement
7. Mode of payment:	MONTHLY SALARY BY CHEQUE
8. Amount:	R2 500
9. Terms of employment:	
9.1 Working hours:	06:00 to 17:00
9.2 Leave:	One week paid leave per annum
10. Protective clothing:	None
Signature:..... Date: <u>01/02/2011</u> at: <u>ELNINO FARM</u> (employee – farm worker)	
Signature:..... Date: <u>01/02/2011</u> at: <u>ELNINO FARM</u> (employer – farmer owner)	

- 3.1.1 Indicate the type of farm worker who signed the contract above. Justify your answer. (3)
- 3.1.2 Select an item from the contract of employment above that relates to the following labour legislation: (1)
- (a) Basic Conditions of Employment Act, 1997 (Act 75 of 1997) (1)
- (b) Occupational Health and Safety Act, 1993 (Act 85 of 1993) (1)
- 3.1.3 Identify an aspect in the contract of employment that contributes to the problem of the scarcity of farm labour. Motivate your answer. (2)
- 3.1.4 The farm worker mentioned in the contract of employment above was diagnosed with HIV/Aids. State TWO ways in which this farm worker would have an impact on the productivity of this farming business. (2)

3.2 In the diagram below a farm manager is recording certain aspects of the capital on the farm.



3.2.1 Indicate the types of capital represented by **A** and **C** in the diagram above. (2)

3.2.2 Give TWO examples of floating capital that would be relevant for the farming operation illustrated above. (2)

3.3 The information below shows the assets and liabilities on a farm.

- Value of farm: R3 500 000
- Tractor loan: R365 000
- Value of vehicles: R275 000
- Overdraft: R150 000
- Bond: R4 200 000
- Cash: R50 000
- Value of buildings: R650 000

Assets	Rand	Liabilities	Rand
Total		Total	
Net worth			

3.3.1 Re-draw the table above and complete it with the information provided. Calculate the net worth of the farm. (7)

3.3.2 Indicate whether this farming business is viable. Give a reason to support your answer. (2)

- 3.4 The table below shows the amount of fertiliser applied and the quantity of potatoes produced on a piece of land.

INPUT (BAGS OF FERTILIZER)	YIELD (BAGS OF POTATOES)
0	18
2	25
4	27
6	28
8	29
10	29



- 3.4.1 Identify the economic characteristic shown by the data in the table above. (1)
- 3.4.2 Deduce the relationship between *fertiliser input* and *potato yield*. (2)
- 3.4.3 Name TWO main measures a farmer can take to make land more productive. (2)
- 3.5 A group of individuals was accepted for a land reform programme after going through a screening process. Their application for this project was successful because of their ability to set up a budget, organise and make decisions. These individuals commented on it when they realised that legislation governs the production and marketing environment in agriculture. This impacts directly on the profit and available capital of a farming business.
- 3.5.1 State TWO managerial principles that the group of individuals above need to follow to succeed in a farming business. (2)
- 3.5.2 Refer to the passage above and indicate TWO external forces that may impact on a farming business. (2)
- 3.5.3 Briefly describe the following types of essential farm records:
- (a) Inventory of moveable assets (2)
- (b) Breeding records (2)
- [35]

QUESTION 4: BASIC AGRICULTURAL GENETICS

Start this question on a NEW page.

- 4.1 The following is a representation of a dihybrid crossing. Answer the questions using the legend below.

Characteristic 1: (Horn conformation)	
A - Poll (no horns)	
a - Horns	
Characteristic 2: (Hair colour)	
B - Black	
b - Red	

					
		A	Ab	aB	ab
AB	1	AABB	2 AABb	3 AaBB	4 AaBb
Ab	5	AABb	6 AAbb	7 AABb	8 Aabb
aB	9	AaBB	10 AaBb	11	12 aaBb
ab	13	AaBb	14	15 aaBb	16 aabb

4.1.1 State the genotype of the following individuals:

- (a) Number 11 (1)
- (b) Number 14 (1)

4.1.2 Determine the phenotype of the following individuals:

- (a) Number 6 (1)
- (b) Number 12 (1)

4.1.3 Individual number 6 and individual number 16 were crossed. Draw a Punnett square to determine the genotype of their offspring. (4)

4.1.4 Indicate the phenotype of the crossing in QUESTION 4.1.3. (1)

- 4.2 The crossings **A**, **B** and **C** below represent different breeding systems applied in cattle farming.

A	B	C
Commercial mixed-breed cow X Holstein stud bull	Sussex bull X Sussex cow (bull's daughter)	Afrikaner bull X Shorthorn cows

- 4.2.1 Identify the breeding systems represented by **A**, **B** and **C**. (3)
- 4.2.2 Indicate the breeding system (**A**, **B** or **C**) that promotes heterosis. (1)
- 4.2.3 State TWO disadvantages of the breeding system represented by crossing **B**. (2)
- 4.2.4 Suggest the best method a farmer can use to change the enterprise from a commercial meat production with Brahman to a Bonsmara stud within a period of 20 years. (1)
- 4.3 Some Nguni cattle are predominantly dark or light with a distinct colour pattern combined with a variety of other colours. If dark and light-coloured animals are crossed, the offspring are neither dark nor light, but both colour combinations are visible on these animals.
- 4.3.1 Identify the type of dominance in the scenario above. (1)
- 4.3.2 When red Shorthorn cattle are crossed with white Shorthorn cattle the result is a roan-coloured offspring. Explain this phenomenon. (2)
- 4.3.3 Distinguish between *incomplete dominance* and *codominance*. (2)
- 4.4 The DNA of a tomato plant was changed through an advanced modification technique.
- 4.4.1 Indicate TWO methods which could be used in this modification process. (2)
- 4.4.2 State TWO disadvantages of using tomatoes with modified DNA. (2)
- 4.5 Distinguish between *continuous variation* and *discontinuous variation*. (2)

4.6

Traditionally people used a selection and breeding method whereby the 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.

- 4.6.1 Define the concept *selection*. (2)
- 4.6.2 Determine the method of selection mentioned in the passage above. (1)
- 4.6.3 Identify THREE animal production characteristics in the passage that were used for selection by these people. (3)
- 4.6.4 Indicate how the following aspects were used by the people in the passage above to improve the phenotype of the animals:
- (a) Genetic variation (1)
 - (b) Environmental variation (1)

[35]

TOTAL SECTION B: 105
GRAND TOTAL: 150