Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE 12

SEPTEMBER 2018

AGRICULTURAL SCIENCES P2

MARKS: **150**

TIME: **2½ hours**

* A G R S E 2 *

This question paper consists of 14 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. Read ALL the questions correctly and answer what is asked.
4. Number the answers correctly according to the numbering system used in this question paper.
5. A non-programmable calculator may be used.
6. Show ALL calculations, including formulae, where applicable.
7. Write neatly and legibly.

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SECTION A

QUESTION 1

1.1 Various options are provided as possible answers to the following questions. Choose the correct 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 D.

1.1.1 When the price of chocolate increases, the demand for chocolate decreases. This shows that chocolate is …

A price elastic.
B price inelastic.
C neutral.
D flexible.

1.1.2 A buyer that will not buy new products and try to convince other consumers not to either:

A Innovative buyer
B Traditionalist
C Adopter
D Early majority

1.1.3 Marketing costs along the marketing chain include …

A production, storage and recreational facilities costs.
B transport costs, production costs, entertainment costs.
C fees, taxes and commissions, storage costs and production costs.
D incentives, processing costs and education costs.

1.1.4 Which one of the following is NOT a feature of controlled marketing?

A Better competition
B Subsidies
C Restriction on imports
D Price guarantees

1.1.5 The factors that cause a shift in demand curve are …

(i) consumer income.
(ii) changes in the prices of related goods.
(iii) consumers' tastes and preferences.
(iv) industry growth and shrinkage.

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

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1.1.6 Which ONE of the following items is an example of floating capital?

A Vehicles
B Buildings
C Seed
D Irrigation system

1.1.7 … is an example of external forces affecting businesses.

A Workforce competency
B Availability of credit
C Poor cash flow
D Outdated machinery

1.1.8 A single-comb cock with a genotype represented by Dd is crossed with a pea-comb hen with a genotype represented by dd. Their offspring will have the following phenotypic ratio:

A 50% single-comb and 50% pea-comb
B All single-comb
C All pea-comb
D 75% single comb

1.1.9 A plant has 12 pairs of chromosomes in the nucleus. The number of chromosomes in the female gametophyte will be …

A 18.
B 6.
C 48.
D 24.

1.1.10 One of the following is an example of related breeding systems:

A Upgrading
B Line breeding
C Species crossing
D Cross breeding (10 x 2) (20)

1.2 Choose a word/term from COLUMN B that best 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 sum of money provided for a specific purpose by a government or public fund that does not have to be paid back	A	logistics
1.2.2	An element of the marketing mix	B	crossing over
1.2.3	The exchange of portions of chromatids of homologous chromosomes giving rise to new gene combinations	C	meiosis
1.2.4	Chromosome number changes from diploid to haploid	D	mitosis
1.2.5	Combining small adjacent fields to make one large field	E	loan
		F	consolidation
		G	mutation
		H	grant
		I	double cropping
		J	promotion

(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 loss or decline in value of movable assets such as vehicles and machinery due to wear and tear

1.3.2 The type of labourers who have no formal skills or training and gain experience as they do their work over many years

1.3.3 The spontaneous changes in the DNA structure that may be forced by exposure to certain chemicals resulting in unique new individuals

1.3.4 A pattern of inheritance in which both alleles are expressed fully in the heterozygous individuals

1.3.5 A diagram of an organisation showing different positions and the relationships between them

(5 x 2) (10)

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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 Inversion is the doubling of whole sets of chromosomes.

1.4.2 Planning involves measuring farm performance against standards and taking the necessary corrective measures.

1.4.3 Land that is suitable for crop production is referred to as arid land.

1.4.4 A monopoly is a market that has many sellers but only one buyer.

1.4.5 Processed products are products that are seen not to cause damage to the environment.

(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 women grading and packaging agricultural produce.

2.1.1 Produce is graded according to pre-set specifications. Indicate the name given to the process of coming up with these specifications. (1)

2.1.2 Suggest any THREE specifications that should be met by the packaging material used by the farmers in the picture above. (3)

2.1.3 List any TWO factors that might hamper the marketing of apples. (2)

2.2 Marketing performs several crucial functions. Identify the marketing function best described by each of the following statements.

2.2.1 Products are protected, contained and displayed in a way that appeals to the consumer. (1)

2.2.2 The delivery of goods either by vehicles, trains, aeroplanes or ship. (1)

2.2.3 The changing of product in order to increase its utility value, keeping quality and shelf life. (1)

2.2.4 Products are kept to bridge the time between production and purchasing. (1)

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2.3 Advertising is an activity carried out to promote a product once it is ready for the market. The nature of the product dictates the approach and marketing systems that should be employed to market it. Different marketing approaches, including sustainable marketing, are used to market agricultural products as consumers are becoming aware of the increasing concern about the care for the environment. The marketing system the farmer uses is also key to the success of the marketing of agricultural produce. Some farmers prefer to use the controlled market system as opposed to free market systems.

2.3.1 Suggest TWO ways of advertising agricultural products. (2)

2.3.2 Distinguish between the following sustainable marketing approaches:

(a) Green Marketing (1)

(b) Eco-labelling (1)

2.3.3 Deduce TWO benefits of the marketing system preferred by farmers in the scenario above. (2)

2.3.4 Name ONE factor to consider when determining the price of the product. (1)

2.4 Farmer A wanted to establish an agricultural co-operative society. The farmer made copies of the identity documents of friends and registered the agricultural co-operative as Siyazama. This society would concentrate on broiler production and processing unit. The farmer borrowed money on behalf of the co-operative to finance the co-operative's activities and did not involve others. Consequently, the business failed.

2.4.1 Suggest ONE reason for the failure of Siyazama Co-operative Society. (1)

2.4.2 Identify TWO principles that should be applied in the functioning of a co-operative society. (2)

2.4.3 Explain how directors of a co-operative society are selected. (2)

2.5 The success of a farm business depends on the entrepreneur in various ways. To be a successful entrepreneur, farmers must focus on SWOT analysis with thorough planning.

2.5.1 Suggest TWO entrepreneurial success factors that is important for a business to thrive. (2)

2.5.2 Name the document referred to in the passage above. (1)

2.5.3 Support, with TWO reasons, the relevance of the document mentioned in QUESTION 2.5.2 when you think of starting a new business venture. (2)

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2.6 The table below shows the demand and supply of tomatoes.

Price of tomatoes (R/kg)	Quantity demanded (kg)	Quantity supplied (kg)
10	180	0
20	160	25
30	140	50
40	120	75
50	100	100
60	80	125
70	60	150
80	40	175

2.6.1 Present the information in the table above in the form of a line graph on the same axis. (6)

2.6.2 Name the situation which occurs at a price of R7. (1)

2.6.3 Determine the price at which the tomatoes will all be sold out at this market. (1)

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QUESTION 3: PRODUCTION FACTORS

3.1 A farmer wanted to determine whether it will be more profitable to move from manual weeding to herbicide use. He made the decision with the aid of the budget below.

Added income due to change		**Added costs due to change**	
Nil		Sprayer	3 000
		Purchase of herbicide	2 000
		Protective clothing	1 000
Reduced costs due to change:		**Reduced income due to change:**	
Weeding labour	6 000	Nil	
Depreciation of hoes	2 000		
Subtotal	---	Subtotal	---
Net change			

3.1.1 Identify the farm budget depicted above. (1)

3.1.2 Justify your answer in QUESTION 3.1.1 above. (2)

3.1.3 Calculate the net change of this farm business. (3)

3.1.4 From the calculation above, deduce the necessary action for the farmer. Support your answer. (2)

3.1.5 Suggest any THREE reasons for the keeping of financial records on farms. (3)

3.1.6. Mention ONE example of a financial record to be kept by the farmer (1)

3.2 A non-governmental organisation, which focuses on HIV/Aids campaigns, approaches a farmer and offer to carry out HIV/Aids awareness campaigns on his farm.

3.2.1 Indicate TWO consequences of failure by the farmer to allow this non-governmental organisation to carry out the campaigns. (2)

3.2.2 In addition to campaigns, suggest TWO ways the farmer can reduce the spread of HIV/Aids on the farm. (2)

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3.3 A recently settled farmer rears pigs, keeps layers and grows maize as well as soya beans. Last year due to the army worm outbreak, the maize field was totally destroyed and this led to a 100% maize yield loss. However, the farmer did not go bankrupt since the other enterprises kept the farm afloat.

3.3.1 Deduce the type of risk that was faced by the farmer in the scenario above. (1)

3.3.2 Identify the risk management strategy used by the farmer. (1)

3.3.3 Explain how the strategy assisted the farmer. (2)

3.3.4 Suggest any other TWO strategies that can be employed by the farmer to manage the type of risk mentioned in QUESTION 3.3.1. (2)

3.4 The world's population is growing at an exponential / alarming rate. This is resulting in increased demand for land. Farmers now, more than ever, need to ensure that their yield per hectare is very high, as land available for agriculture is becoming minimal due to the combined effect of urbanisation and climate change.

3.4.1 Identify the TWO economic characteristics of land in the scenario above. (2)

3.4.2 Suggest THREE ways farmers can increase the yield per hectare. (3)

3.4.3 Name TWO functions of land as a production factor. (2)

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3.5 The photograph below shows a farm worker applying a pesticide.

3.5.1 Mention the labour legislation which forces farmers to ensure that the workers have safety equipment. (1)

3.5.2 Give the piece of legislation the farm worker above could use if the farm worker contracts a disease due to failure by the farmer to provide safety clothing. (1)

3.5.3 Which piece of legislation encourages farmers to assist in the training of the farm workers? (1)

3.5.4 In addition to safety, farmers also need to ensure that their workers are motivated. Recommend THREE ways farmers can use to motivate their workers, so as to improve productivity. (3)

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QUESTION 4: BASIC AGRICULTURAL GENETICS

4.1 A pure-bred short white bull mated with a tall black cow. Tall (T) and black (B) are dominant characteristics.

4.1.1 List the genotype of each of the parents. (2)

4.1.2 Use a Punnet square to determine the genotype of the F2 generation offsprings. (6)

4.1.3 Deduce the type of cross in the scenario above. (1)

4.1.4 Give a reason for your answer. (1)

4.1.5 Classify the characteristics in the scenario as either qualitative or quantitative. (1)

4.2 There are mechanisms of inheritance which alter Mendelian ratios. Sometimes two different genes affect the same gene. This implies that the expression of one gene is controlled by another gene. This is seen mostly in the feather colour in chickens, for example, the colour gene with the alleles B = black and b = white. The gene which controls the expression of the colour gene is the alleles: I = no colour and i = colour. If a bird has a copy of I gene, it will have white feathers, irrespective of the black allele as the colour gene.

4.2.1 Indicate the phenotypes of the feathers with the following genotypes:

(a) BBII
(b) BbIi
(c) Bbii (3)

4.2.2 Identify the type of inheritance described in the passage above. (1)

4.3 The table below shows the heritability of some production traits in pigs.

TRAIT / CHARACTERISTIC	HERITABILITY %
Average weaning mass	36
Lean meat	68
Litter size at birth	49
Average daily gain	65
Feed conversion	58

4.3.1 Determine the characteristic that the farmer should not select for. (1)

4.3.2 Justify your choice in QUESTION 4.3.1. (2)

4.3.3 Provide a name for the use of statistics in biology to analyse the genetic data of individuals in order to estimate true genetics and their breeding value. (1)

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4.4 The DNA of organisms, especially plants, can be manipulated in the laboratory. A gene from one organism is inserted into the DNA of another organism to give it a new and beneficial characteristic.

4.4.1 Identify the process mentioned above. (1)

4.4.2 State TWO techniques that can be used to insert genes into the DNA of an organism. (2)

4.4.3 Give THREE reasons why plant breeders make use of the method above as opposed to traditional methods of plant improvement. (3)

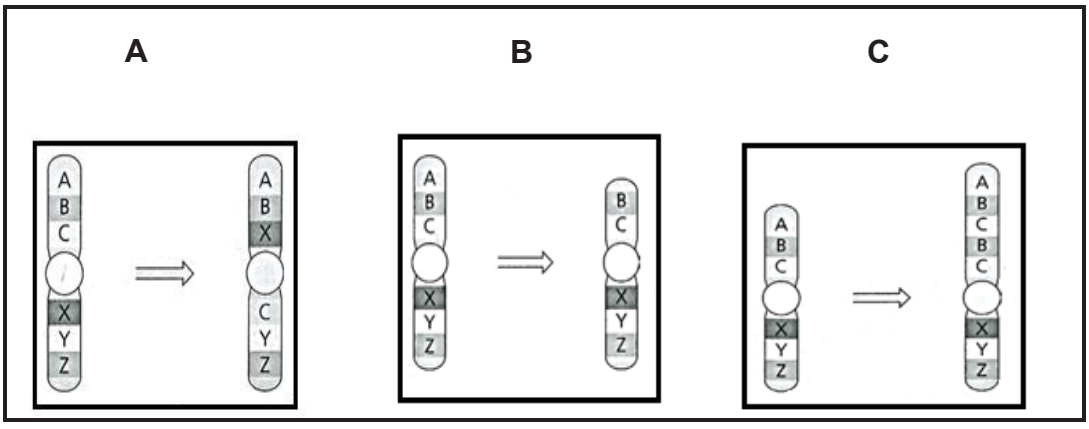
4.4.4 Some African countries have banned GMOs. Suggest THREE reasons to support the banning of GMOs. (3)

4.5 Variation can be caused by genetic factors within the organism such as mutation. Relate the following statements with causes of variation in animals:

4.5.1 (a) The homologous chromosomes break at one or two places along their string and re-unite into two homologous parts (1)

(b) The parents' genes only shuffle and incorporate an already existing genetic variation but do not create a new one (1)

4.5.2 Chromosomal re-arrangements affect the expression of genes and cause changes in the phenotype. The diagrams below show the new patterns of chromosomal structure.



(a) Identify the mutation types **A**, **B** and **C** shown above. (3)

(b) Briefly explain the significance of mutation in plant and animal breeding. (2)

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TOTAL SECTION B: 105
GRAND TOTAL: 150

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