



EXAMINATIONS AND ASSESSMENT CHIEF DIRECTORATE

Home of Examinations and Assessment, Zone 6, Zwelitsha, 5600

REPUBLIC OF SOUTH AFRICA, Website: www.ecdoe.gov.za

2020 NSC CHIEF MARKER'S REPORT

SUBJECT:	AGRICULTURAL SCIENCES
PAPER:	2
DURATION OF PAPER:	2½ hours

SECTION 1: (General overview of Learner Performance in the question paper as a whole.)

SECTION 2:

Comment on candidates' performance in individual questions

(It is expected that a comment will be provided for each question on a separate sheet).

QUESTION 1
(a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?
This question was fairly well answered as only a few learners managed to score 25 marks out of 45. On average learners were able to get 10 marks out of 45. There is not much difference as compared to the previous year's performance though there is a slight drop in performance compared to 2019.

(a) Why was the question poorly answered? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.

Thorough practice of multiple-choice questions has significantly assisted learners to perform better in this section. However, certain errors and misconceptions were observed.

Question 1.1

In Question 1.1.1 some learners confused **stocks sales** with **farm gate** as the marketing channels where goods are sold to the highest bidder.

Question 1.1.4 and 1.1.9 high-order questions of combinations of options posed a great challenge to most learners as they struggled to get all four marks. Teachers should place more emphasis on these types of questions.

In Question 1.1.6 there was a great misconception as learners opted for money as a production factor that is also regarded as capital instead of land.

Suggestions for improvement of Section A Question 1.1

Teachers must drill learners to answer combination questions and how to identify key words from the questions that lead them to the correct option. Teachers should always incorporate multiple-choice questions in all their formal and non-formal assessment tasks.

Teachers should also drill learners on concepts and ensure that all the concepts involved are well explained. Previous question papers are a good revision tool for this section.

Question 1.2

There was excellent performance in Question 1.2 compared to previous years. Most learners have mastered this questioning technique and the reduction of destructors in Column B was to the advantage of learners.

Common errors were observed in Question 1.2.1 as some learners confused **in-store promotion** with **advertising**.

Question 1.2.3 some learners thought that a list of all capital goods on a farm is a budget instead of inventory.

Also in Question 1.2.4 a misconception was observed as learners confused net worth with budget as the difference between assets and liabilities.

Suggestions for improvement of Question 1.2

Exposing learners to various terminologies is the best way to prepare learners for this Question as they will not find much difficulty in matching the descriptions of concepts in Column A and agricultural terms in column B.

Question 1.3

A very encouraging performance by learners on this section which is usually quite challenging for learners. This performance shows that learners are gradually mastering agricultural terminology which is the backbone of the understanding of the subject. Learners were well prepared for this section. Few misconceptions were identified in Question 1.3.1 where learners confused market equilibrium with market equilibrium price.

A common error was picked in Question 1.3.2 where learners confused casual or temporary with part time, unskilled and skilled labour.

In Question 1.3.3 some learners failed to differentiate between the process of genetic modification (GM) and Genetically Modified Organisms (GMO). Another common error identified was in Question 1.3.4 where some learners failed to distinguish between the two breeding systems: cross-breeding and species-crossing. Learners wrote cross-breeding instead of species-crossing as the breeding system involving two farm animals from different species.

In Question 1.3.5 a misconception was noted as some learners wrote heredity instead of heritability. Lack of practice may have caused these misconceptions to occur.

Suggestions for improvement of Question 1.3

Teachers should formulate a term bank for all concepts for each and every chapter and try to give a clear definition for each and every agricultural term to assist learners master agricultural language. **Quiz** and **word puzzles** should be used as tools to assess agricultural terms in preparation for exams. Continuous assessment on terminology should be done on a weekly basis.

Question 1.4

This Question was poorly performed by most learners and a lot of misconceptions were noted. In Question 1.4.1 some learners wrote niche marketing instead of mass marketing as answers instead of green marketing. In Question 1.4.2 learners confused contract with permit as a legally binding document between two parties.

Suggestions for improvement of Question 1.4

Learners should be well prepared so that their attention should not be only on the underlined word but on the description provided. Terminology bank is very useful in preparing learners for this type of questioning.

(b) Provide suggestions for improvement in relation to Teaching and Learning for QUESTION 1 as a whole.

- Basic knowledge of the subject terminology remains very important and is the main determinant of candidates' performance. Candidates should be explicitly taught the subject terminology to ensure that they are well acquainted with essential subject terminology.
- Assessment of terminology could be made interesting for learners through the introduction of **speed tests** on crossword puzzles, matching items, one-word answers and multiple-choice items that can be incorporated into daily teaching.
- Learners should also be encouraged by their teachers to prepare a terminology bank for each topic and be encouraged to know the importance of concepts in mastering the subject.
- Short Terminology tests at regular intervals are advised.

QUESTION 2: AGRICULTURAL MANAGEMENT AND MARKETING

In general, this question was fairly answered by most candidates. Candidates with developed skills of interpreting questions and application of concepts were able to score between 20-30 in question 2. The question was demanding direct understanding of agricultural management and marketing content as outlined by CAPS. Poorly performing candidates were also able to articulate the question using diverse explanations trying to explain the concepts. Learners could have maximised on this question but due to the common errors and misconceptions outlined below they could not take maximum advantage of this question to score more marks.

- (a) In 2.1.1 most learners confused packaging with processing, the diagram showed packets with pipe pouring something on them. As a result learners thought that it is processing.
- (b) Question 2.1.2 learners gave the advantages of processing because of the confusion in the diagram and as a result they lost 2 marks.
- (c) In 2.2.1 learners could not differentiate the dependent and independent variables. As a result, most of them could not get 6 full marks. 80% of learners from this question got 4 marks. The placement of units also posed a challenge as they wrote only 1 unit which is R (rand) and omitted the kilograms (kg).
- (d) In 2.2.4 most learners could not answer the question well as they failed to interpret the table. Instead of differentiating between the two products, they gave

elasticity for both of them, and most unfortunately 2.2.5 was dependent to 2.2.4. As a result learners lost the whole 4 marks from this question.

- (e) In 2.3.1 learners struggled to differentiate between the advantages of free marketing to the consumer and the producer. They just took the statement as it is from the scenario.
- (f) In 2.4.1 most candidates struggled with identifying the marketing chain illustrated on the chart; instead, they answered marketing channels or systems.
- (g) In 2.4.2 the learners were generalising the factors hampering the marketing of agricultural products.
- (h) In 2.4.3 most learners wrote ways to promote a product.

Suggestions for improvement of Question 2.

- Teachers should expose learners to different resources for diagrams and use flow diagrams, tables and scenarios during assessment. Teachers should also expose learners to all types of questions that need an application and instructional questions
- Learners need to be given frequent assessment on data response questions, e.g scenarios and tables. They should also be taught to translate information from tables and graphs into words.
- Learners should also be drilled on the skill of drawing graphs especially **calibration** and how they can get all marks.
- The utter shortage of teaching and learning material does reflect on the performance of learners in deep rural and semi-rural communities of our country. This will continue to negatively affect matric results in our province. Shortage include text books, overhead projectors, funds for excursions to relevant institutions etc.

Recommendations

- The criteria for marking graphs should be adjusted to benefit candidates, like a mark on accuracy should not only be awarded after the learner has obtained all correct but be redirected to the correct calibration and actual plotting of the graph.
- The use of examination guidelines and diagnostic report is very crucial as it guides candidates on areas which they should concentrate on when revising and also diagnostic report help learners not to repeat the same errors year after year.
- Various teaching aids like Video, TV and radio channels, Telematics and Farmer's Weekly magazines would be very effective to the fourth industrial generation.

Question 3: Production factors

Question 3.1

Learners performed poorly as few candidates managed to answer long term credit correctly. Learners wrote loan, capital and credit not specifying the type of credit required.

Reason for the performance observed

This performance was because candidates could not understand the scenario provided to identify the type of credit required. Question 3.1.2 and 3.1.3 were embedded to question 3.1.1; therefore learners who failed question 3.1.1 also failed to give the correct responses to the linked questions. In question 3.1.3 learners were providing general problems relating to capital not specifically writing the one related to the scenario.

Suggestions for improvement

Learners should be given more scenario based informal tasks as to train them tackling data responses questions. Terminology journals should be developed for each topic to assist learners to understand all concepts.

Learners performance in Question 3.2

It was poor, they could not define management and were unable to list main components of management. Instead they mentioned management skills and qualities.

Reasons for performance

Learners confused components with management skills and management qualities.

Suggestions for Improvement

- More informal activities must be given
- Question banks must be developed
- Use of past question papers so as to expose learners to various questioning techniques.

Question 3.3

Learners Performance

The performance was excellent in this question. Most learners answered correctly as all the indicators were not that confusing.

Question 3.4

Learners performance

The performance was fair in 3.4.1 as learners were able to provide the correct aspects found in the contract of farm worker under the legislation “Basic Conditions of

Employment Act”. However, in 3.4.2(a) and (b) learners found difficulties in giving the correct legislation related to the given situations: some wrote wrong Act numbers and some gave incomplete legislation while others wrote only abbreviations.

Reason for Performance

In 3.4.1 the reason for excellent performance was that legislation was taught well, as they were revising the labour contract templates in class. In 3.4.2 most learners did not perform well because few previous question papers consist of such questions. No time was enough for revision and learners studied under pressure.

Suggestions for improvement

- Learners need to be first taught well the concept of legislation.
- Regular assessment of previous work can assist them to recall previous content.
- Oral questioning and whole class room assessment on legislation can assist most learners.

Question 3.5

Learners performance

The performance was fair. Learners were able to give the correct economic characteristic of land and linked with statement given. They have background knowledge of economic characteristics as they were able to list them correctly, even though some failed. Also, in 3.5.3 this question was well answered because soil science has been tough in Grade 11, so they know how to improve soil productivity.

A common error was noted in question 3.5.2 as learners confused economic characteristics of land with **economic functions** of land.

Suggestions for Improvement

- More work to be given in each of the production factors.
- Practical activities should also focus on land as production factor. Also educators must emphasise the differences between economical functions and economic characteristics of soil.
- Teachers are once again advised to regularly expose learners to data response questions in their assessment as these types of questions will encourage learners to be creative in thinking of valid responses. However, teachers must make learners aware that their responses must be valid, based on fact, and, in line with the requirements of the question.

- Teachers should focus on all aspects of content as listed in both the CAPS and the Examination Guidelines for Agricultural Sciences. Furthermore, teachers should encourage learners to also be updated with current issues that affect agricultural sector.

Question 4: Basic Agricultural genetics

Generally, there was not much deviation of learners' performance in Question 4 compared to the previous years, especially 2019. Previous trends used to show a number of candidates leaving genetics Question un-attempted and most candidates scoring less than 5 marks. This year's positive improvement in Question 4 may be due to increased co-operation between subject advisors and subject planner in ensuring that educators with content gap in genetics are assisted.

Common errors and Misconceptions

- 4.1.1 most candidates failed to be precise on the genotype of the cow. They wrote the genotype for both parents (BB x bb) instead of bb. Interpretation of the question was the common error found in most learners.
- Question 4.1.2 learners confused monohybrid Punnet square with that of a dihybrid. Most candidates got 3 marks and failed to obtain the mark for determining the phenotype of the F₁-generation. There is still a challenge in interpretation of a Punnet square.
- In Question 4.1.3 learners were not able to identify the type of dominance that occurred in Nguni Cattle. They confused complete dominance with incomplete dominance/ co-dominance. There was a misconception by some learners who know some Nguni cattle in general that it has a mixture of coat colour, so learners thought that was co-dominance. Much emphasis is needed on the patterns of inheritance that lead to different phenotypes. In Question 4.1.4 learners gave an explanation of **incomplete** and **co-dominance** instead of a **complete** dominance.
- Question 4.2.1 was well answered by most candidates together with the supporting reasons in Question 4.2.2. Candidates were able to identify the type of crossing represented by the Punnet square given.
- Question 4.2.3 challenged most learners as they failed to understand the question and ended up providing the genotype similar to the parents that is BbRr. Learners are still lacking in-depth understanding of dihybrid crosses.

- f) Question 4.3.1 was not very challenging to most learners though some common errors occurred as learners confused homozygous with heterozygous. It was not easy for learners to explain homozygous as they wrote alleles are dominant and some, instead of writing same alleles, they wrote same letters.
- g) In Question 4.3.3(a) most learners didn't include the phenotype when writing the phenotypic ratio of the F2 generation.
- h) 4.4.1 was challenging to most candidates giving genetic modification as the answer instead of variation. This has caused most learners not to get 4.2.2 and 4.2.3 correct.
- i) In Question 4.4.4 most learners did not know the correct genetics term as they ended up doing guess work.
- j) 4.5.1 Most learners confused **polygenic inheritance** with **multiple alleles**.
- k) 4.5.2 Most learners got it correct but lost another mark for not showing the calculation.
- l) 4.6.1 Most learners wrote gene gun as a technique to modify plants, and lost one mark.

Suggestions for Improvement of Question 4

- a) The subject should be incorporated in e-learning programs like telematics and SABC TV programs which help learners to have a clear understanding of Agricultural genetics
- b) Teachers should in their teaching pay special attention to basic crossing, genetic concepts and terminology
- c) Emphasis should be given to the pattern of inheritance that leads to different genotype, incomplete dominance, co-dominance, complete dominance, multiple alleles, polygenic inheritance and epistasis.
- d) The teaching of genetics should be enhanced by providing practical examples within the learning site, such as plants, flowers and animals.



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

SENIOR CERTIFICATE/ NATIONAL SENIOR CERTIFICATE

GRADE 12

AGRICULTURAL SCIENCES P2

NOVEMBER 2020

MARKS: 150

TIME: 2½ hours

This question paper consists of 13 pages.



★ A G R S E 2 ★



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 numbers (1.1.1 to 1.1.10) in the ANSWER BOOK, e.g. 1.1.11 B.

1.1.1 A free marketing channel where goods are sold to the highest bidder is known as ... marketing.

- A farm gate
- B direct sale
- C internet
- D stock sale

1.1.2 Which ONE of the following elements of a SWOT analysis is a strength of a business?

- A Consumers cannot easily access the market
- B Production of high-quality products
- C High demand for a product
- D Many producers selling a product

1.1.3 This process involves the production of the product and moving it to consumers:

- A Marketing
- B Processing
- C Standardisation
- D Grading

1.1.4 Oversupply in a market can be avoided by the following:

- (i) Converting excess produce to other consumable products
- (ii) Entering into future contracts with wholesalers
- (iii) Increasing the price of the produce
- (iv) Having a storage facility

Choose the CORRECT combination:

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

1.1.5 The following represents a fixed capital item:

- A A tractor
- B A dam
- C Fuel
- D Seed



- 1.1.6 A production factor that is also regarded as capital:
- A Land
 - B Labour
 - C Management
 - D Money
- 1.1.7 A number of different production enterprises on a farm is referred to as ...
- A specialisation.
 - B flexibility.
 - C diversification.
 - D hedging.
- 1.1.8 The creation of capital by borrowing from financial institutions is called ...
- A credit.
 - B a grant.
 - C capital.
 - D debt.
- 1.1.9 The following are the main types of gene mutation:
- (i) Insertion
 - (ii) Duplication
 - (iii) Inversion
 - (iv) Deletion
- Choose the CORRECT combination:
- A (ii), (iii) and (iv)
 - B (i), (iii) and (iv)
 - C (i), (ii) and (iv)
 - D (i), (ii) and (iii)
- 1.1.10 ONE of the following is NOT Mendel's law of inheritance:
- A Law of dominance
 - B Law of diminishing returns
 - C Law of segregation
 - D Law of independent assortment
- (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–H) next to the question numbers (1.2.1 to 1.2.5) in the ANSWER BOOK, e.g. 1.2.6 K.

COLUMN A		COLUMN B	
1.2.1	Method of promotion whereby consumers are allowed to taste a product	A	price fixing
		B	inventory
1.2.2	A condition where a price is held constant regardless of the cost of production	C	in-store promotion
		D	net worth
1.2.3	A list of all the capital goods on a farm	E	budget
		F	dominant
1.2.4	The difference between assets and liabilities	G	recessive
		H	advertising
1.2.5	An allele that is not expressed in the phenotype of a heterozygous organism		

(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 numbers (1.3.1 to 1.3.5) in the ANSWER BOOK.

- 1.3.1 The situation in a market where the quantity of products supplied is exactly equal to the quantity demanded
- 1.3.2 The type of labour employed to build a kraal
- 1.3.3 Form of biotechnology that produces a genetically modified organism
- 1.3.4 The crossing of farm animals from different species
- 1.3.5 The degree to which a characteristic is determined more by genes than by environmental factors

(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 numbers (1.4.1 to 1.4.5) in the ANSWER BOOK.

1.4.1 Multi-segment is a marketing approach where products are responded to and marketed in an environmentally sensitive way.

1.4.2 A permit is a legally binding document between two parties.

1.4.3 The selection of animals based on the performance of their siblings is known as mass selection.

1.4.4 An estimate of how much better or less than average an offspring will be for a particular characteristic is known as breeding.

1.4.5 Atavism is when one parent has greater than usual ability to transfer traits to the offspring. (5 x 1) (5)

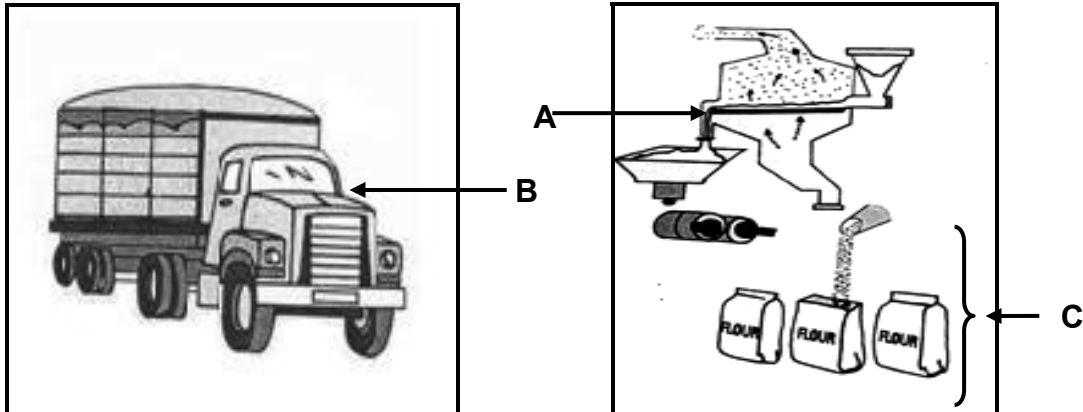
TOTAL SECTION A: 45



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

Start this question on a NEW page.

2.1 The pictures below illustrate the functions of marketing.



2.1.1 Identify the marketing functions illustrated in **B** and **C**. (2)

2.1.2 State TWO guidelines for the marketing function in **C**. (2)

2.1.3 Name TWO advantages of the marketing function in **A**. (2)

2.2 The table below shows the demand of two products at different prices.

PRICE PER BAG (R)	QUANTITY DEMANDED (kg)	
	PRODUCT 1	PRODUCT 2
R5	600	2 500
R10	500	2 300
R15	400	2 000
R20	300	2 000
R25	200	2 000
R30	100	2 000

2.2.1 Draw a line graph showing the quantity of PRODUCT 1 demanded at the different prices. (6)

2.2.2 Identify the product (1 or 2) in the table that reflects the law of demand. (1)

2.2.3 Justify the answer to QUESTION 2.2.2. (1)

2.2.4 Name the form of elasticity displayed in PRODUCT 1 and PRODUCT 2. (2)

2.2.5 Give a reason for the answer to QUESTION 2.2.4 for EACH of the products. (2)

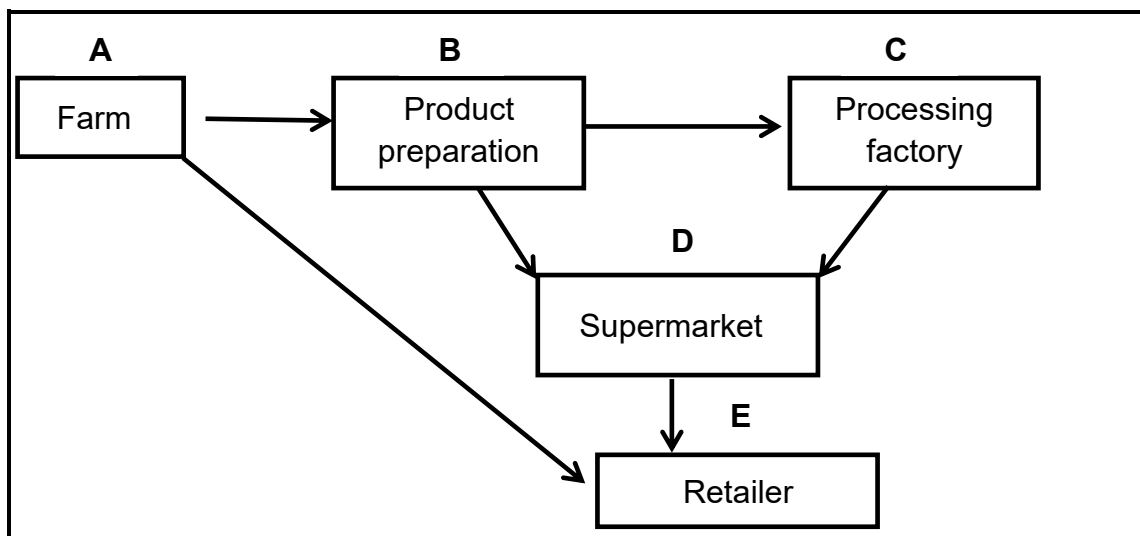
2.3 In a free-market system, producers sell their produce whenever and wherever they want at a price agreed upon by both the buyer and the seller.

2.3.1 Identify an advantage of a free-market system for the consumer. (1)

2.3.2 Name TWO disadvantages of a free-market system for the producer. (2)

2.3.3 State TWO marketing channels which the producers in a free-market system can use to market their produce. (2)

2.4 The flow chart below represents a marketing chain.



2.4.1 Identify the marketing chain illustrated above. (1)

2.4.2 Name the factor that may hamper the marketing at stage E if fewer products are sold. (1)

2.4.3 Indicate TWO ways to improve the agribusiness chain between stage A and stage E. (2)

2.5 The following are personal characteristics that make an entrepreneur succeed in a business.

perseverance; innovation; risk-taking;
confidence; interpersonal skills

2.5.1 Choose a personal characteristic of an entrepreneur above that matches EACH of the following statements:

- (a) Finding ways of generating new ideas to overcome challenges (1)
- (b) Ability to interact with people (1)
- (c) Does not give up easily even in difficult times (1)
- (d) Buying new equipment hoping that it will increase production (1)

2.5.2 Name TWO phases of the entrepreneurial process. (2)

2.5.3 State TWO problems that the entrepreneur may encounter when drawing up a business plan. (2)

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QUESTION 3: PRODUCTION FACTORS

Start this question on a NEW page.

3.1 An Agricultural Sciences graduate wanted money to buy a farm and start a farming enterprise. The graduate managed to get money on credit.

- 3.1.1 Indicate the type of credit obtained to buy the farm. (1)
- 3.1.2 Explain the type of credit indicated in QUESTION 3.1.1. (2)
- 3.1.3 Identify TWO problems with capital that the graduate may experience. (2)
- 3.1.4 State TWO other ways of creating capital. (2)

3.2 Farming is a business that requires management as a production factor to manage it effectively.

- 3.2.1 Define the term *management*. (2)
- 3.2.2 List THREE main components of management. (3)

3.3 The following are external forces that affect a business.

Environmental forces	Economic forces
Legal forces	
Technological forces	Sociocultural forces

Match the external forces above with the descriptions below.

- 3.3.1 Affects a farming business through the inflation rate (1)
- 3.3.2 The way a farming business provides working conditions for its labour force (1)
- 3.3.3 A change in the population demographics, such as age, race and gender, can affect customers' needs and wants (1)
- 3.3.4 The impact of drought and flooding on a farming business (1)
- 3.3.5 The effect of infrastructure and telecommunications on a farming business (1)



3.4 LABOUR LEGISLATION

3.4.1 Name THREE aspects in the contract of a farm worker that address the Basic Conditions of Employment Act, 1997 (Act 75 of 1997). (3)

3.4.2 Indicate the legislation that makes provision for farm workers to do the following:

(a) Wear gumboots and overalls during the milking process (1)

(b) The right to strike and unfair labour practices (1)

3.5 Soil may be damaged, but cannot be destroyed.

3.5.1 Indicate an economic characteristic of land represented by the statement above. (1)

3.5.2 State any THREE other economic characteristics of land. (3)

3.5.3 Name TWO methods that can be used to improve soil productivity. (2)

3.6 The table below shows a broiler production budget.

EXPENDITURE ITEMS (RAND)		INCOME (RAND)	
Cost price of 1 500 broilers	1 500	Sales of 1 450 broilers	79 750
Feed (starter, grower and finisher)	45 000	Sales of manure	3 700
Electricity and water	6 000		
Vaccines	800		
Saw dust	700		
Wages	1 600		
Insurance	800		
Total:			

3.6.1 Identify, in the table above, an example of:

(a) Fixed costs (1)

(b) Variable costs (1)

3.6.2 Calculate the profit/loss of the budget above. (3)

3.6.3 Name TWO types of budgets on a farm. (2)

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QUESTION 4: BASIC AGRICULTURAL GENETICS

Start this question on a NEW page.

- 4.1 In Nguni cattle the black (B) colour is dominant over the white (b) colour. A homozygous black bull is crossed with a homozygous white cow.

- 4.1.1 Determine the genotype of the cow. (1)
- 4.1.2 Draw a Punnett square to determine the phenotype of the F_1 -generation. (4)
- 4.1.3 Name the type of dominance that occurs in Nguni cattle. (1)
- 4.1.4 Give a reason to motivate the answer to QUESTION 4.1.3. (1)

- 4.2 Fruit colour in plants is controlled by two alleles, black (B) and red (b). Fruit shape is controlled by two alleles, round (R) and wrinkled (r). Black and round are dominant over red and wrinkled respectively. Two plants, heterozygous for both characteristics, were crossed.

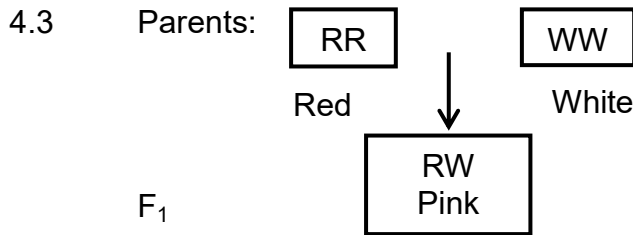
Characteristic 1: (Colour)	
B - Black	
b - Red	
Characteristic 2: (Shape)	
R - Round	
r - Wrinkled	

The table below shows the possible genotypes of the offspring of the first generation.

	BR	Br	bR	br
BR	BBRR	BBRr	BbRR	BbRr
Br	BBRr	BBrr	BbRr	Bbrr
bR	BbRR	BbRr	bbRR	bbRr
br	BbRr	Bbrr	bbRr	bbrr

- 4.2.1 Identify the type of crossing represented above. (1)
- 4.2.2 Give a reason for the answer to QUESTION 4.2.1. (1)
- 4.2.3 Name ONE genotype of the offspring which is different from that of parents in the Punnett square above, that will give rise to the phenotype that is similar to that of the parents. (1)





4.3.1 Indicate whether the parents are homozygous or heterozygous. (1)

4.3.2 Give a reason for the answer to QUESTION 4.3.1. (1)

4.3.3 Determine the following after interbreeding of the F₁-offspring:

(a) The phenotypic ratio of the F₂-generation (1)

(b) The percentage of red offspring (1)

4.4 Genotypically identical maize seeds were planted in different areas of the province. The seeds were planted at the same time. The table below shows the height of the maize plants after three months.

AREA	HEIGHT
A	Tall
B	Dwarf
C	Medium

4.4.1 Indicate the genetic phenomenon illustrated in the table above. (1)

4.4.2 Define the *genetic phenomenon* in QUESTION 4.4.1. (2)

4.4.3 Name THREE environmental factors that may have contributed to the difference in height of the maize plants. (3)

4.4.4 If two different cultivars of maize are crossed the offspring normally shows a very large and drastic improvement in yield. Give a scientific term for this improvement. (1)

4.4.5 Name the type of breeding system given in the statement in QUESTION 4.4.4. (1)

4.5 The height of a tomato plant is controlled by two pairs of genes. The base height of a recessive plant (aabb) is 30 cm. Each additive allele contributes 10 cm to the base height.

4.5.1 Define the concept *polygenic inheritance*. (2)

4.5.2 Determine the height of an AABB tomato plant. (2)

4.5.3 Name the THREE different genotypes of a 50 cm tomato plant. (3)



4.6 GENETIC MODIFICATION

- 4.6.1 Name TWO techniques that can be used to modify plants. (2)
- 4.6.2 State TWO advantages of GM crops. (2)
- 4.6.3 Indicate TWO disadvantages of GM crops. (2)
- [35]**

TOTAL SECTION B: 105
GRAND TOTAL: 150





basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

SENIOR CERTIFICATE/ NATIONAL SENIOR CERTIFICATE

GRADE 12

AGRICULTURAL SCIENCES P2

NOVEMBER 2020

MARKING GUIDELINES

MARKS: 150

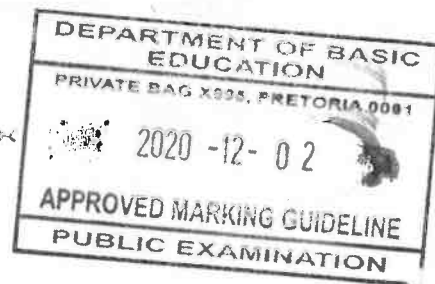
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Seloane RA

Internal moderator

02/12/2020



These marking guidelines consist of 10 pages.

Approved

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MATHOBO DN

UMALUSI

02/12/2020

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ISHABANG AT

UMALUSI

02/12/2020

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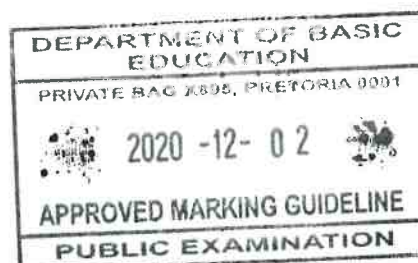
SM Gwensu

UMALUSI

02-12-2020

SECTION A**QUESTION 1**

1.1	1.1.1	D ✓✓		
	1.1.2	B ✓✓		
	1.1.3	A ✓✓		
	1.1.4	C ✓✓		
	1.1.5	B ✓✓		
	1.1.6	A ✓✓		
	1.1.7	C ✓✓		
	1.1.8	A ✓✓		
	1.1.9	B ✓✓		
	1.1.10	B ✓✓	(10 x 2)	(20)
1.2	1.2.1	C ✓✓		
	1.2.2	A ✓✓		
	1.2.3	B ✓✓		
	1.2.4	D ✓✓		
	1.2.5	G ✓✓	(5 x 2)	(10)
1.3	1.3.1	Market equilibrium ✓✓		
	1.3.2	Casual/temporary ✓✓		
	1.3.3	Genetic modification/Genetic engineering/manipulation ✓✓		
	1.3.4	Species crossing ✓✓		
	1.3.5	Heritability ✓✓	(5 x 2)	(10)
1.4	1.4.1	Green/eco/sustainable agricultural marketing ✓		
	1.4.2	Contract ✓		
	1.4.3	Family ✓		
	1.4.4	Estimated breeding value/EBV ✓		
	1.4.5	Prepotency ✓	(5 x 1)	(5)

TOTAL SECTION A: 45

SECTION B**QUESTION 2: AGRICULTURAL MANAGEMENT AND MARKETING****2.1 Functions of marketing****2.1.1 Identification of the marketing function****B - Transportation** ✓

(1)

C - Packaging ✓

(1)

2.1.2 TWO guidelines of packaging

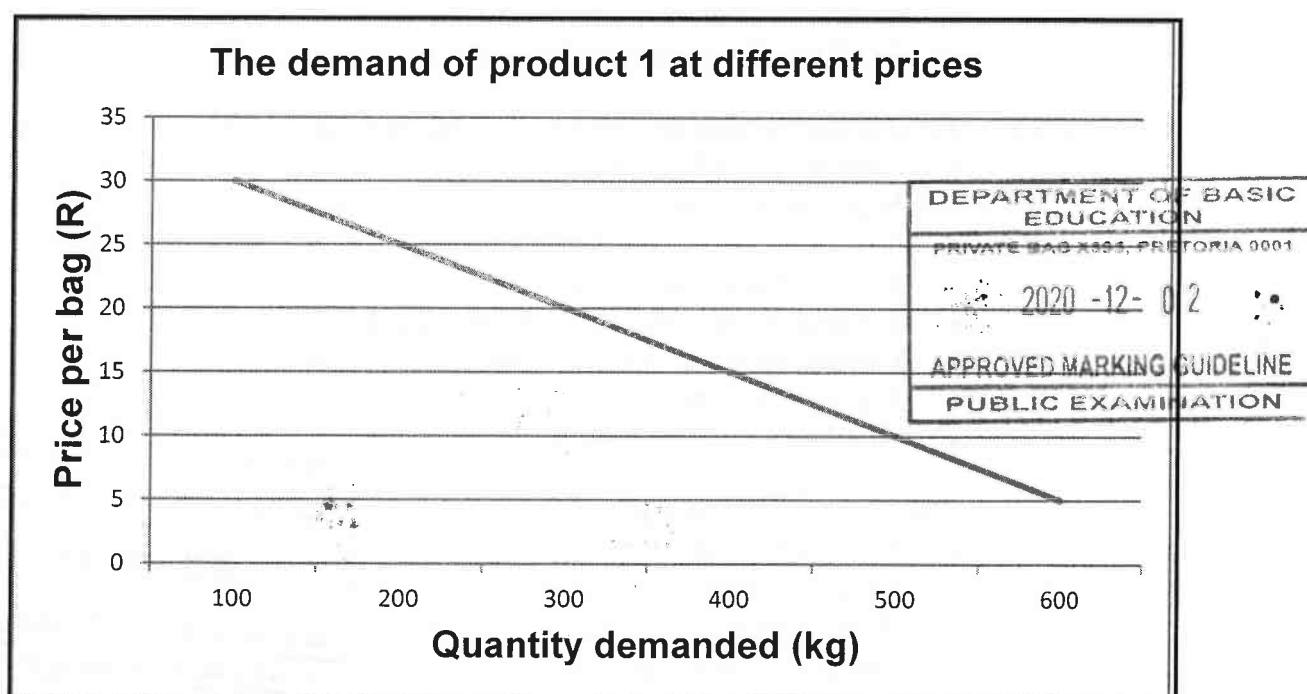
- Provide information about the product/identification ✓
- Convenient for handling/containment ✓
- Biodegradable/recyclable ✓
- Free from chemicals/foreign objects ✓
- Protection against mechanical damage ✓

(Any 2) (2)

2.1.3 TWO advantages of processing

- Increases the value of the product ✓
- Overcome over-supply of the product ✓
- Allows easier packaging and handling of product/ easy to transport/convenience ✓
- Provide job opportunities ✓
- Ensures the availability of product throughout the year ✓
- Reduces spoilage/perishability/longer shelf life ✓
- Ensures food security ✓
- Improved food safety ✓
- Makes the products more appealing to the consumer ✓

(Any 2) (2)

2.2 2.2.1 Line graph

Criteria/rubric/marketing guideline

- Correct heading ✓
- X-axis: Correctly calibrated with label (Quantity demanded) ✓
- Y-axis: Correctly calibrated with label (Price per bag) ✓
- Line graph ✓
- Correct units (R and kg) ✓
- Accuracy ✓ (6)

2.2.2 Identification of the product reflecting law of demand

Product 1 ✓ (1)

2.2.3 Justification

The lower the price, the higher the demand ✓

OR

The higher the price, the lower the demand ✓ (Any 1) (1)

2.2.4 Indication of the form of elasticity

PRODUCT 1 - Price elasticity of demand ✓ (1)

PRODUCT 2 - Price inelasticity of demand ✓ (1)

2.2.5 Reason

PRODUCT 1 - Demand changed drastically with change in price ✓ (1)

PRODUCT 2 - Demand remained high/constant despite the change in price ✓ (1)

2.3 Free market system**2.3.1 Advantage of a free marketing system to the consumer**

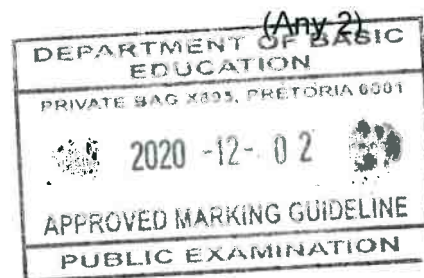
- Consumer can benefit from better quality products/ fresh produce ✓
- Consumer can bargain through negotiating price ✓
- Consumer can buy wherever they want ✓
- Produce are cheaper as there is no intermediaries ✓ (Any 1) (1)

2.3.2 TWO disadvantages of free marketing system for the producer

- Greater price fluctuation ✓
- High market costs as marketing takes place on a small scale ✓
- Time is spent on marketing/producer responsible for marketing ✓
- Limited bargaining power/the producer acts as an individual ✓
- Smaller profit if the agent is not fully active ✓
- Greater financial loss if wrong decisions are made ✓
- Highly competitive ✓
- Risk/theft ✓ (Any 2) (2)

2.3.3 TWO free marketing channels

- Farm gate marketing ✓
- Fresh produce markets ✓
- Stock sales/auction ✓
- Direct/contract marketing ✓
- Internet marketing ✓



(Any 2) (2)

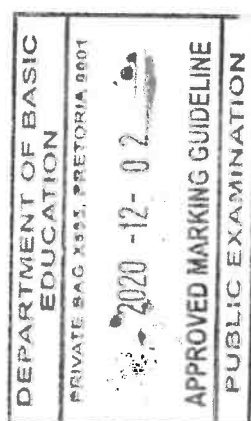
2.4 Marketing chain

- 2.4.1 **Identification of the marketing chain**
Supply/Agri-business chain ✓ (1)
- 2.4.2 **Factor that may hamper the marketing at stage E**
- Spoilage/perishability/lack of storage facilities ✓
 - Accidents/theft ✓
- (Any 1) (1)
- 2.4.3 **TWO ways to improve agri-business chain**
- Improving road infrastructure ✓
 - Improving access to market information ✓
 - Providing storage facilities to prevent oversupply ✓
 - Processing products close to where they are produced to reduce transportation costs ✓
 - Use of refrigerated transport to prevent spoilage/perishability ✓
 - Provision of access to finance ✓
 - Grading/standardisation ✓
 - Collective marketing ✓
- (Any 2) (2)

2.5 Entrepreneurship

- 2.5.1 **Personal characteristics of an entrepreneur**
- (a) - Innovation ✓ (1)
 - (b) - Interpersonal skill ✓ (1)
 - (c) - Perseverance ✓ (1)
 - (d) - Risk taking ✓ (1)
- 2.5.2 **TWO phases of entrepreneurial process**
- Identification of the business opportunities ✓
 - Evaluating the opportunity ✓
 - Developing a business plan/planning ✓
 - Resource mobilization ✓
 - Starting and managing the business ✓
- (Any 2) (2)
- 2.5.3 **TWO problems of drawing up a business plan**
- Incomplete/incorrect financials details ✓
 - Vague business plan ✓
 - Unrealistic assumptions/over ambitiousness ✓
 - Ignore risks/hiding weaknesses ✓
 - Not highlighting potential competitors/competition ✓
 - Who and where are the suppliers ✓
 - Leaving gaps/leaving out technical details ✓
 - Using the incorrect format ✓
 - Insufficient research ✓
- (Any 2) (2)

[35]



QUESTION 3: PRODUCTION FACTORS**3.1 Capital**

3.1.1 **Identification of the type of credit**
Long-term credit ✓ (1)

3.1.2 **Explanation of long-term credit**

- Used to buy fixed capital assets ✓
- Repayable over a period of 10 - 30 years ✓
- At a lower interest rate ✓
- Offered by the financial institutions/Land Bank ✓ (Any 2) (2)

3.1.3 **Problems related to capital**

- Capital is scarce ✓
- Total amount due is high/capital is expensive ✓
- High risk factor ✓ (Any 2) (2)

3.1.4 **TWO other ways of creating capital**

- Savings ✓
- Production/sales ✓
- Grants ✓
- Inheritance ✓
- Gifts/donation/lottery ✓
- Potential investors/business partners ✓ (Any 2) (2)

3.2 Management

3.2.1 **Definition of management**
The effective combination/coordination of resources ✓
to achieve a specific goal/maximise profit ✓ (2)

3.2.2 **THREE main components of management**

- Set goals ✓
- Planning ✓
- Organising/coordination/implementation ✓
- Directing/leading ✓
- Control/monitoring/supervision ✓
- Decision making ✓
- Communication ✓ (Any 3) (3)

3.3 External forces that effect a business

3.3.1 Economic forces ✓ (1)

3.3.2 Legal forces ✓ (1)

3.3.3 Socio-cultural forces ✓ (1)

3.3.4 Environmental forces ✓ (1)

3.3.5 Technological forces ✓ (1)



3.4 Labour legislation**3.4.1 THREE aspects in the contract of a farm worker**

- Details of the employee ✓
- Leave ✓
- Working hours ✓
- Working on Sundays/public holidays ✓
- Daily and weekly rest periods/meal intervals ✓
- Deductions ✓
- Wages/pay slip/method of payment/allowance ✓
- Overtime ✓
- Termination of employment ✓
- Job description ✓

(Any 3) (3)

3.4.2 Indication of the legislations

- (a) Occupational Health and Safety Act (Act 85 of 1993) ✓ (1)
- (b) Labour Relations Act (Act 66 of 1995) ✓ (1)

3.5 Land**3.5.1 Indication of an economic characteristic of land represented**

Land cannot be destroyed/indestructibility ✓ (1)

3.5.2 Other THREE economic characteristic of land

- Land is subject to the law of diminishing returns ✓
- Land is durable ✓
- Land can be bought/sold/has value ✓
- Good agricultural land is limited ✓
- Land is found in a specific environment ✓
- Available agricultural land is limited/availability ✓
- Differences with regard to production potential/restrictedness ✓
- The value of land appreciates over time ✓
- It is a passive factor of production ✓
- It is a primary factor of production ✓

(Any 3) (3)

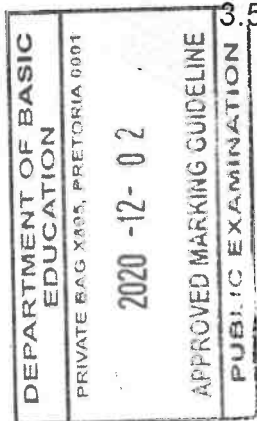
3.5.3 TWO methods to improve land productivity

- Water supply/provision ✓
- Farming land more efficiently/
consolidation of uneconomic farm units ✓
- Improving soil fertility/restoring land potential ✓
- Changing cropping practices and farming systems
- Use of scientific farming methods ✓

(Any 2) (2)

3.6 Budget**3.6.1 Identification of**

- (a) **Fixed costs** - Insurance ✓ (1)
- (b) **Variable costs** - Feed/sawdust/electricity/water/vaccines/
broilers/wages ✓ (Any 1) (1)



3.6.2 Calculation of a profit/loss

$$\begin{aligned}
 \text{Profit/loss} &= \text{Total Income} - \text{Total Expenditure} \checkmark \\
 &= \text{R}83\,450 - \text{R}56\,400 \checkmark \\
 &= \text{R}27\,050 \checkmark \\
 &\text{OR} \\
 &= \text{R}83\,450 \checkmark - \text{R}56\,400 \checkmark \\
 &= \text{R}27\,050 \checkmark
 \end{aligned}$$

(3)

3.6.3 TWO types of budget

- Whole farm budget ✓
- Enterprise budget ✓
- Partial budget ✓

(Any 2)

(2)

[35]**QUESTION 4: BASIC AGRICULTURAL GENETICS****4.1 Monohybrid crossing****4.1.1 Determination of the female genotype**

bb ✓

(1)

4.1.2 Punnet square

♂ \ ♀	b	b
B	Bb	Bb
B	Bb	Bb

MARKING CRITERIA

- Correct male gametes ✓
- Correct offspring ✓
- Punnet square with gametes and offspring ✓
- All the offspring are black ✓

(4)

4.1.3 Identification of the type of dominance

Complete dominance ✓

(1)

4.1.4 Reason

Black colour is dominant over white colour/white colour is recessive to black colour/one allele masks/over shadows the other ✓

(1)

4.2 Dihybrid crossing**4.2.1 Identification of the type of crossing**

Dihybrid crossing ✓

(1)

4.2.2 REASON

This crossing involves two different characteristics/colour and shape ✓

(1)



- 4.2.3 **ONE of the offspring which is different from that of parents**
- BBRr ✓
 - BBRR ✓
 - BbRR ✓
- (Any 1) (1)
- 4.3 **Pedigree diagram**
- 4.3.1 **Indication of homozygous or heterozygous**
Homozygous ✓ (1)
- 4.3.2 **Reason to motivate for homozygous**
Similar alleles ✓ (1)
- 4.3.3 **Determination of**
- (a) F₂ phenotype: 1 red : 2 pink : 1 white ✓ (1)
 - (b) Percentage of red offspring - 25% ✓ (1)
- 4.4 **Variation**
- 4.4.1 **Indication of the genetic phenomenon**
Variation ✓ (1)
- 4.4.2 **Definition of the genetic phenomenon**
- The difference that occurs amongst individuals ✓ of the same species ✓
 - Difference in the genotype and phenotype ✓ of the same species ✓
- (Any 1) (2)
- 4.4.3 **THREE environmental factors**
- Soil factors ✓
 - Temperature ✓
 - Light intensity ✓
 - Diseases and pests ✓
 - Moisture/water content ✓
 - Topography ✓
 - Nutrition ✓
- (Any 3) (3)
- 4.4.4 **Scientific term for the improvement**
Heterosis/hybrid vigour ✓ (1)
- 4.4.5 **The type of breeding system**
Cross breeding ✓ (1)
- 4.5 **Polygenic inheritance**
- 4.5.1 **Definition of polygenic inheritance**
Characteristic that is determined ✓ by many different genes ✓ (2)
- 4.5.2 **Determination of the height of an AABB**
30 cm + 10 cm + 10 cm + 10 cm + 10 cm ✓
= 70 cm ✓ (2)



4.5.3 THREE different genotypes of a 50 cm tomato plant

- AAbb ✓
- aaBB ✓
- AaBb ✓

(3)

4.6 Genetic modification**4.6.1 TWO techniques that can be used to modify plants**

- Agro-bacterium tumefaciens/bacterial carriers ✓
- Viral carriers ✓
- Biolistic ✓
- Calcium phosphate precipitation ✓
- Electroporation ✓
- Gene slicing ✓
- Gene silencing ✓
- Lipofection ✓
- Micro-injection ✓
- Chemicalporation ✓

(Any 2) (2)

4.6.2 TWO advantages of GM crops

- Improving the shelf life of produce ✓
- Improving the nutritional value of food ✓
- More resistance to insects/pests/diseases ✓
- Resistance to weed killers ✓
- More resistance to adverse environmental influences/factors ✓
- Increased yield ✓

(Any 2) (2)

4.6.3 TWO disadvantages of GM crops

- Health risks ✓
- Environmental risks ✓
- Personal/ethical/socio-cultural concerns ✓
- Reduced biodiversity ✓
- Socio-economic risks/expensive to emerging farmers ✓ Any 2)

(2)

[35]

TOTAL SECTION B: 105
GRAND TOTAL: 150

