



LIMPOPO

PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
EDUCATION

**NATIONAL
SENIOR CERTIFICATE**

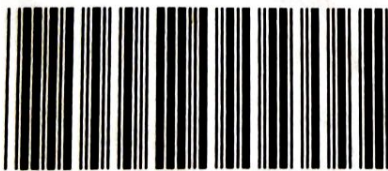
GRADE 12

AGRICULTURAL SCIENCES P2

SEPTEMBER 2020

MARKS: 150

TIME: $2\frac{1}{2}$ hours



EAGRSP2

This question paper consists of 16 pages

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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. Write down the question number (1.1.1 – 1.1.10). Choose the answer and write the letter (A – D) of the answer of your choice in the ANSWER BOOK.

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 An event where different buyers come together to bid on farm produce available:

- A Cooperative farming
- B Agricultural show
- C Auction
- D Liquidity

- 1.1.3 One of the following statements about an entrepreneur is incorrect:

An entrepreneur is a person who ...

- A Only works for somebody else to earn a salary
- B Takes risks
- C Works hard
- D Has a desire to achieve success

- 1.1.4 In sex-linked characteristics, maleness or femaleness is considered a ...

- A Genetic genotype
- B Genetic phenotype
- C Polygenic appearance
- D Single base loss

- 1.1.5 A decrease in performance with each generation caused by the crossing of two plants or animals that are closely-related, is called ...
- A Inbreeding depression
 - B Variation
 - C Upgrading
 - D Incomplete dominance
- 1.1.6 Cattle have 30 pairs of chromosomes in the nucleus. The number of chromosomes in the female gametes will be ...
- A 15
 - B 45
 - C 60
 - D 30
- 1.1.7 One of the following is not associated with labour legislation:
- A Occupational Health and Safety act
 - B Skills Development Act
 - C Basic Conditions of Unemployment Act
 - D Labour Relations Act
- 1.1.8 Capital that is invested in items of a more permanent nature, like a water reservoir is called ... capital
- A Fixed
 - B Moveable
 - C working
 - D Floating
- 1.1.9 The measure of how much the demand for a product changes with a change in price:
- A Equilibrium
 - B fluctuation
 - C Price elasticity of demand
 - D Price inelasticity of demand

1.1.10 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)

(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 A combination of four factors that a company uses to develop a marketing strategy	A. broker B. grant
1.2.2 Type of buyer that acts as middleman, purchases large quantities of a product and sells small units to consumers	C. locus D. market development
1.2.3 Funding provided by government /organisation for a particular purpose that does not have to be repaid	E. market mix F. gamete
1.2.4 Specific position of a gene on a chromosome	G. retailer H. loan
1.2.5 Reproductive cell formed during meiosis	I. DNA J. testes
	(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 Random change in the genetic composition of a cell.
- 1.3.2 Characteristics controlled by a number of genes that produce continuous variation in a particular phenotype such as crop yield and size of fruit.
- 1.3.3 Record of moveable assets on a farm e.g. equipment and livestock.
- 1.3.4 The increased input of one production factor, while keeping other inputs constant, does not result in a proportional increase in output/yield.
- 1.3.5 A form of sustainability measurement where labelling certifies the product as environmentally friendly and creates awareness and consideration of environmental concerns in consumers.

(5 x 2) (10)

1.4 Change the UNDERLINED WORD(S) in each of the following statements to make the statements TRUE. Write only the answer next to the question number (1.4.1 – 1.4.5) in the ANSWER BOOK.

- 1.4.1 Outcrossing is the crossing of individuals of different species to produce a hybrid which often express hybrid vigour.
- 1.4.2 A bar graph is the type of a graph that represents continuous / numerical data in columns with no gaps in between.
- 1.4.3 A financial document that summarises assets and liabilities to determine the net worth of a business at a particular time is called a cash flow statement.
- 1.4.4 An entity's income minus expenses for an accounting period is liabilities.
- 1.4.5 A market chain refers to the collection of information about consumers and the existing competition.

(5 x 1) (5)

TOTAL SECTION A: 45

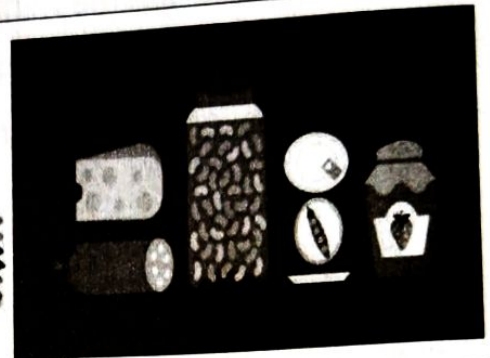
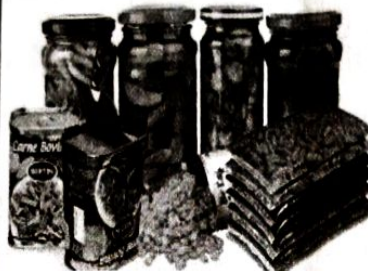
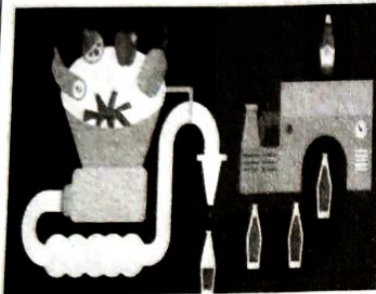
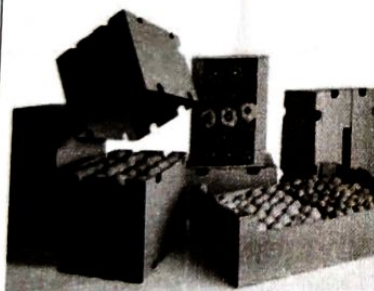
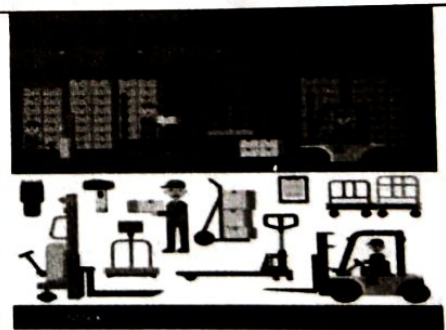
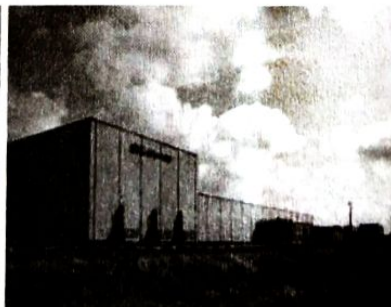
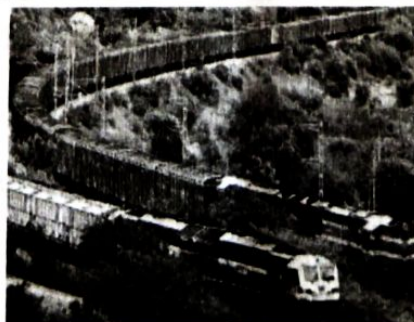
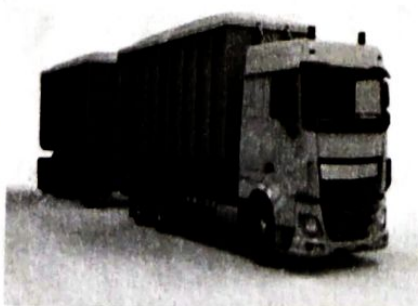
SECTION B**QUESTION 2: AGRICULTURAL MANAGEMENT AND MARKETING**

Start this question on a NEW page.

- 2.1 Study the passage together with the pictures A, B, C and D below and answer the questions that follow:

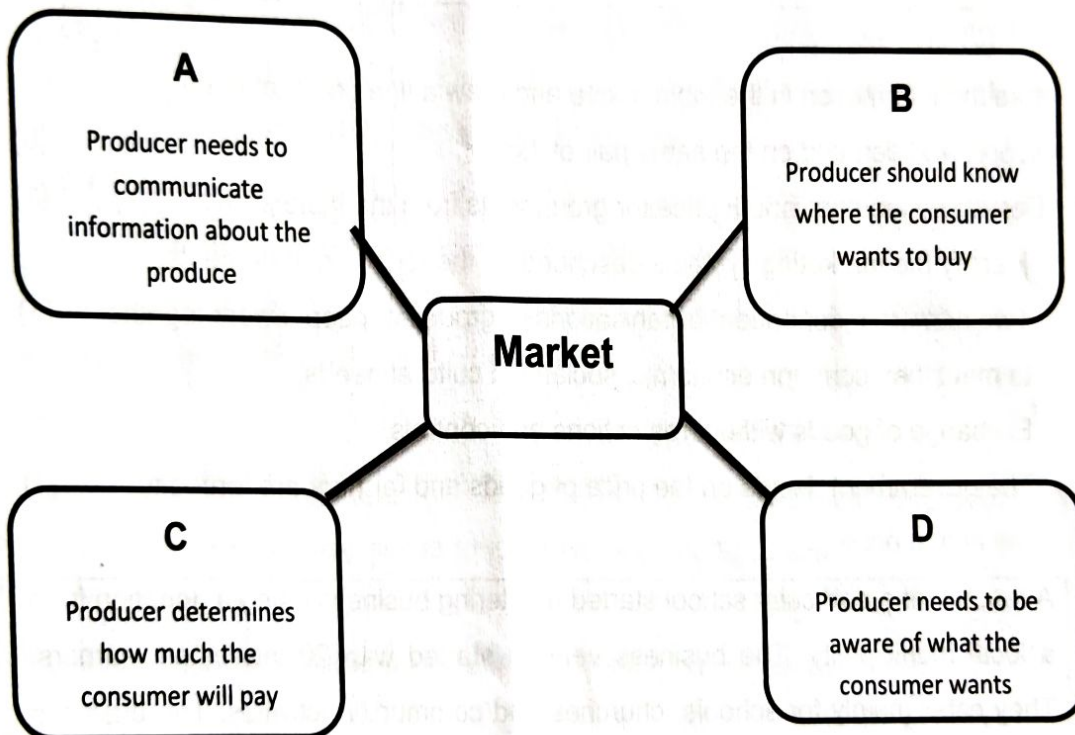
Functions of Agricultural Marketing

After harvesting, most products are taken to a facility where they are cleaned, graded, packed into boxes according to preset specifications, stored and then transported to the market.

A**B****C****D**

- 2.1.1 Identify the physical functions of agricultural marketing explained in the passage and further depicted by the pictures **A**, **B**, **C** and **D** above. (4)
- 2.1.2 State THREE advantages of the physical Agricultural marketing function represented by picture **A** above. (3)
- 2.1.3 Mention TWO facilitating functions of agricultural marketing in the passage above. (2)
- 2.1.4 Tabulate TWO differences between marketing and selling (4)

- 2.2 The diagram below shows various strategies in developing a market. Study the diagram and then answer the questions based on it:



- 2.2.1 Identify the strategies of developing a market represented by **A** to **D** (4)
- 2.2.2 State TWO factors that the producer should consider when planning the strategy represented by **D**. (2)
- 2.2.3 Name TWO ways in which the producer can implement the strategy represented by **A** successfully. (2)
- 2.2.4 Indicate TWO aspects a producer has to consider when deciding on the strategy represented by **C**. (2)

- 2.3 The table below shows the supply and demand of groundnuts at different prices

Price per kg (R)	Quantities supplied (kg)	Quantities demanded (kg)
1	1	9
2	2	8
3	3	7
4	4	6
5	5	5
6	6	4
7	7	3
8	8	2
9	9	1

- 2.3.1 Use the information in the table above and draw a line graph of both supply and demand on the same pair of axes. (6)
- 2.3.2 Determine the equilibrium price for groundnuts from the table above. (1)
- 2.4 Identify the marketing systems described by the following statements:
- 2.4.1 Two or more independent organisations or groups of people work together to meet their common economic, social and cultural needs. (1)
- 2.4.2 Exchange of goods without restrictions and controls. (1)
- 2.4.3 The government decide on the price of goods and farmers are forced to sell at that price. (1)

- 2.5 A teacher at a particular school started a catering business using a donation from a 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 200 youths who have finished school have already been trained to start their own businesses.

- 2.5.1 Identify ONE entrepreneurial quality displayed by the teacher in this case study. (1)
- 2.5.2 State ONE resource that an entrepreneur requires when starting a business. (1)

QUESTION 3: PRODUCTION FACTORS

Start this question on a NEW page.

3.1 Factors of production are resources that are used as inputs to produce outputs. Factors of production are further explained as resources necessary for the production of goods or services in order to make a profit.

3.1.1 Identify the factor of production best explained by each of the description below:

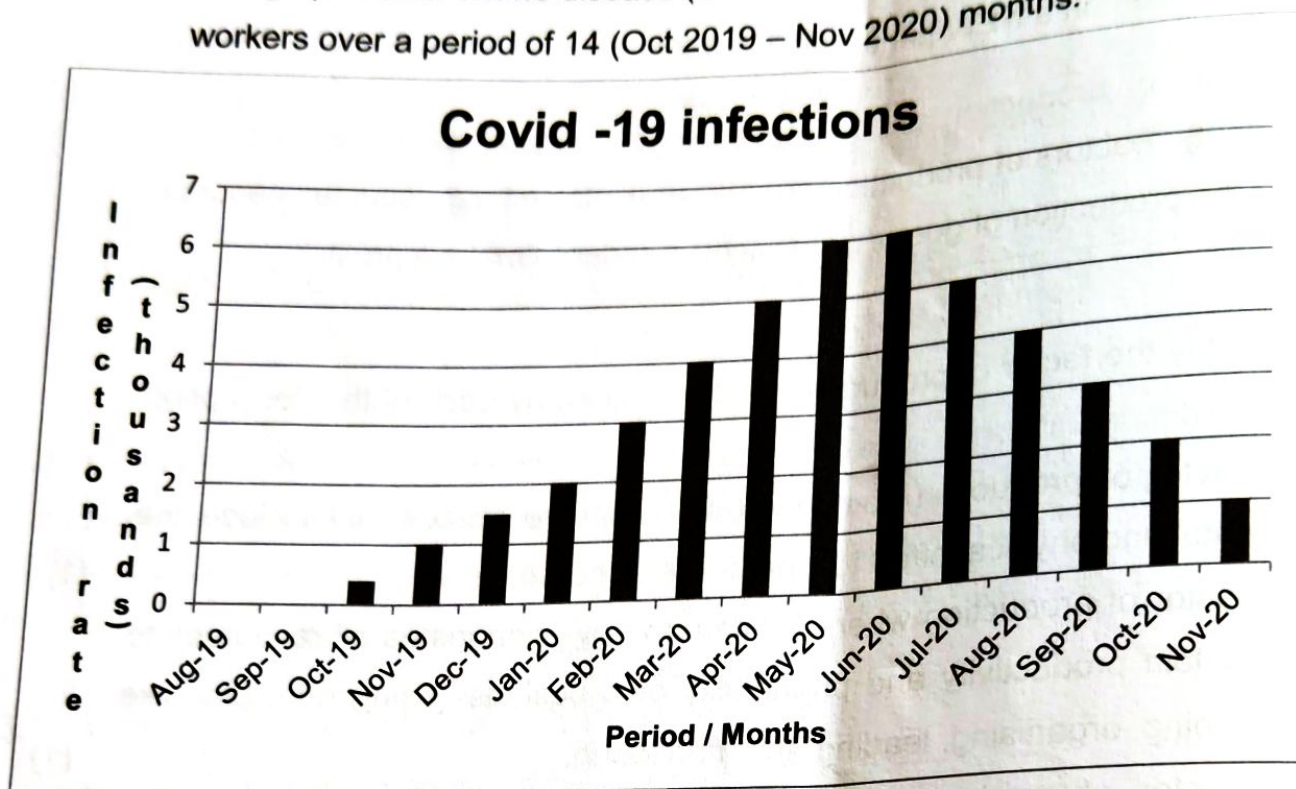
- (a) A factor of production composed of human resources that include the mental and physical effort to work for remuneration. (1)
- (b) A factor of production where human energy coordinates all resources to maintain productivity and profitability of a business using principles like planning, organising, leading and monitoring. (1)
- (c) A factor of production composed of man-made resources that are required in the production process to generate income. (1)
- (d) A factor of production with financial value that is a primary natural resource for agricultural production. (1)

3.1.2 From the answers given in 3.1.1 (a) to (d), choose a factor of production that could be used as collateral when applying for a loan. (1)

3.1.3 Justify your answer to Question 3.1.2 with TWO reasons (2)

3.1.4 Give THREE economic characteristics of the production factor mentioned in 3.1.2 above. (3)

- 3.2 The graph below shows disease (Covid- 19 /Coronavirus) infections among farm workers over a period of 14 (Oct 2019 – Nov 2020) months.



- 3.2.1 Explain the development of Coronavirus infections among farm workers over the months October 2019 – November 2020. (2)
- 3.2.2 Suggest TWO measures that possibly resulted in the development after June 2020. (2)
- 3.2.3 Mention TWO possible impacts of the Coronavirus infections on the productivity of farm workers. (2)
- 3.2.4 Suggest TWO ways through which the economic conditions of farm workers can be improved. (2)

- 3.3 A group of farmers from Ka-Dzingidzingi in Limpopo Province was accepted for a land reform programme. Their application for this project was successful because of their ability to identify the principles of management as well as developing a vision, mission and the setting of goals and objectives. The group further realised that legislation governs the production and marketing environment in agriculture. This impact on the profit and funding of a farming business.

- 3.3.1 State TWO managerial principles that the group of farmers above needed to follow to succeed in a farming business. (2)
- 3.3.2 Name TWO components of strategic management outlined in the passage above. (2)
- 3.3.3 Refer to the passage above and indicate TWO external forces that may impact on a farming business. (2)
- 3.4 The document below belongs to a commercial farmer in the Waterberg district of the Limpopo Province. Study the document and answer the questions based on it:

Income		R	c	Expenditure		R	c
Sales		15 000	85	Tomato seedlings		600	00
Interest on credits		250	07	Fertiliser		750	00
				Insecticides		370	30
				Harvesting		1 350	45
				Storage boxes		650	80
				Transport by truck		800	00
TOTAL				TOTAL			

- 3.4.1 Identify the document above. (1)
- 3.4.2 Justify your answer to Question 3.4.1 with TWO reasons (1)
- 3.4.3 Identify TWO types of capital mentioned in the document, and give one example of each. (4)
- 3.4.4 Calculate the profit or loss of the farmer according to the document. Show all the calculations. (5)

[35]

QUESTION 4: BASIC AGRICULTURAL GENETICS

Start this question on a NEW page.

- 4.1 From the farmer's flock of sheep, a heterozygous red ram was mated with a homozygous black ewe. The following symbols are used for coat colour:
- **R** = red coat
 - **r** = Black coat
- 4.1.1 Determine the genotype of the parents in the first crossing. (2)
- 4.1.2 Draw a punnet square to illustrate the genotype of the F1 generation resulted from the crossing of the parents in 4.1.1 above (4)
- 4.1.3 Give the genotype ratio of the F1 generation outlined in 4.1.2 above. (1)
- 4.1.4 Refer to the punnet square and calculate the percentage of the F1 generation that is homozygous for a certain colour. (2)
- 4.1.5 Identify the colour of the offspring that is homozygous (1)
- 4.2 Identify the following patterns of inheritance that lead to different phenotypes:
- 4.2.1 Red flower ($F^R F^R$) x White flower ($F^W F^W$) = Pink flower ($F^R F^W$). (1)
- 4.2.2 Red hair ($H^R H^R$) x White hair ($H^W H^W$) = Roan hair ($H^R H^W$) i.e both red and white hairs appear on an individual animal all together. (1)
- 4.2.3 Black hair (AA) x White hair (aa) = Black hair (Aa). (1)
- 4.2.4 A situation where chicken feather colour is controlled by two genes:
- The colour gene, with the alleles **R (= red)** and **r (= white)**
 - The gene which controls the expression of the colour gene with the alleles **I (= no colour)** and **i (= colour)**.
- $RRii$ (Red feathers) x $rrII$ (White feathers) = $RrIi$ (White feathers) (1)
- 4.2.5 Inheritance of milk yield in dairy cows where a dominant gene adds milk yield, for example:
- $aabbcc = 4000$ L
 - $Aabbcc = 4000$ L + 400 L = $4\ 400$ L (1)
 - $AaBbcc = 4000$ L + $2(400)$ L = $4\ 800$ L.

4.3

A goat farmer wants to increase the weaning weight of his herd. The average weaning weight of the herd is currently 17.5 kg. The farmer selects the male and female goat with the highest weaning weight to start a breeding programme. The weaning weight of the male is 19.6 kg and that of the female is 18.7 kg. The heritability of the weaning weight in goats is 60% (0.6).

The following formulae are important in calculating EBV and heritability:

- $\text{EBV of male goat} = (\text{weaning weight of male} - \text{average weaning weight}) \times \% \text{ heritability}.$
- $\text{EBV of female goat} = (\text{weaning weight of Female} - \text{average weaning weight}) \times \% \text{ heritability}.$
- $\text{Expected genetic gain} = (\text{EBV of male} + \text{EBV of female}) \div 2$

4.3.1 Define the concepts:

(a) Heritability

(2)

(b) Estimated breeding value (EBV)

(2)

4.3.2 Calculate the EBVs of the parent goats in the passage above.

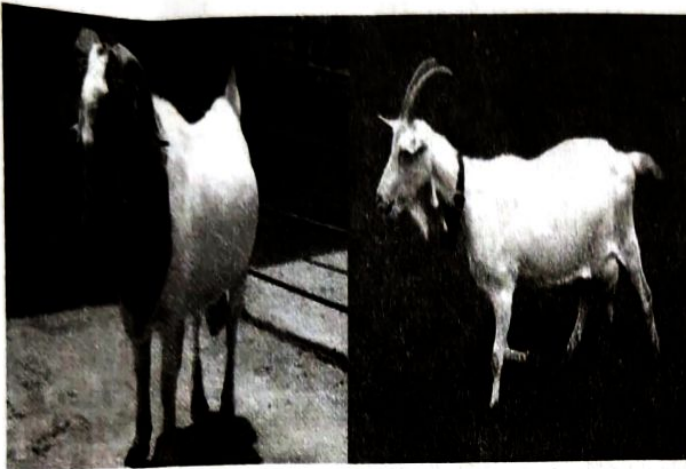
(4)

4.3.3 Calculate the expected genetic gain of the offspring.

(2)

4.4

The pictures below show two groups of animals. Picture **A** is made up of **two** different breeds of goats. Picture **B** consists of a male donkey and a female horse. Use the information in the pictures to answer the questions that follow.



Picture A



Picture B

- 4.4.1 Identify the type of breeding that could be taking place in picture A (1)
- 4.4.2 Give a **term** for an increase in performance in the offspring or progeny as a result of the breeding in question 4.4.1 above. (1)
- 4.4.3 Give **TWO** disadvantages of the type of breeding in A (2)
- 4.4.4 Identify the type of breeding in picture B (1)

- 4.5 Genetic modification allows plant and animal breeders to directly and accurately change the genotype of an organism. Some people believe that it is unnatural to modify the genes of organisms, and that Genetically Modified Organisms (GMOs) could be harmful in ways we cannot imagine.

- 4.5.1 Mention **ONE** technique of genetic modification in plants. (1)
- 4.5.2 State **ONE** aim of genetic modification in animals. (1)
- 4.5.3 Give **THREE** benefits of Genetically Modified Organisms (GMOs). (3)

[35]**TOTAL****150**