



# basic education

Department:  
Basic Education  
**REPUBLIC OF SOUTH AFRICA**

## **NATIONAL SENIOR CERTIFICATE**

**GRADE 12**

**AGRICULTURAL SCIENCES P2**

**FEBRUARY/MARCH 2013**

**MARKS: 150**

**TIME: 2<sup>1</sup>/<sub>2</sub> hours**

**This question paper consists of 17 pages and 1 answer sheet.**

**INSTRUCTIONS AND INFORMATION**

1. Answer ALL the questions.
2. Answer SECTION A (QUESTION 1) on the attached ANSWER SHEET.
3. Answer SECTION B (QUESTION 2 to 4) in the ANSWER BOOK.
4. Start EACH question from SECTION B on a NEW page.
5. Read ALL the questions carefully and answer only what is asked.
6. Number the answers correctly according to the numbering system used in this question paper.
7. Place your ANSWER SHEET for SECTION A (QUESTION 1) in your ANSWER BOOK.
8. You may use a non-programmable calculator. Show ALL the steps of your calculations.
9. Write neatly and legibly.

**SECTION A****QUESTION 1**

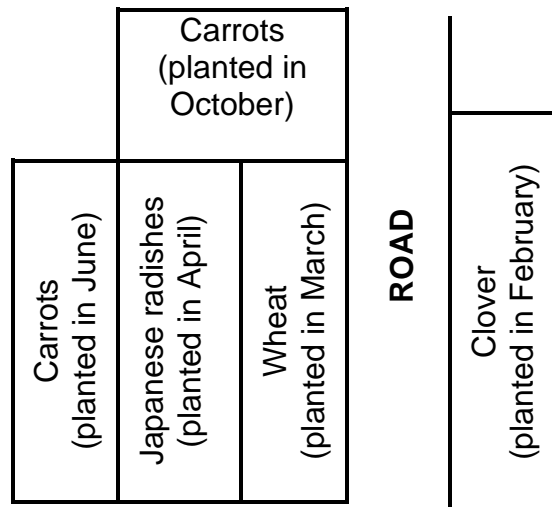
- 1.1 Various options are provided as possible answers to the following questions. Choose the answer and make a cross (X) in the block (A–D) next to the question number (1.1.1–1.1.10) on the attached ANSWER SHEET. NO marks will be allocated if more than one cross (X) appears for an answer.

EXAMPLE: 1.1.11 

X A	B	C	D
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- 1.1.1 A national programme aimed at increasing the levels of participation of black South Africans in land ownership, use and management is ...
- A black economic empowerment.
  - B tenure reform.
  - C expropriation.
  - D constitutional reform.
- 1.1.2 A written document that briefly outlines future actions on income and expenses of a farming business, based on projects, historic data, premises and experience:
- A Budget plan
  - B Strategic income plan
  - C Cash flow
  - D Inventory
- 1.1.3 ONE of the following is NOT a function of agricultural marketing:
- A Storage
  - B Processing
  - C Competition
  - D Transport
- 1.1.4 Equity schemes in the agricultural industry are aimed at ...
- A educating the children of farm labourers.
  - B marketing products for participants.
  - C enriching participants.
  - D giving equal opportunities to all farm workers.
- 1.1.5 The ability of a farm manager to deal with unpredictable climatic conditions by making good decisions indicates a ... skill.
- A communication
  - B risk management
  - C planning
  - D human relations

1.1.6 The map below is an example of a ... record to be kept on a farm.



- A labour productivity
- B cropping activity
- C performance activity
- D livestock activity

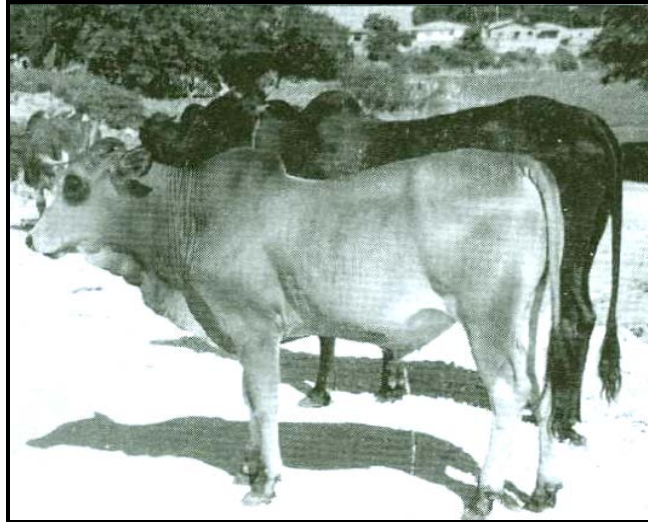
1.1.7 ONE of the following is an advantage of a controlled marketing system in the agricultural sector:

- A Large bargaining power
- B No delay in receiving payment
- C Stimulates entrepreneurship
- D Producers sell their products to who they want

1.1.8 A written document recording the decisions one makes when starting a business, and which is seen as a roadmap for the business, is called a ... plan.

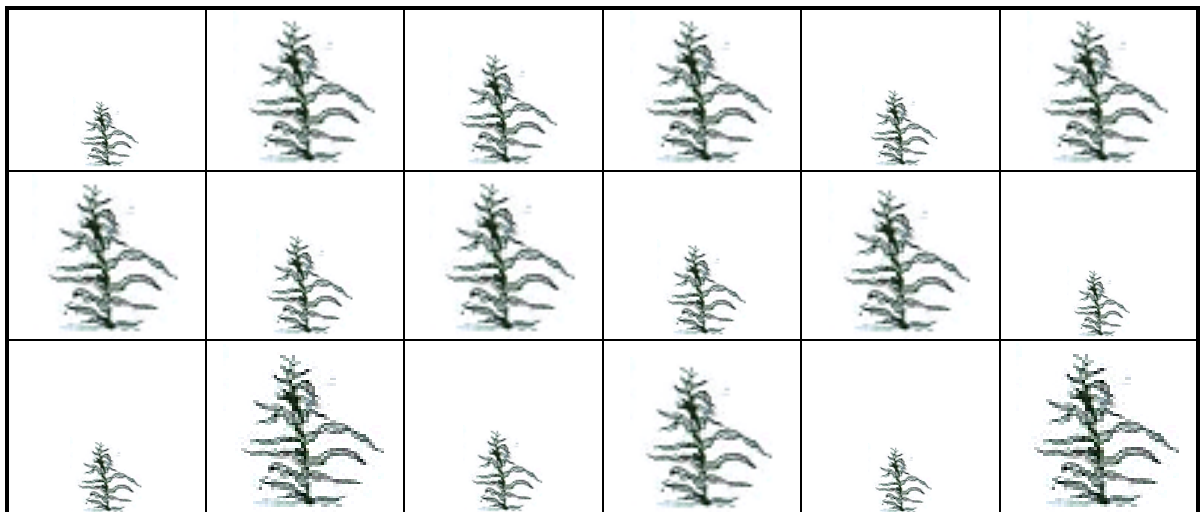
- A business
- B budget
- C marketing
- D labour

1.1.9 The photograph below represents an indigenous cattle breed. One of the characteristics associated with this breed which makes it more resistant to tick infections, is ...



- A fur development during cold winter periods.
- B the colour of the cattle.
- C thick and smooth skin.
- D the size of the animal.

1.1.10 Variation is the difference between individuals of the same species and occurs in both plant and animal species. The type of variation illustrated below is called ... variation.



- A natural
- B genetically modified
- C discontinuous
- D continuous

(10 x 2) (20)

- 1.2 Choose a term from COLUMN B that matches a description in COLUMN A. Write only the letter (A–J) next to the question number (1.2.1–1.2.5) on the attached ANSWER SHEET, for example 1.2.6 K.

COLUMN A		COLUMN B	
1.2.1	A phenomenon that shows how the quantity of produced goods responds to a change in price at a market	A	combination breeding
		B	meiosis
		C	elasticity of supply
1.2.2	Strategic farm management	D	hybrid vigour
1.2.3	A large increase in the growth and productivity of cross-bred offspring compared to their pure-bred parents	E	vision and mission
		F	mass selection
1.2.4	A breeding method used to transfer characteristics from various plant varieties into a single plant variety	G	mitosis
		H	market equilibrium
		I	inbreeding
1.2.5	The chromosome number changes from diploid to haploid	J	bureaucratic management

(5 x 2)

(10)

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

1.3.1 The portion of the final price that is taken up by costs involved in selling the produced goods

1.3.2 The process of attracting public attention to a specific agricultural product or business through various forms of communication

1.3.3 The selling and promotion of agricultural products with a special but limited utilisation value to a small segment of the market by small and micro enterprises

1.3.4 The crossing of two homozygous individuals that results in heterozygous offspring showing the characteristics of the one parent

1.3.5 The transfer of a specific gene of one organism into the cell of another organism in order to obtain a desired characteristic

(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 word(s) next to the question number (1.4.1–1.4.5) on the attached ANSWER SHEET.

1.4.1 The total quantity of a commodity that a producer wishes to sell is called the demand for that product.

1.4.2 The portion of the total available capital of the farming enterprise which is supplied by other persons or financial institutions, is known as own capital.

1.4.3 A farm worker spends most of his/her time on planning, administrative duties, marketing and supervisory tasks.

1.4.4 Cross-breeding leads to a gradual decrease in performance from generation to generation.

1.4.5 A micro-injection is an apparatus used to fire tiny particles of genes into a piece of plant tissue.

(5 x 1) (5)

**TOTAL SECTION A: 45**

**SECTION B**

Start this question on a **NEW** page.

**QUESTION 2: AGRICULTURAL MANAGEMENT**

- 2.1 The table below is a hypothetical demand schedule for carrots, indicating the different quantities demanded at six selected prices.

PRICE (RAND)	QUANTITY OF CARROTS (BUNCHES)
5	11
10	9
15	8
20	7
25	6
30	5

- 2.1.1 Plot a line graph using the above data to show the relationship between the price and the quantity demanded. (6)
- 2.1.2 Predict the effect on the price if the quantity demanded increases while the quantity supplied stays the same. (2)
- 2.1.3 Describe FOUR problems related to the marketing of agricultural products. (4)
- 2.2 Read the scenario below and answer the questions that follow.

**KENNETH MILLS PROJECT**

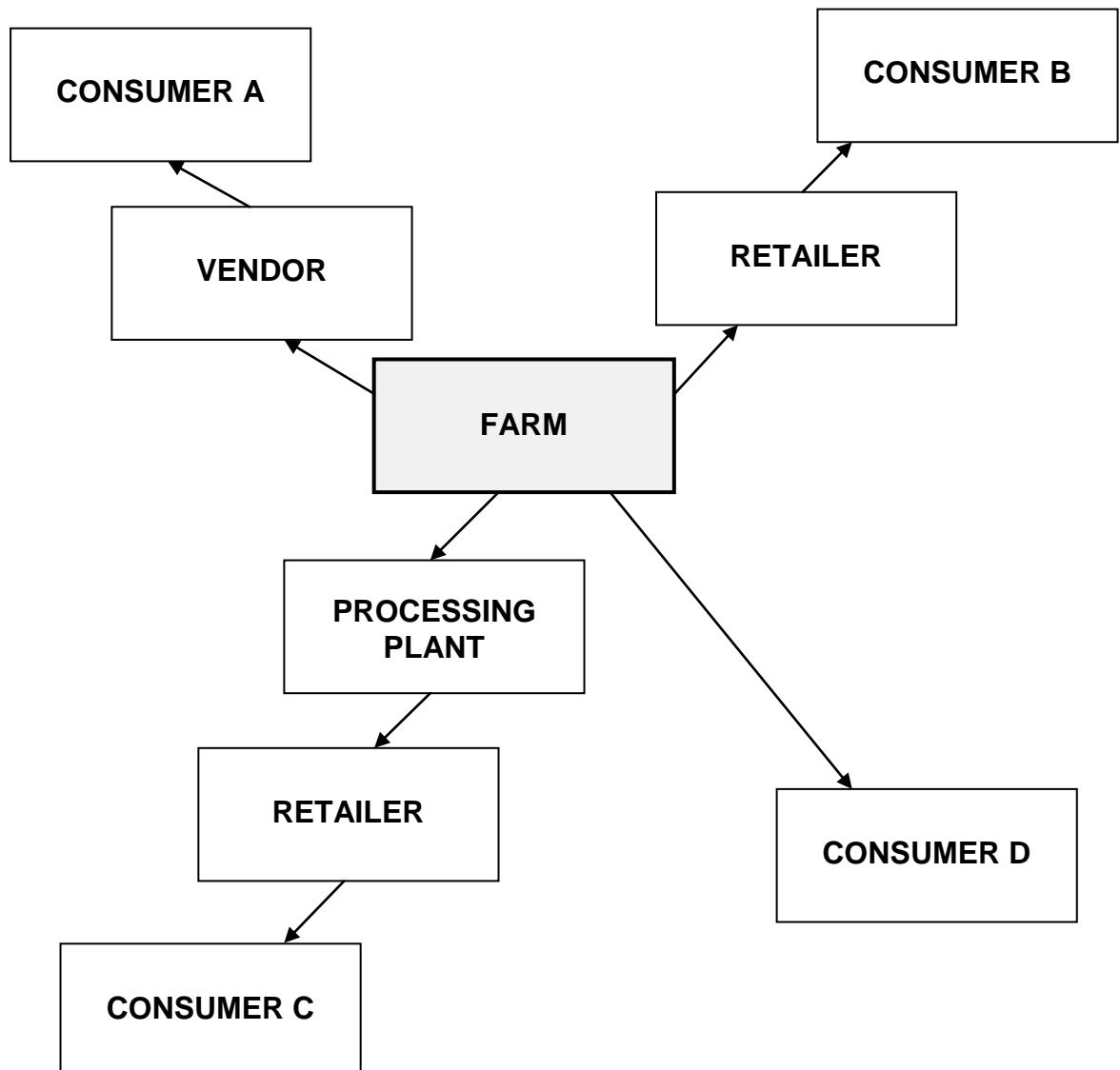
This project is located in a poverty-stricken area of Limpopo. Every day about 50 customers use the mill to grind their maize into mealie meal and samp. Kenneth also grinds peanuts for peanut butter.

Recently he employed two people on a permanent basis. Kenneth hopes to use the Internet to find a market for the poor small-scale farmers and to attract tourists to their area. He also hopes that the municipality will provide water and electricity.

- 2.2.1 Describe TWO advantages of this business for the local poverty-stricken area. (2)
- 2.2.2 Give the TWO main reasons for producing and processing peanuts from the scenario above. (2)
- 2.2.3 Name the type of marketing function represented by the Kenneth Mills Project. (1)
- 2.2.4 State TWO attractions of this poverty-stricken area for tourists from the scenario above. (2)



2.3 The schematic representation below illustrates the route followed by a product from a farm to different consumers.



- 2.3.1 Identify the marketing aspect illustrated in the schematic representation above. (1)
- 2.3.2 Indicate the consumer (**A**, **B**, **C** or **D**) that will pay the most for the product that originated on the farm. Motivate your answer. (2)
- 2.3.3 Choose the most appropriate consumer in the schematic representation above that matches each of the following statements.
- (a) A person buys fresh agricultural products from a person selling small quantities at the station (1)
- (b) A person stopping at the farm to buy fresh products from the farmer (1)
- (c) A person buys processed products from a large retail grocery store (1)

- 2.4 Some small-scale farmers attended a marketing course to improve their skills. During his presentation on the development of a marketing strategy, the presenter referred to the four Ps which should be combined to form a marketing mix.
- 2.4.1 Name the aspects represented by the four Ps in the marketing mix. (4)
- 2.4.2 Indicate TWO possible disadvantages faced by these small-scale farmers when marketing their own produce. (2)
- 2.5 The free marketing system is commonly practised in the agricultural sector in South Africa. Name FOUR advantages of this system. (4)
- [35]**

Start this question on a NEW page.

### QUESTION 3: PRODUCTION FACTORS AND MANAGEMENT

3.1 Read the scenario below and answer the questions that follow.

#### LEMON GRASS – A SUCCESS STORY

A group of subsistence farmers in the remote coastal area of the Eastern Cape turned to lemon grass and essential oil production and found a ready market. They transformed into a commercial entity.

The Zizamele Farmers Cooperative, funded by Old Mutual, was launched in 2009 and began with eight women growing lemon grass. The Agricultural Consulting Company visited the farmers and trained them in harvesting, drying and packaging techniques. The Zizamele farmers signed a contract with a rooibos tea company that uses lemon grass as flavouring.

Due to challenges experienced with the loss of their crop harvest to mould in 2010 they decided to diversify by including essential oils and lemon grass soap to their product range. The Agricultural Research Council was invited to give them training in essential oil extraction and a follow-up workshop was conducted later.

[Source: Adapted from *Farmers Weekly*, 17 February 2012]

- 3.1.1 Define the concept *diversification*. (2)
- 3.1.2 Name the institution from which the Zizamele Farmers Cooperative obtained their capital. (1)
- 3.1.3 Identify a method of marketing that these farmers used to market their product. Motivate your answer. (2)
- 3.1.4 Name a post-harvest aspect that the Agricultural Consulting Company focused on during their training of the Zizamele farmers. (1)
- 3.1.5 Name a risk factor that was experienced in 2010. (1)
- 3.1.6 Explain how this group of farmers addressed the risk factor mentioned in QUESTION 3.1.5. (2)

3.2 The table below represents control results of management tasks done on a specific day at a particular farm.

<b>MONDAY</b>	<b>PLANNING</b>		<b>ORGANISING</b>		
<b>Production enterprise</b>	<b>Planned activity</b>	<b>Employees involved</b>	<b>Other resources</b>	<b>Implementation</b>	<b>Reflection/Comment</b>
1. Sunflowers	Harvest land 10 ha	Piet (driver), Padiso, Vosloo, 2 temporary employees	Harvester 2 tractors and trailers	Completed 9 ha	1 ha short Harvester had a flat tyre
2. Cattle and horses	Observe cattle	Klasie	Horse, record book	Cattle in order	Up to standard
	Check lick and creep feed	Klasie		Creep feed in camp 3 filled up	Up to standard
	Wean, mark, dose, weigh 100 calves	Moloto, Abram	Handling facilities, branding equipment, remedies and dosing	100 calves and activities completed	Up to standard
	Feed horses	Kagiso, Henry	Feeds	Activities completed	Up to standard
3. Broilers	Prepare house 3 (remove old bedding)	Johanna, Mina, Johannes	Loose hand tools	House prepared Filled water troughs	Up to standard
4. General work	Paint workshop	Private contractor	Own tools	Work proceeding well	Up to standard

[Adapted from *Farming SA*, July 2011]

3.2.1 Select ONE of the following from the table above:

- (a) Daily activity (1)
- (b) Seasonal activity (1)

3.2.2 Identify the types of labourers suitable for doing the following:

- (a) Assist only during the harvesting of sunflower (1)
- (b) Remove old bedding in the broiler house (1)

3.2.3 State the farm work that was probably done by the casual labourers. Justify your answer. (2)

3.2.4 Tabulate the differences between *fixed*, *movable* and *working* assets and give an example in each case from the data in the table. (6)

3.3 Read the scenario below and answer the questions that follow.

**CONTROL IS THE KEY**

Efficient control is essential to help improve the management of any farming business. The level of control in your farm business is influenced by your employees' trustworthiness, experience and level of training.

In practical terms, control implies that a person who has responsibility, authority, experience and delegated powers such as the manager or supervisor, has to physically look at, check, measure, compare and judge the work done by subordinates' against set standards.

Control is important and it is necessary to make sure the right things are done the right way at the right time, at the same time flexibly, accurately and objectively.

[Source: *Farming SA*, July 2011]

3.3.1 Define the concept *control* as outlined in the scenario above. (2)

3.3.2 Indicate a term from the case study above that best describes each of the statements below:

(a) John has been working on the farm for twenty-five years and knows that the farm tractor must be kept in the barn. (1)

(b) Mary was tasked to deposit the weekly payments for the produce sold at the farm stall during the week. (1)

3.3.3 State TWO practical measures that a farm manager could implement to ensure that workers' time spent at work is recorded. (2)

- 3.4 The data below shows the income and expenditure of two poultry farmers involved in the laying-hen industry in South Africa over a period of six months.

**FARMER A**

<b>EXPENDITURE</b>	<b>RAND</b>	<b>INCOME</b>	<b>RAND</b>	<b>Profit</b>
Cost of layers	13 500,00	Eggs	25 500,00	
Feed	9 500,00	Sale of layers	6 700,00	
Electricity, water and wages	6 000,00	Sale of manure	5 400,00	
Gas for heating	400,00			
Egg trays	2 100,00			
Veterinary care	1 200,00			
Maintenance	800,00			
<b>Total</b>				

**FARMER B**

<b>EXPENDITURE</b>	<b>RAND</b>	<b>INCOME</b>	<b>RAND</b>	<b>Profit</b>
Cost of layers	13 500,00	Eggs	25 500,00	
Feed	10 500,00	Sale of layers	6 700,00	
Electricity, water and wages	6 000,00			
Gas for heating	400,00			
Egg trays	2 100,00			
Veterinary care	1 200,00			
Maintenance	600,00			
<b>Total</b>				

- 3.4.1 Calculate the net profits of farmers **A** and **B**. (4)
- 3.4.2 Determine which farmer is more successful, based on your answer to QUESTION 3.4.1. Give a reason to support your answer. (2)
- 3.4.3 Give farmer **B** advice, based on data from farmer **A**, on how to increase his/her income. (2)

**[35]**

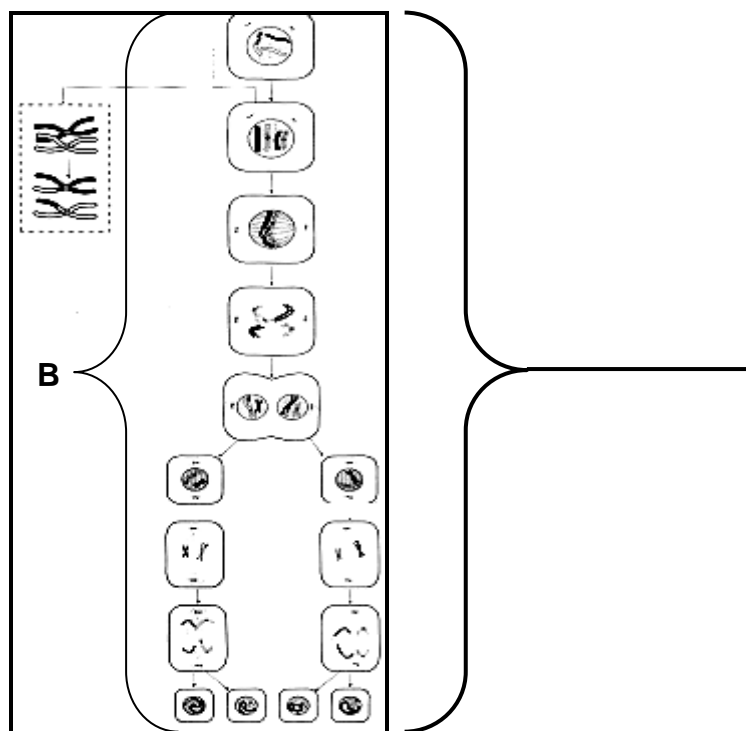
Start this question on a **NEW** page.

**QUESTION 4: BASIC AGRICULTURAL GENETICS**

4.1 The schematic representation below represents a crossing between two pea plant cultivars.

**PARENTS**

**Genotype:**  $F^P F^P$   $F^W F^W$   
**Phenotype:** **Purple flowers** **X** **White flowers**  
 $F^P$  or  $F^P$   $F^W$  or  $F^W$



**F<sub>1</sub> GENERATION**

**Phenotype:** **All pink flowers**

- 4.1.1 Name the type of dominance illustrated above. Give a reason to support your answer. (2)
- 4.1.2 Identify the cell-division process labelled **B** in the schematic representation above. (1)
- 4.1.3 Name the type of cells formed during the process mentioned in QUESTION 4.1.2. (1)
- 4.1.4 Deduce the genotype of the F<sub>1</sub> generation from the schematic representation above. (1)
- 4.1.5 Write the phenotypic ratio of purple flowers : pink flowers : white flowers that will be found in the F<sub>2</sub>-generation if the plants with pink flowers were used in a crossing. (3)

- 4.2 In the creeper *Hedera sp.* green leaves are dominant over variegated leaves. A plant which is heterozygous with green leaves is crossed with a plant with variegated leaves. Use the following key to represent the genotype:

G = green and g = variegated

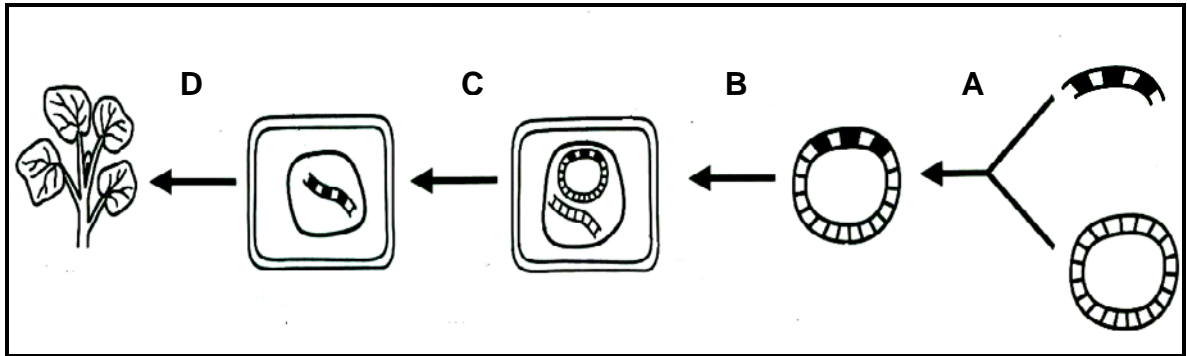
- 4.2.1 Use a schematic representation with labels to indicate the crossing of these two plants up to the F<sub>1</sub> generation. Indicate the phenotypes next to the genotypes, where necessary. Illustrate the F<sub>1</sub> generation by means of a Punnett diagram. (6)
- 4.2.2 Calculate the percentage of the F<sub>1</sub> generation that will have variegated leaves. (1)
- 4.2.3 The plant with green leaves in the F<sub>1</sub> generation is self-pollinated and 64 new plants are reproduced from it. Indicate the number of plants with variegated leaves. (2)
- 4.3 The photograph below shows a plant breeder taking pollen from flowers of fruit trees.



- 4.3.1 Describe the type of pollination illustrated in the photograph above. (1)
- 4.3.2 Pollen is harvested from the flowers in the photograph above. Describe FOUR steps that will be followed during this process to complete the pollination process. (4)
- 4.3.3 Explain the genetic contribution of the parent plant in the photograph above towards the seeds that will be produced. (2)
- 4.3.4 Define *natural* and *artificial selection*. (2)



4.4 The flow chart below illustrates a technique used in plant breeding.



- 4.4.1 Identify the plant breeding process illustrated above. (1)
- 4.4.2 State TWO aims of the process illustrated above. (2)
- 4.4.3 Summarise the process illustrated above by referring to labels **A** to **D**. (4)
- 4.4.4 State TWO potential environmental benefits of GM crops. (2)

**[35]**

**TOTAL SECTION B: 105**  
**GRAND TOTAL: 150**

**ANSWER SHEET****CENTRE NUMBER:**

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**EXAMINATION NUMBER:**

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**SECTION A****QUESTION 1.1**

1.1.1	A	B	C	D
1.1.2	A	B	C	D
1.1.3	A	B	C	D
1.1.4	A	B	C	D
1.1.5	A	B	C	D
1.1.6	A	B	C	D
1.1.7	A	B	C	D
1.1.8	A	B	C	D
1.1.9	A	B	C	D
1.1.10	A	B	C	D

(10 x 2) (20)

**QUESTION 1.2**

1.2.1 \_\_\_\_\_  
1.2.2 \_\_\_\_\_  
1.2.3 \_\_\_\_\_  
1.2.4 \_\_\_\_\_  
1.2.5 \_\_\_\_\_

(5 x 2) (10)

**QUESTION 1.3**

1.3.1 \_\_\_\_\_  
1.3.2 \_\_\_\_\_  
1.3.3 \_\_\_\_\_  
1.3.4 \_\_\_\_\_  
1.3.5 \_\_\_\_\_

(5 x 2) (10)

**QUESTION 1.4**

1.4.1 \_\_\_\_\_  
1.4.2 \_\_\_\_\_  
1.4.3 \_\_\_\_\_  
1.4.4 \_\_\_\_\_  
1.4.5 \_\_\_\_\_

(5 x 1) (5)

**TOTAL SECTION A: 45**