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**NATIONAL
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GRADE 11

NOVEMBER 2023

AGRICULTURAL SCIENCES P2

MARKS: 150

TIME: 2½ hours

This question paper consists of 13 pages.

INSTRUCTIONS AND INFORMATION

1. This question paper consists of TWO sections, namely SECTION A and SECTION B.
2. Answer ALL the questions in the ANSWER BOOK.
3. Start each question on a NEW page.
4. Number the answers correctly according to the numbering system used in this question paper.
5. 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 correct answer and write only the letter (A–D) next to the question numbers (1.1.1 to 1.1.10) in your ANSWER BOOK, for example 1.1.11 D.

1.1.1 The even distribution of fertiliser over the whole surface of the field.

- A Band placing
- B Foliar application
- C Broadcasting
- D Fertigation

1.1.2 Which ONE of the statements below is correct regarding osmosis?

- A Water molecules move from a dilute to a concentrated solution.
- B Water molecules move from a concentrated to a dilute solution.
- C Water molecules move from a region of lower concentration of molecules to a region of higher concentration of molecules.
- D Molecules of any substance move from a region of higher concentration of molecules to a region of lower concentration of molecules.

1.1.3 Calculate the percentage phosphorus in the fertiliser bag below.



- A 9,3%
- B 14,0%
- C 4,7%
- D 28%

1.1.4 ... are fruits that develop from flowers with many ovaries.

- A Simple fruits
- B Multiple fruits
- C Compound fruits
- D Accessory fruits

1.1.5 ... is an example of chewing pests.

- A Leaf miners
- B Caterpillars
- C Aphids
- D Red spider mites

1.1.6 The following are disadvantages of asexual reproduction.

- (i) Reduced gene pool
- (ii) A pollinating agent is required
- (iii) Negative mutations are passed on to offspring and cannot leave lineage
- (iv) Meiosis does not take place

Choose the correct combination:

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

1.1.7 The middle fleshy part of the fruit that is usually edible.

- A Pericarp
- B Mesocarp
- C Endocarp
- D Exocarp

1.1.8 ... is NOT an example of a fresh water species.

- A Carp
- B Goldfish
- C African catfish
- D Abalone

1.1.9 Which ONE of the following is NOT an important consideration when choosing a site for a greenhouse?

- A Light
- B Temperature
- C Humidity
- D Cultivar

1.1.10 ... is an indigenous method in which all plant remains are left on the soil surface during the whole process of cultivation.

- A Whole plant removal
- B Mulching
- C Shifting cultivation
- D Bare tillage

(10 x 2) (20)

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

COLUMN A		COLUMN B	
1.2.1	Chemicals that are used to control weeds	A	Xylem
1.2.2	Thickened underground stems with nodes and internodes	B	Phloem
1.2.3	Plant tissue that transports water from the roots to the other parts of the plant	C	GIS
1.2.4	The production of protein for human consumption in water under controlled production circumstance	D	Rhizomes
1.2.5	A computer system for capturing, storing, checking and displaying data related to positions on the earth's surface	E	Agronomy
		F	Herbicides
		G	Bulbs
		H	Miticides
		I	GPS
		J	Aquaculture

(5 x 2) (10)

- 1.3 Give ONE term for each of the following descriptions. Write ONLY the term next to the question numbers (1.3.1 to 1.3.5) in the ANSWER BOOK.

- 1.3.1 The upward pulling force exerted on the water column in plants when water is lost during transpiration
- 1.3.2 A substance applied to the soil to correct acidity
- 1.3.3 A broad-based approach that combines both chemical and non-chemical practices for optimum pest control
- 1.3.4 The use of biological processes to manufacture products that improve quality of human life
- 1.3.5 A systematic study of the soil of an area including classification and mapping of the properties and the distribution of various soil units

(5 x 2) (10)

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

1.4.1 Oculation is the fusion of the nucleus of a male gamete with the nucleus of a female gamete.

1.4.2 Carbon dioxide is a by-product of photosynthesis.

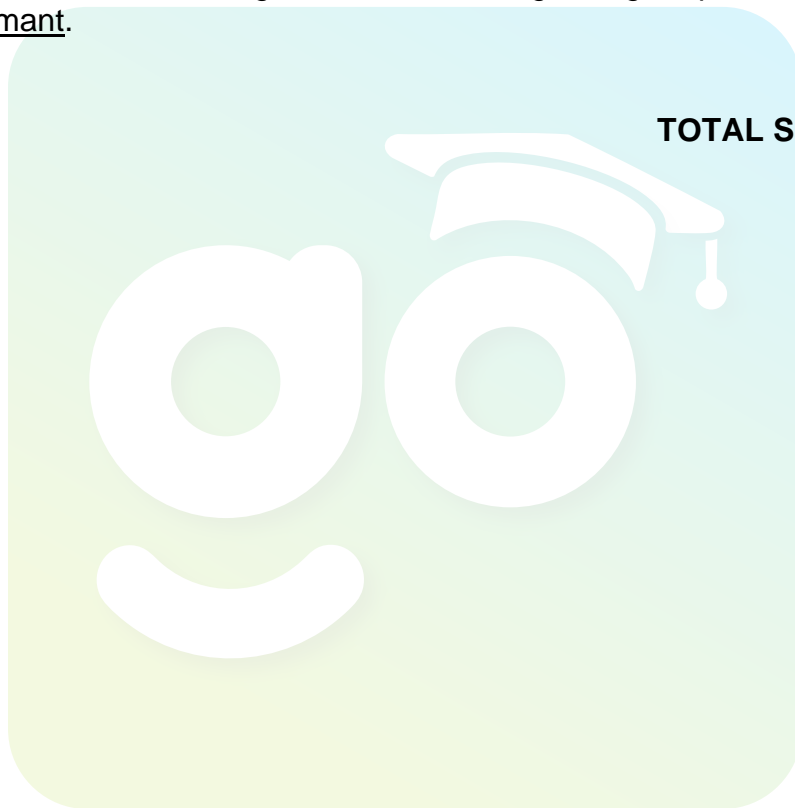
1.4.3 Intercropping is the cultivation of a single crop in a given area.

1.4.4 Crops that fix nitrogen by means of bacteria in their roots are called cereals.

1.4.5 When a field is resting from the work of growing crops, it is said to be dormant.

(5 x 1) (5)

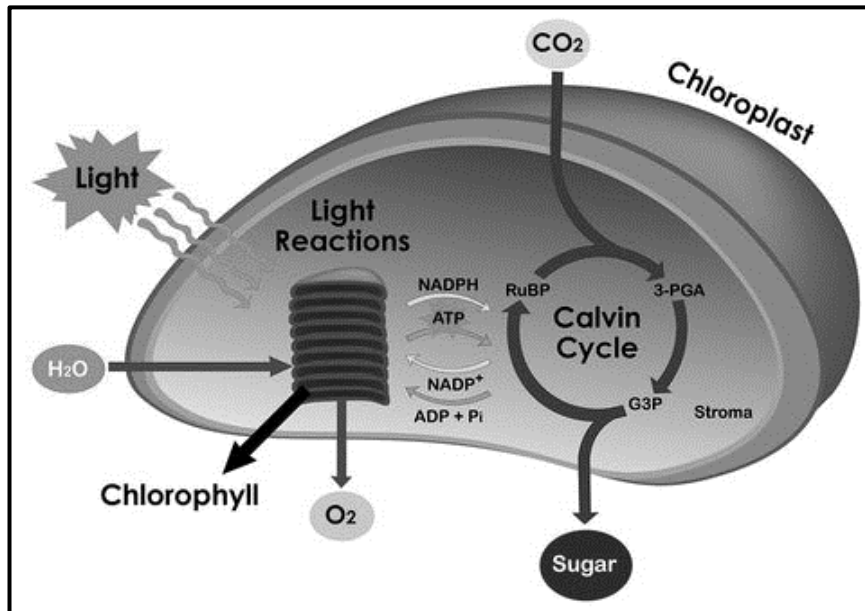
TOTAL SECTION A: 45



SECTION B

QUESTION 2: PLANT STUDIES (NUTRITION)

2.1 The equation below shows a process that takes place in plants.



2.1.1 Identify the process shown above. (1)

2.1.2 Identify the product of the process. (1)

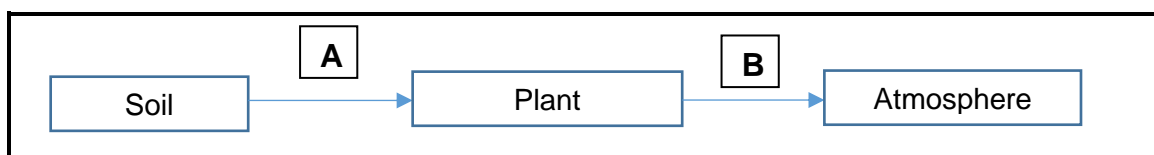
2.1.3 Name TWO organs in plants where the products of the process are stored. (2)

2.1.4 Give TWO factors that influence the speed of the process. (2)

2.1.5 Suggest TWO measures farmers can take to optimise the process. (2)

2.1.6 Describe TWO consequences of the absence of the above process. (2)

2.2 The flow chart diagram below shows how water moves in plants.



2.2.1 Identify the processes **A** and **B**. (2)

2.2.2 The movement of water shown above is critical for plant growth. Justify this statement with TWO reasons. (2)

2.2.3 Describe TWO ways in which plants reduce water movement in direction **B**. (2)

2.3 The table below shows various minerals required for plant growth.

Mineral	Symbol	Macro/micro	Form absorbed by plants	Deficiency symptom
Iron	A	B	Fe ²⁺ ions	Necrotic young leaves
C	K	Macro	D	Scorched leaf tips
Nitrogen	N	Macro	E	F
Calcium	Ca	G	Ca ²⁺ ions	Poor leaf and root development

2.3.1 Provide the labels for **B–G** to make the table complete. (6)

2.3.2 Suggest TWO methods that can be used by farmers to determine the nutrient status of plants and soil. (2)

2.4 Plants get their water and mineral nutrients from the soil. The uptake of minerals can be active or passive.

2.4.1 Tabulate TWO differences between passive and active mineral uptake. (4)

2.4.2 Give TWO factors that might influence the availability of nutrients such as nitrogen to plants. (2)

2.5 The table below shows the approaches used by different farmers to improve the fertility of their soils.

Farmer A	Farmer B
Uses compost, green and farm manures.	Uses compound fertilisers when planting and applies phosphatic or nitrogenous fertilisers as top dressing.

2.5.1 Classify the fertilisers used by each of the farmers above. (2)

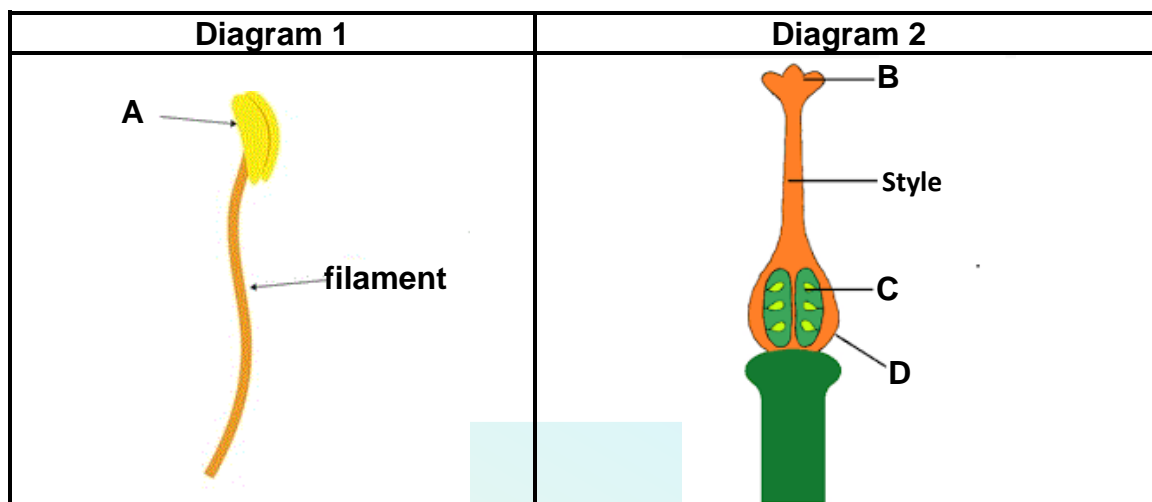
2.5.2 Give TWO environmental impacts of the fertilisers used by farmer **B**. (2)

2.5.3 Give ONE example of a nitrogenous fertiliser. (1)

[35]

QUESTION 3: PLANT REPRODUCTION AND PROTECTION

3.1 The diagrams below show parts of a flower.



3.1.1 Provide captions for diagrams 1 and 2 above. (2)

3.1.2 Describe the function of part **C** in diagram 2. (1)

3.1.3 Identify flower parts **B** and **D**. (2)

3.1.4 Name the process during which pollen grains are transferred from part **A** of diagram 1 to part **B** of diagram 2. (1)

3.1.5 Give TWO examples of agents for the process described in QUESTION 3.1.4. (2)

3.1.6 Give the letter of the parts that will turn into:

(a) Fruit (1)

(b) Seed (1)

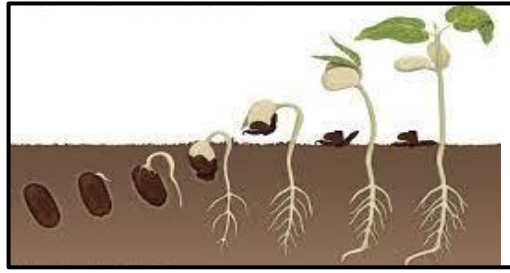
3.2 Process A	Process B
The production of fruit without the fertilisation of ovules, resulting in production of seedless fruit.	When fruit trees shed many young flowers and fruit to reduce the amount of fruit set.

3.2.1 Identify the processes **A** and **B** described above. (2)

3.2.2 State the TWO types of process **A**. (2)

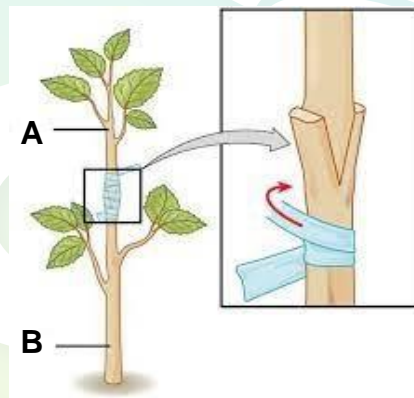
3.2.3 Give TWO factors that influence the process **B**. (2)

3.3



- 3.3.1 Identify the process shown in the picture above. (1)
- 3.3.2 What is the name given to the failure of the process above taking place even though the environmental conditions are conducive? (1)
- 3.3.3 Suggest TWO strategies that can be used by farmers to overcome the challenge in QUESTION 3.3.2. (2)
- 3.3.4 Give ONE environmental requirement for the process mentioned in QUESTION 3.3.1. (1)

3.4 The image below shows an example of an artificial plant propagation method.



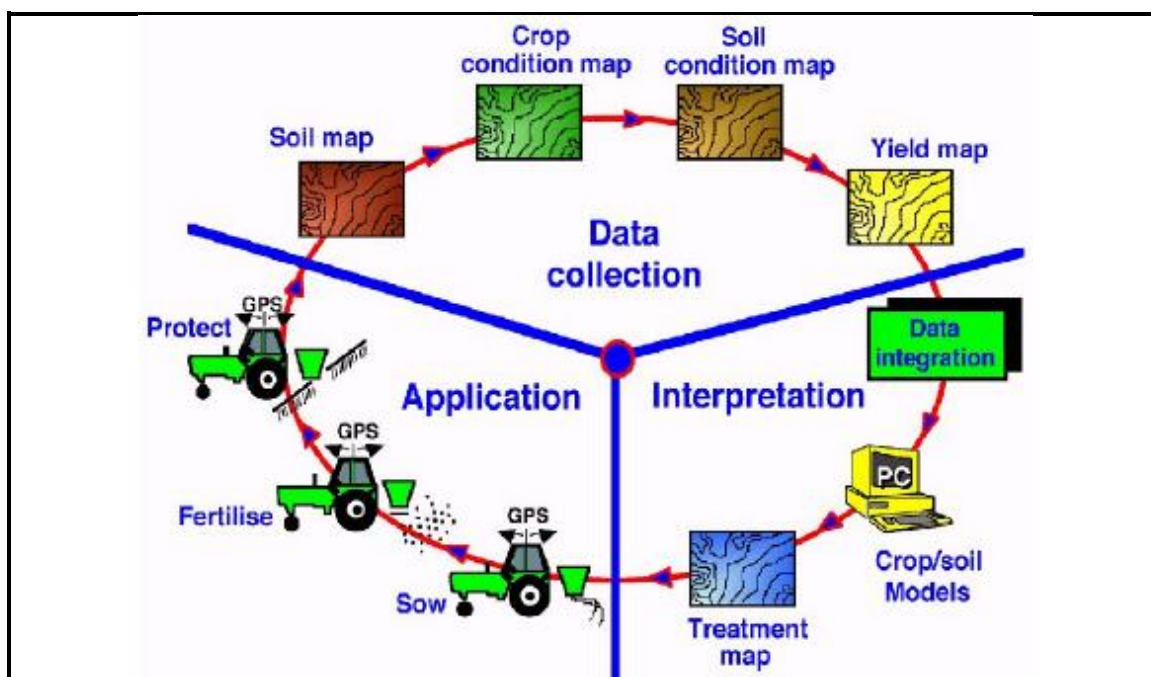
- 3.4.1 Name parts **A** and **B**. (2)
- 3.4.2 Determine whether the reproduction type above is sexual or asexual. (1)
- 3.4.3 Justify your answer to QUESTION 3.4.2. above. (1)
- 3.4.4 Give TWO advantages of the reproduction type given in QUESTION 3.4.2 above. (2)
- 3.5 For as long as humans have been cultivating plants, weeds have been a problem. Weeds compete with crops for moisture, light, nutrients and space. They serve as a host for insect pests and pathogens.

- 3.5.1 Identify the role of weeds in plant disease outbreaks in the passage above. (1)
- 3.5.2 Suggest TWO mechanical weed control methods that can be used by framers. (2)
- 3.5.3 Describe THREE contributions of the state towards plant protection. (3)
- 3.5.4 Name TWO examples of stored grain pests. (2)

[35]

QUESTION 4: OPTIMAL RESOURCE UTILISATION

4.1 The diagram below shows a modern farming approach.



4.1.1 Identify the farming approach depicted above. (1)

4.1.2 Identify TWO key technologies visible in the diagram that are used in the farming approach. (2)

4.1.3 Give TWO aims of this farming approach. (2)

4.2 The table below shows a comparison between the leaf size of spinach grown in a greenhouse and to that grown in an open field.

Time (weeks)	Leaf area (cm ²)	
	Open field	Greenhouse
1	4	16
2	7	24
3	9	28
4	12	31

4.2.1 Present the information in the table above in the form of a graph. (6)

4.2.2 Deduce the trend shown in the graph. (2)

4.2.3 Briefly explain the possible cause of the differences in leaf sizes recorded above. (2)

- 4.3 Soil cultivation is the mechanical manipulation of the soil which takes place in two stages; the first one being primary cultivation, which will be followed by secondary cultivation.

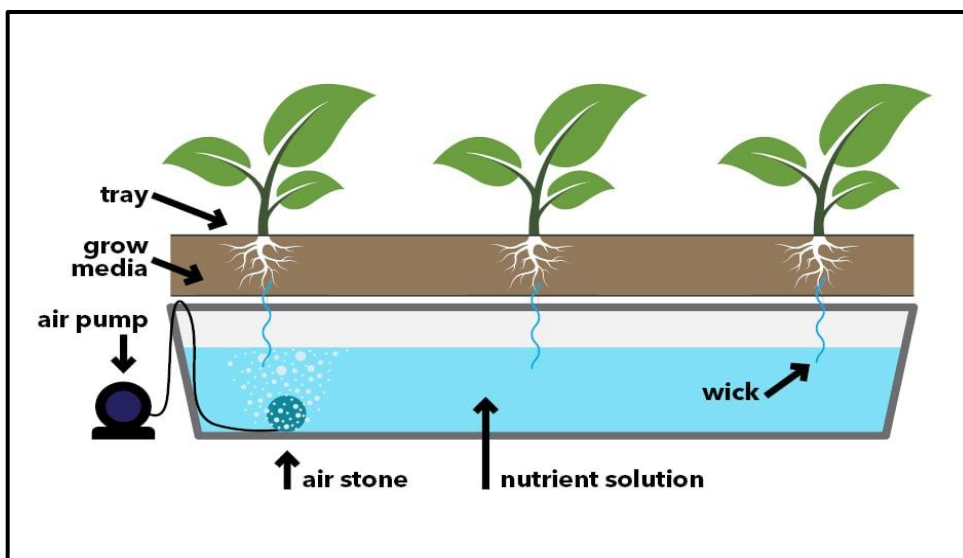
- 4.3.1 Give TWO aims of soil cultivation. (2)
- 4.3.2 Distinguish secondary from primary cultivation. (2)
- 4.3.3 For each cultivation type in QUESTION 4.3.2, give an example of an implement that can be used. (2)
- 4.3.4 Recommend TWO cultivation systems that are environmentally friendly. (2)

- 4.4 The table below shows how farmers can plant different crops on different plots on their farm.

	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5
Cycle 1	Leaf crops	Legumes	Brassicas	Root crops	Solanaceae
Cycle 2	Solanaceae	Leaf crops	Legumes	Brassicas	Root crops
Cycle 3	Root crops	Solanaceae	Leaf crops	Legumes	Brassicas

- 4.4.1 Identify the cropping system shown in the table above. (1)
- 4.4.2 Deduce TWO principles of the cropping system shown in the table. (2)
- 4.4.3 Give TWO reasons why you would recommend the system above to farmers. (2)

- 4.5 The picture below shows a production system that is gaining popularity among farmers.



- 4.5.1 Identify the cultivation system shown above. (1)
- 4.5.2 Differentiate between the system shown above and an open field system. (2)
- 4.5.3 Give TWO examples of growth media that can be used in the system above. (2)
- 4.5.4 The production system shown above can be carried out through an open or a closed system. Give TWO disadvantages of the closed system. (2)
- [35]**

TOTAL SECTION B: 105
GRAND TOTAL: 150