



Province of the
EASTERN CAPE
EDUCATION

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Provinsie van die Oos Kaap: Departement van Onderwys
Porafensie Ya Kapa Botjhabela: Lefapha la Thuto

NATIONAL SENIOR CERTIFICATE

GRADE 11

NOVEMBER 2024

AGRICULTURAL SCIENCES P2

MARKS: 150

TIME: 2½ hours



This question paper consists of 14 pages.

INSTRUCTIONS AND INFORMATION

1. This question paper consists of TWO sections, namely SECTION A and SECTION B.
2. Answer ALL the questions in the ANSWER BOOK.
3. 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, for example 1.1.11 D.

1.1.1 The splitting of water molecules into hydrogen and oxygen atoms in the presence of light.

- A Respiration
- B Photosynthesis
- C Photolysis
- D Photophosphorylation

1.1.2 The active absorption of cations in the plant cell takes place by means of ...

- A diffusion.
- B osmosis.
- C carrier molecule.
- D respiration.

1.1.3 The release of water vapour through the stomata is called ...

- A transportation.
- B transverse movement.
- C transpiration.
- D translocation.

1.1.4 The following are mechanical ways of controlling weeds.

- (i) Use of natural enemies
- (ii) Cutting of weeds
- (iii) Burning fields to destroy weeds
- (iv) Correct soil cultivation practices

Choose the CORRECT combination:

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

1.1.5 The deficiency symptom of this element shows an internal cork in apples and tomatoes:

- A Boron (B)
- B Iron (Fe)
- C Zinc (Zn)
- D Cobalt (Co)

- 1.1.6 Which ONE of the following is NOT a contributory factor to soil erosion in South Africa?
- A Incorrect cultivation
 - B Temperature
 - C Slope of land
 - D Veld fires
- 1.1.7 An important requirement for pesticides to be registered is the ...
- A degradability of the pesticide.
 - B period of activity.
 - C toxicity of the pesticide
 - D proposed price.
- 1.1.8 The designing of a drainage system is influenced by various factors, except.
- A Topography of the ground
 - B The requirements of the crop
 - C The amount of water to be added to the soil profile
 - D The characteristics of the soil
- 1.1.9 Artificial supplementation of water to areas where rainfall is insufficient, is called ...
- A drainage.
 - B evaporation.
 - C precipitation.
 - D irrigation.
- 1.1.10 A scientific instrument used to measure how hard a plant has to work to extract water from the soil is called a/an ...
- A evaporation pan.
 - B neutron moisture meter.
 - C rain gauge.
 - D tensiometer.
- (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 question numbers (1.2.1 to 1.2.5) in the ANSWER BOOK, for example 1.2.6 I.

COLUMN A		COLUMN B
1.2.1	The membranes where light phase takes place	A stroma
1.2.2	A method of organic fertilisation	B fruit setting
1.2.3	Keeping plant cover on soil surface	C green manuring
1.2.4	A fertiliser used during land preparation to rectify low soil pH	D mulching
1.2.5	A system where different crops are grown alternately on the same land year after year	E lime
		F monoculture
		G crop rotation
		H thylakoid

(5 x 2) (10)

- 1.3 Give ONE word/phrase 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 Living organisms that can produce their own organic food
- 1.3.2 Flowers that produce seed with two seed lobes
- 1.3.3 The dropping of flowers and fruitlets to reduce the amount of fruit set
- 1.3.4 The system used to remove the excess water in the soil in a field which is water-logged
- 1.3.5 A farm structure with transparent walls and roof creating a favourable environment for plant growth

(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 Transpiration is the process where excess water is pushed out of the leaves through the hydathodes.

1.4.2 Application of fertiliser through irrigation water is called aerial application.

1.4.3 The stamen of the flower consists of the stigma, style and ovary.

1.4.4 Bulbs are thickened underground stems with nodes and internodes that grow almost horizontally with the soil surface.

1.4.5 Fishbone drainage systems are used to protect lower lying areas from water seeping into the area. (5 x 1) (5)

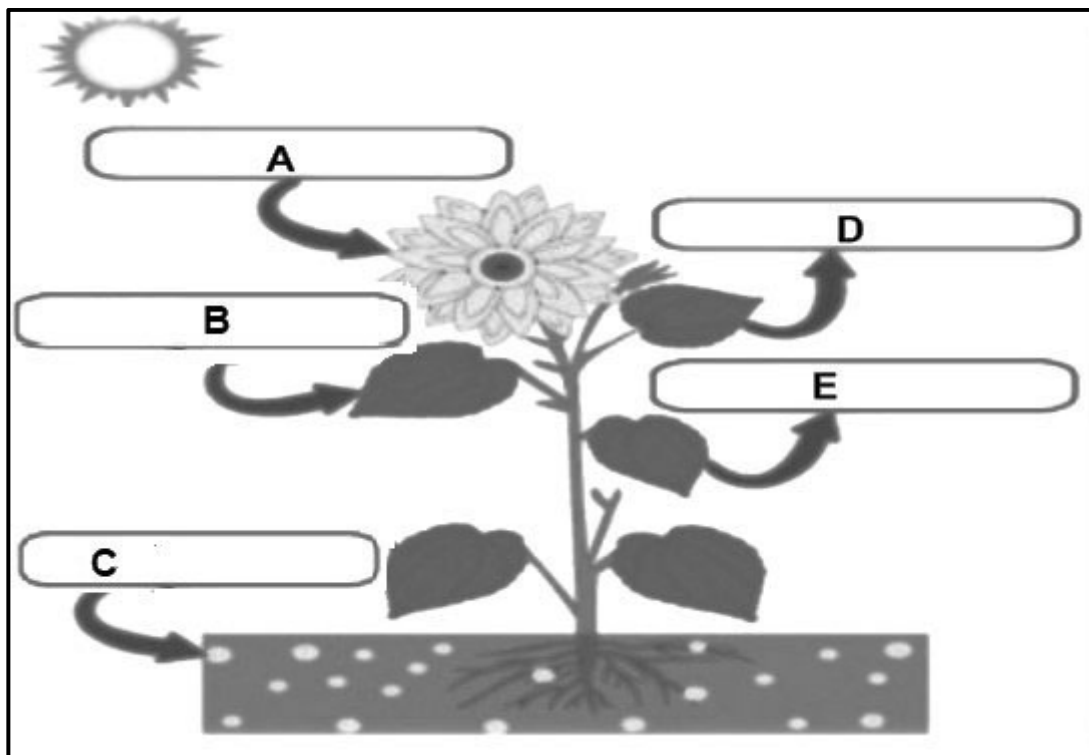
TOTAL SECTION A: 45

SECTION B

QUESTION 2: PLANT STUDIES (NUTRITION)

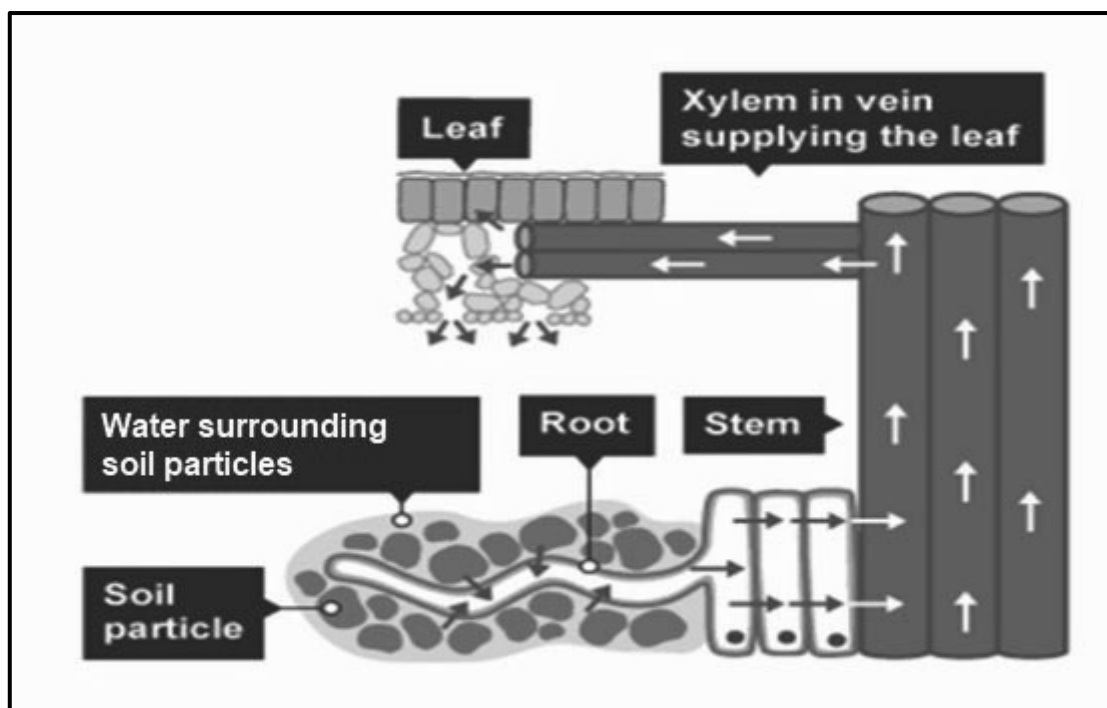
Start this question on a NEW page.

- 2.1 The diagram below shows a process which takes place in green plants. Study the diagram and answer the questions that follow.



- 2.1.1 Identify the process shown in the diagram above. (1)
- 2.1.2 Deduce substances **A** and **C** in the diagram above that act as a requirement for the process in QUESTION 2.1.1. (2)
- 2.1.3 Name the gas that is produced by the process shown above. (1)
- 2.1.4 Explain the importance of the process shown above to the environment. (2)
- 2.1.5 Recommend TWO ways to increase the rate of the process shown above. (2)
- 2.1.6 The process illustrated above is described as anabolic. Justify this statement. (2)

2.2 The diagram below shows water uptake, water transport and transpiration.



2.2.1 Suggest the mechanism through which roots absorb each of the following:

- (a) Minerals from high concentration to lower concentration (1)
- (b) Minerals against their concentration gradient (1)

2.2.2 State how the root is structurally adapted to perform its function. (1)

2.2.3 Give the function of xylem tissues. (1)

2.2.4 Differentiate between *transpiration pull* and *osmotic flow* in plants. (2)

2.2.5 Explain how root pressure influences the upward movement of water. (2)

2.2.6 Supply TWO adaptation features of plants to reduce water loss through transpiration. (2)

2.3 Study the primary and secondary macro-elements in the box below and match them with the corresponding statements.

Nitrogen;	Phosphorus;	Potassium;	Calcium;	Magnesium
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2.3.1 Forms part of the carrier molecule. (1)

2.3.2 Improves fruit quality. (1)

2.3.3 It can be easily converted by *Rhizobium* bacteria. (1)

2.3.4 Assists with the activation of plant enzymes. (1)

2.4 Farmers are encouraged to take their plants and soil samples for analysis.

2.4.1 Name the equipment used to collect soil samples. (1)

2.4.2 State TWO facts of importance of soil analysis. (2)

2.4.3 Explain why farmers are encouraged to take their crops for leaf analysis. (2)

2.5 Soil productivity depends on a number of factors. One of the factors is the presence of a sufficient supply of the necessary nutrient elements in the soil.

Below is a bag of compound fertiliser with the ratio of its nutrients.



2.5.1 Classify the type of the fertiliser above. (1)

2.5.2 Calculate the percentage of phosphorus in the compound fertiliser above. (3)

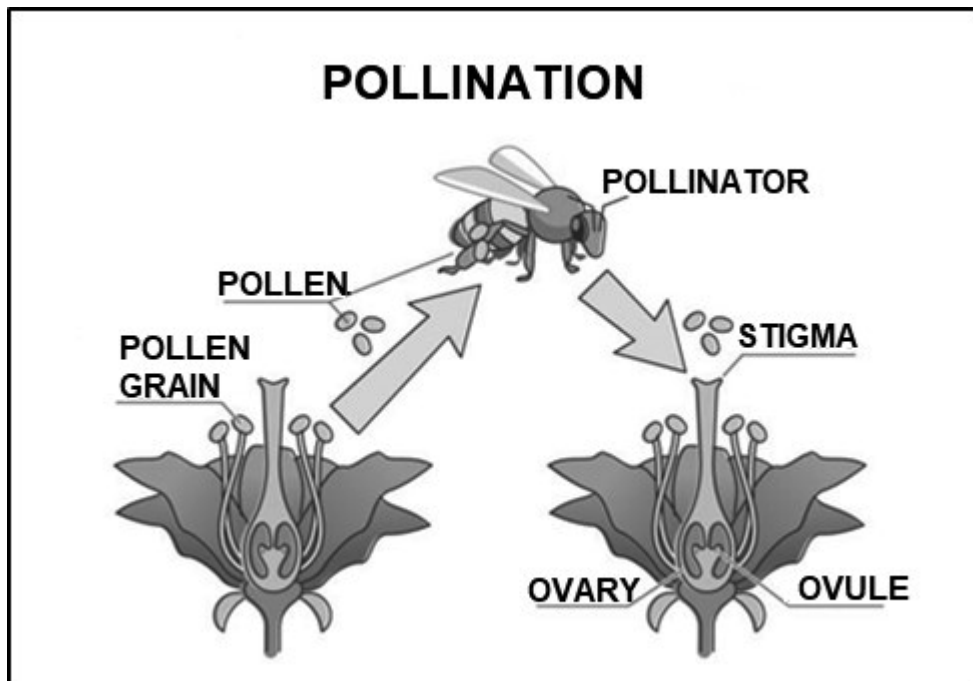
2.5.3 Explain how fertilisers cause eutrophication. (2)

[35]

QUESTION 3: PLANT REPRODUCTION AND PROTECTION

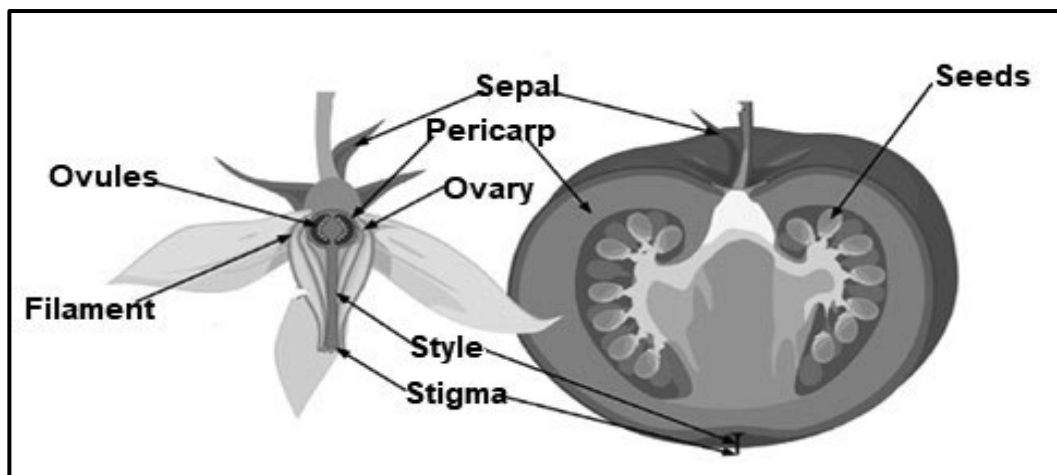
Start this question on a NEW page.

3.1 Analyse the diagram below and answer the questions that follow.



- 3.1.1 Identify the type of pollination depicted above. (1)
- 3.1.2 Justify your answer to QUESTION 3.1.1. (2)
- 3.1.3 Describe TWO adaptations of the flowers in the diagram above for the type of pollination mentioned in QUESTION 3.1.1. (2)
- 3.1.4 State the functions of the following parts of the flower:
- (a) Ovary (1)
 - (b) Stigma (1)
- 3.1.5 Explain how double fertilisation occurs in plants. (2)
- 3.1.6 Differentiate between *vegetative parthenocarpy* and *stimulative parthenocarpy*. (2)

3.2 The picture below shows the development of tomato fruit.



3.2.1 Classify the tomato fruit above as succulent or dry fruit. (1)

3.2.2 Justify your answer to QUESTION 3.2.1 above. (1)

3.2.3 Name the part of the flower which will develop into the following:

(a) Fruit (1)

(b) Seeds (1)

3.2.4 Briefly explain the following concepts:

(a) *Seed coat-enhanced dormancy* (2)

(b) *Natural asexual reproduction process* (2)

3.3 Study the table below of types of GM crops in South Africa.

CROP	% OF CROP GROWN	GM TRAIT
White maize	60	Drought resistant
Yellow maize	50	Drought resistant
Soybean	80	Herbicide tolerant
Cotton	90	Insect tolerant

3.3.1 Draw a bar graph to compare the percentage of different crops grown as GM crops in South Africa. (6)

3.3.2 State THREE advantages of genetically modified organisms. (3)

3.4 Biological control of weeds involves using nature to rid the soil of weeds.

3.4.1 Suggest TWO examples of biological weed control methods a farmer can use. (2)

3.4.2 Give TWO advantages of biological control of weeds. (2)

3.4.3 State THREE benefits of Integrated Pest Management strategy. (3)

[35]

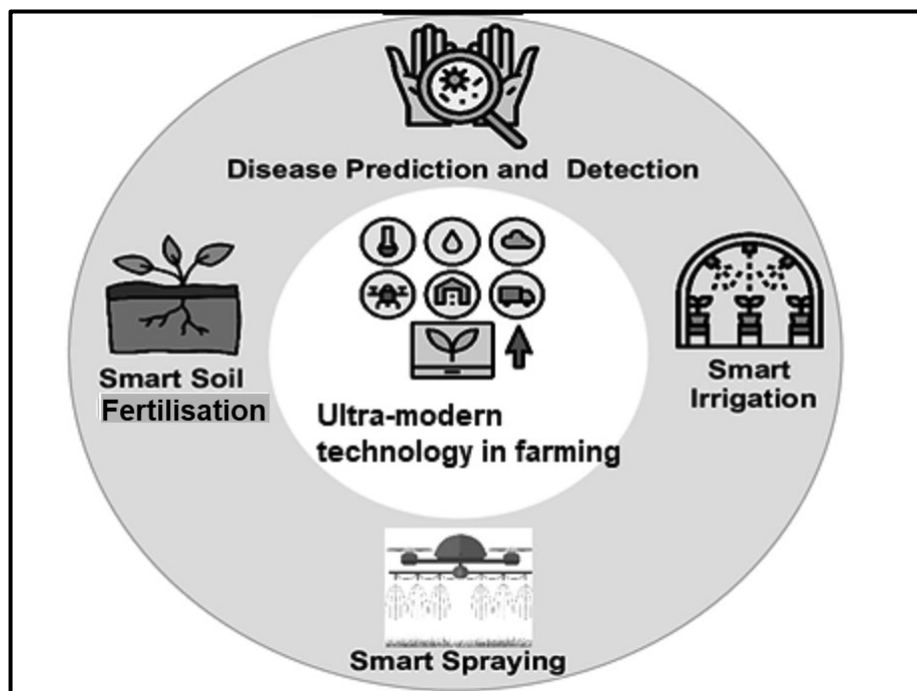
QUESTION 4: OPTIMAL RESOURCE UTILISATION

Start this question on a NEW page.

- 4.1 Soil surveying is the methodical examination, classification and description of soil by the physical examination of a soil profile. This is done to determine the suitability of soil for agricultural purposes. Different factors are taken into account when doing soil survey. The description of the surveyed soil data is then captured on a topographic map to produce the soil map.

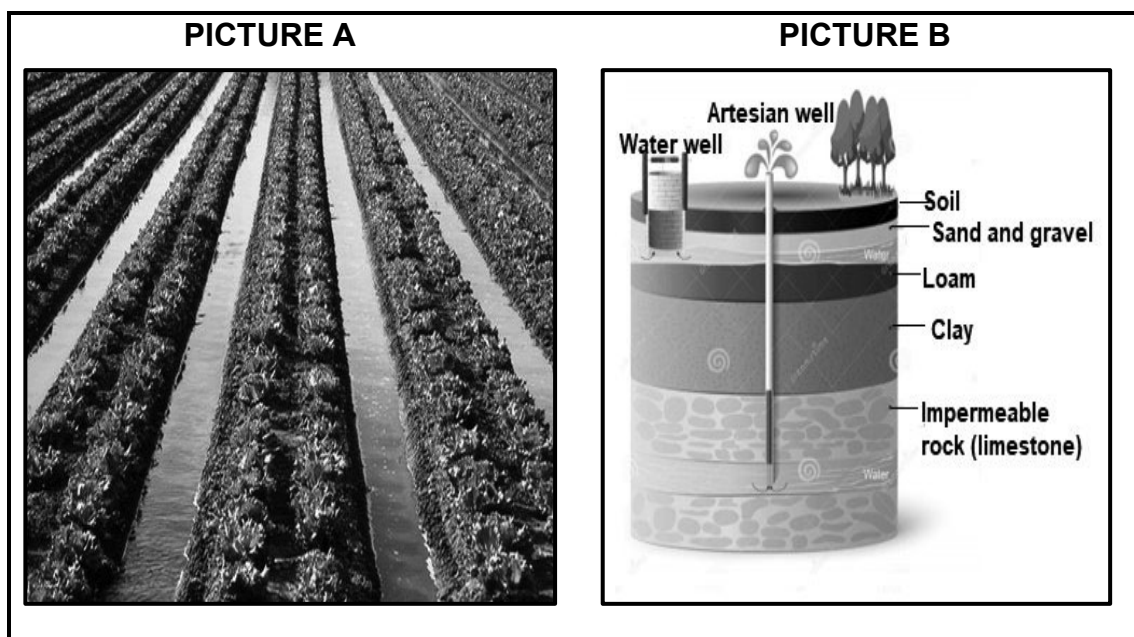
- 4.1.1 Extract, from the scenario above, the aim of a soil survey. (1)
- 4.1.2 State THREE factors to consider when a soil survey is done. (3)
- 4.1.3 Explain how data captured on the soil map will be useful to the farmer. (2)
- 4.1.4 Indicate THREE steps to follow in the physical analysis of soil. (3)

- 4.2 The picture below shows a modern farming approach that uses hi-tech applications and models that give farmers pin-point accurate information on factors that influence production.



- 4.2.1 Identify the farming approach illustrated in the picture above. (1)
- 4.2.2 Give TWO main aims of applying the modern farming method outlined in QUESTION 4.2.1 above. (2)
- 4.2.3 Explain the benefits of the smart soil fertilisation approach to the farmer. (2)

4.3 Study the pictures below and answer the questions that follow.



4.3.1 Name the type of flood system in PICTURE **A** above. (1)

4.3.2 Mention TWO advantages of flood irrigation. (2)

4.3.3 Explain the negative effects of improper irrigation scheduling. (2)

4.3.4 Identify the source of water for irrigation in PICTURE **B**. (1)

4.3.5 Determine TWO criteria used to determine water quality used for irrigation. (2)

4.4 Soil cultivation can be divided into two main groups, namely conventional and conservation tillage.

4.4.1 Identify the type of soil cultivation with the following aspects:

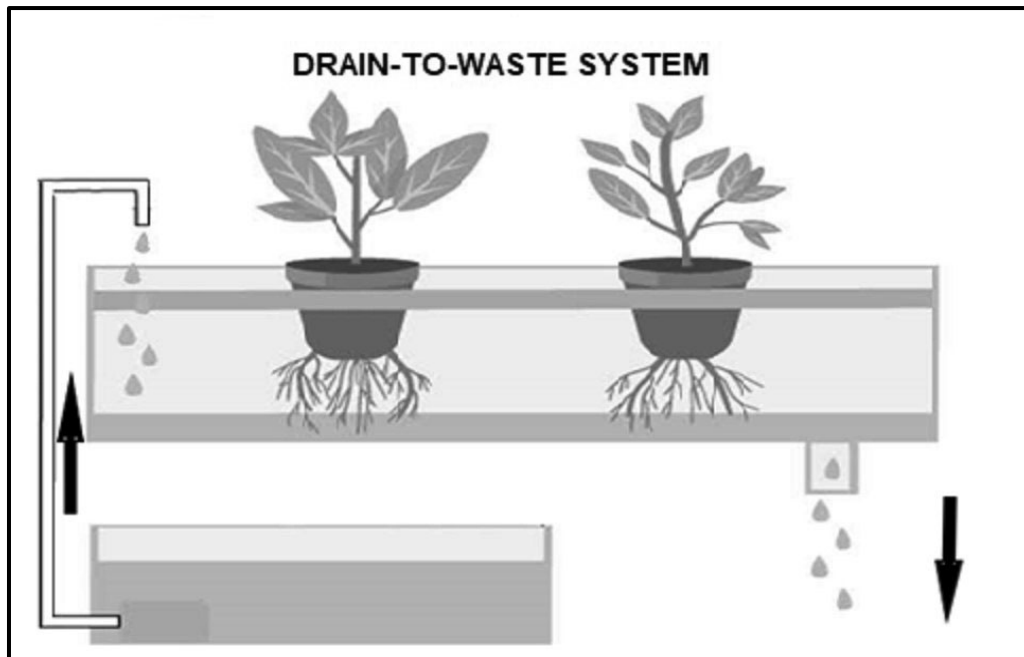
(a) Farming is done in a more sustainable way with minimum harm to the natural environment (1)

(b) Heavy implements are used to turn soil upside down and leaving the soil bare (1)

4.4.2 Mention TWO disadvantages of conventional tillage. (2)

4.4.3 State TWO advantages of crop rotation. (2)

- 4.5 The diagram below illustrates a drain-to-waste system that avoids recycle of nutrients and water for plants.



- 4.5.1 Identify the farming system that uses the system illustrated above. (1)
- 4.5.2 Give THREE advantages of the system mentioned in QUESTION 4.5.1 over the open field system. (3)
- 4.5.3 State ONE disadvantage of the drain-to-waste system illustrated in the picture above. (1)
- 4.5.4 Explain what *aquaculture* is. (2)

[35]

TOTAL SECTION B: 105
GRAND TOTAL: 150

