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Province of the  
**EASTERN CAPE**  
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**GRADE 11**

**NOVEMBER 2018**

**AGRICULTURAL SCIENCES P2**

**MARKS: 150**

**TIME: 2½ hours**



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This question paper consists of 16 pages.

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## INSTRUCTIONS AND INFORMATION

1. Answer ALL the questions in the ANSWER BOOK.
2. Start EACH question on a NEW page.
3. Read ALL the questions correctly and answer only what is asked.
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 your calculations, including units and formula, 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 number (1.1.1–1.1.10) in the ANSWER BOOK, for example

1.1.11 A.

1.1.1 A catabolic process where carbohydrates are broken down and energy is released.

- A Mineralisation
- B Photosynthesis
- C Anabolism
- D Respiration (2)

1.1.2 The leaf pigment responsible for the orange colour in plants is/are ...

- A carotenoids.
- B xanthophylls.
- C carotene.
- D chlorophyll. (2)

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

- A Photophosphorylation
- B Respiration
- C Photosynthesis
- D Photolysis (2)

1.1.4 Characteristics of genetically modified crops.

- (i) Increased yield and damage to crop
- (ii) Increased yield and better flavour
- (iii) Increased yield and improved shell life
- (iv) Resistance to pests, and decreased in input cost

Choose the correct combination:

- A (i), (iii) and (iv)
- B (i), (ii) and (iv)
- C (ii), (iii) and (iv)
- D (i), (ii) and (iii) (2)

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

- A Boron
- B Iron
- C Zinc
- D Cobalt

(2)

1.1.6 The actual quantity of phosphorus contained in 50 kg of fertiliser marked 2 : 3 : 2 (21).

- A 3 kg
- B 4,5 kg
- C 9 kg
- D 12 kg

(2)

1.1.7 Fruit that develops from the ripened ovary and some other parts of the flower.

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

(2)

1.1.8 A swollen underground modified stem with nodes and internodes.

- A Bulb
- B Stolon
- C Runner
- D Tuber

(2)

1.1.9 The following are biological control methods of weeds except ...

- A systemic herbicides.
- B species specific insects.
- C other invertebrates.
- D natural enemies.

1.1.10 Artificial supplementation of water to areas where rainfall is insufficient:

- A Evaporation
- B Irrigation
- C Drainage
- D Transpiration

(2)

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

COLUMN A	KOLOM B
1.2.1 Micro-irrigation system	A Vermiculite
1.2.2 An example of a bacterial disease in plants	B Re-circulation system
1.2.3 Growing medium in hydroponics	C Geographic information system
1.2.4 Allows water to pass through the system once before it is discharged	D Drip system
1.2.5 An application that determines a precise position on the globe	E Potato leaf roll
	F Geographic positioning system
	G An open through flow system
	H Leaf blight
	I Green house
	J Centre pivot

(5 x 2) (10)

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

1.3.1 Male organ of a flower

1.3.2 The practice employed by farmers to ensure maximum exposure to sunlight for efficient photosynthesis

1.3.3 The organic component of soil formed by the decomposition of leaves and other plant material by soil micro-organisms

1.3.4 Addition of fertiliser on one or both sides of a row of plants or underneath seeds

1.3.5 The process to determine suitability of soil for agricultural and non-agricultural purposes

(5 x 2) (10)

1.4 Change the underlined word(s) in each of the following statements. Write only the correct word(s) next to the question number (1.4.1–1.4.5) in the attached ANSWER BOOK.

1.4.1 Most ions reach the leaves of plants from the roots through the phloem.

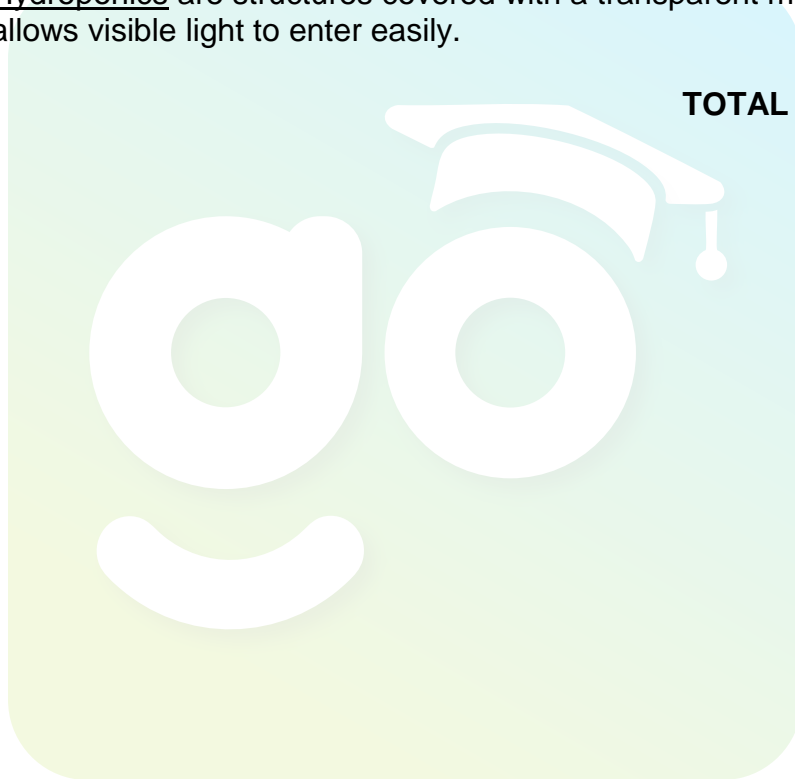
1.4.2 A tensiometer is a special flat water-filled container used to measure the rate of water loss.

1.4.3 Fresh water located in the pore space of soil and rocks is capillary water.

1.4.4 Zero tillage is the first tillage of the soil in the new season.

1.4.5 Hydroponics are structures covered with a transparent material which allows visible light to enter easily. (5 x 1) (5)

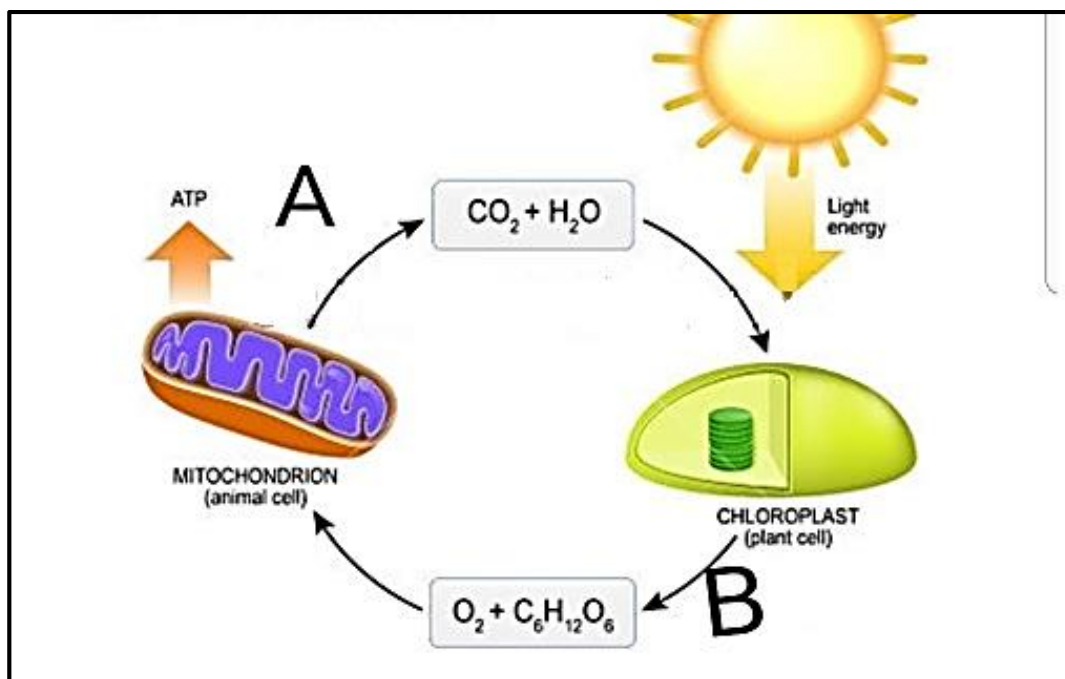
**TOTAL SECTION A: 45**



**SECTION B****QUESTION 2: PLANT NUTRITION**

Start this question on a NEW page.

2.1 The picture below illustrates the process taking place plant production.



- 2.1.1 Identify the processes labelled **A** and **B** respectively. (2)
- 2.1.2 Tabulate the difference between the TWO processes with regard to: (2)
- (a) Carbohydrates (2)
  - (b) Oxygen (2)
- 2.1.3 Suggest any TWO main pigments involved in the process labelled **B**. (2)
- 2.1.4 Deduce the end products of the process labelled **B**. (2)
- 2.1.5 Indicate TWO phases of the process in **B**. (2)



2.2 The following are examples of food that are stored in different plant organs.

Ginger, Onions; Sweet potato; Beetroot; Sunflower; Mangos
---

2.2.1 Match the examples of food above with their storage organs:

- (a) Seeds
- (b) Root
- (c) Stem (3)

2.2.2 Many plants have adaptation features to reduce the rate of transpiration. Suggest TWO adaptation features of plants to reduce transpiration. (2)

2.3 Plants need nutrients for normal growth. Below is a chemical representation of the forms in which elements are available to plant for absorption in the soil.

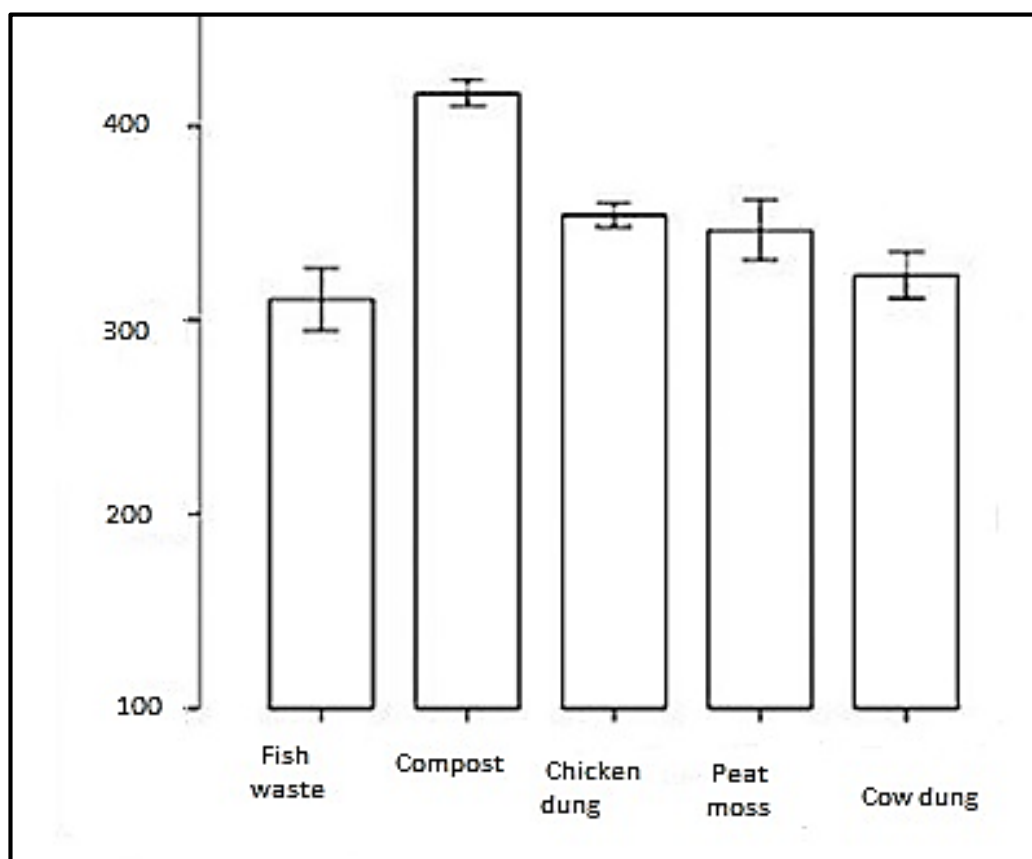
- |    |   |
|----|---|
| A. | Mn <sup>++</sup> -ions and Mo <sup>+-</sup> ions  |
| B. | NO <sub>3</sub> -ions of PO <sub>3</sub> ,K <sup>+</sup> ions , Ca <sup>++</sup> - ions and Mg <sup>++</sup> -ions, H <sub>2</sub> and O <sub>2</sub> |

2.3.1 Classify 'A' and name the two elements respectively. (3)

2.3.2 Identify TWO primary nutrients and TWO secondary nutrients. (4)

2.3.3 Name the TWO non-mineral elements. (2)

- 2.4 Organic fertilisers are made from plant and animal matter and as such they cannot damage the environment in the way that chemical or synthetic substances do. The graph below shows the impact of organic fertilisers on plant growth.



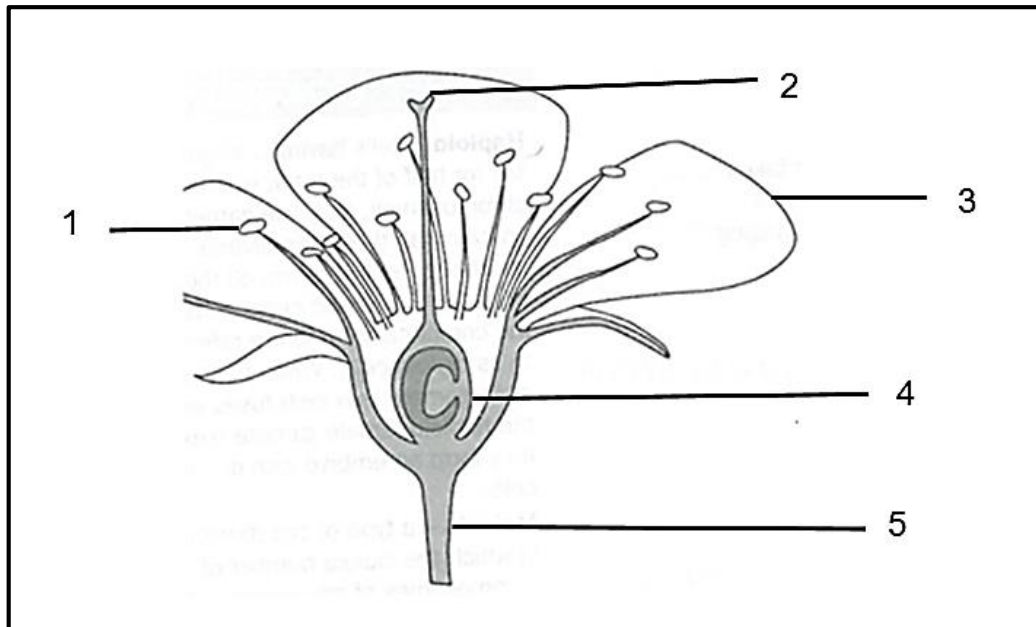
- 2.4.1 Translate the information on the graph to a table. (4)
- 2.4.2 Identify from the graph the organic fertiliser that is most effective for plant growth. Justify the answer. (2)
- 2.4.3 Suggest ONE factor to consider when using farm manure. (1)
- 2.4.4 Mention TWO methods of fertiliser application. (2)

**[35]**

**QUESTION 3: PLANT REPRODUCTION**

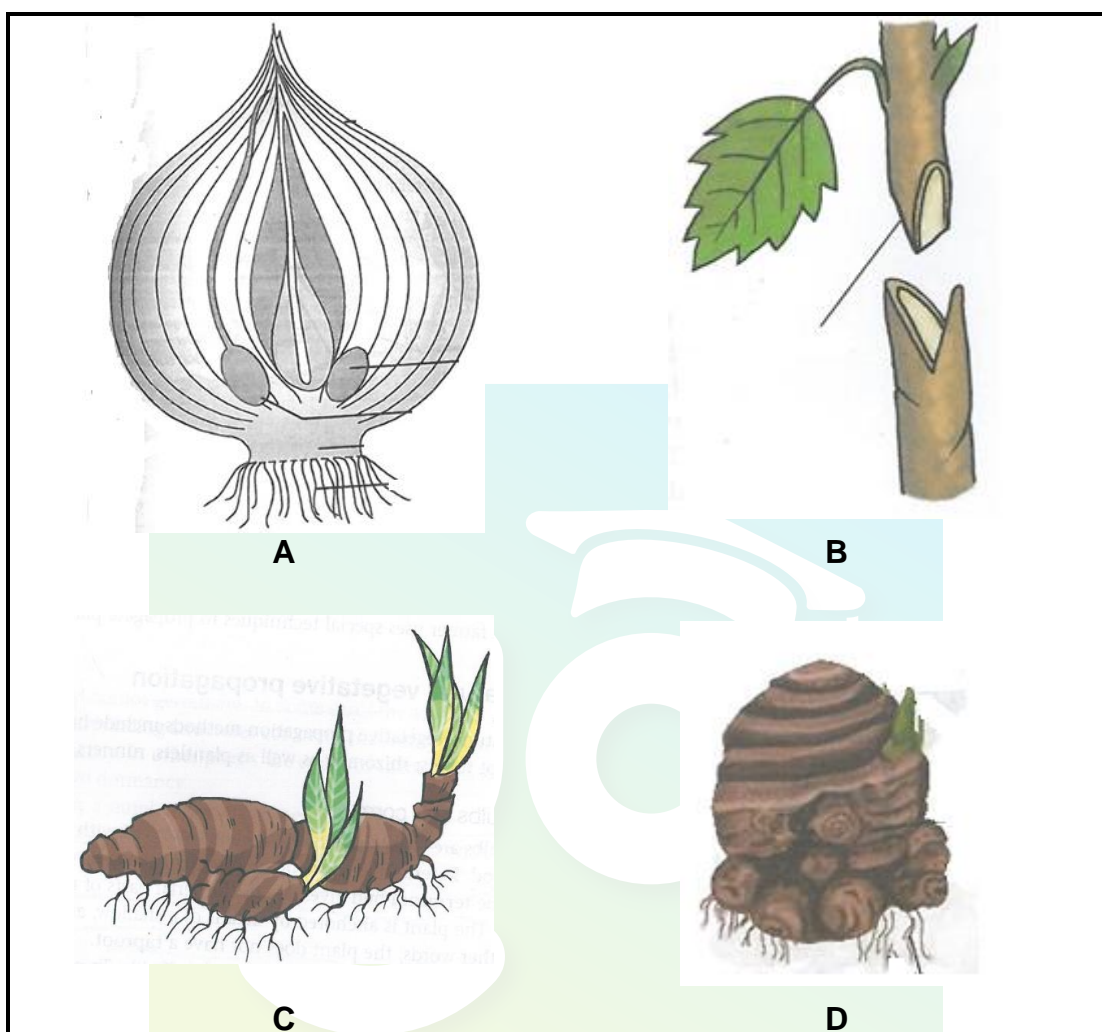
Start this question on a NEW page.

- 3.1 The diagram below represents a flower. Answer the questions based on it.



- 3.1.1 Identify the number of the part on the diagram where pollen grains are produced. (1)
- 3.1.2 Indicate whether the structure above represents a unisexual or a bisexual flower. Motivate your answer. (2)
- 3.1.3 Write down the number of the structure responsible for the attraction of insects for pollination. (1)
- 3.1.4 (a) Two male nuclei are produced in the germinating pollen grain. Name these two male nuclei. (2)
- (b) Explain ONE function performed by each of these two nuclei. (2)

- 3.2 Certain small scale farmers investigated the possibilities of starting their own nurseries. They wanted to know more about the various asexual reproductive methods that can be applied to propagate different crops. The diagrams below show reproduction methods labelled **A–D**.



3.2.1 Match the diagrams above with the following statements:

- |     |  |     |
|-----|--|-----|
| (a) | A thickened underground stem that grows more or less parallel with the surface of the soil | (1) |
| (b) | An artificial method of vegetative propagation   | (1) |
| (c) | Short, thick round underground stems that store food                                       | (1) |
| (d) | Underground stems covered by fleshy scale leaves that store food                           | (1) |

3.2.2 Suggest TWO disadvantages of the vegetative reproduction methods in QUESTION 3.2.1. (2)

3.2.3 Give the name of the parts that are joined together in asexual reproduction method **B**. (2)

3.2.4 Mutation can be induced artificially by using agents such as radiation and certain chemicals. Suggest TWO advantages of gene mutation. (2)

3.3 The table below shows the production of crops on a farm where equal amounts of conventional and GM seeds were planted.

Crop	Hectares planted	GM Production/ha (tons)	Conventional Production /ha (tons)
White maize	50	4	2
Yellow maize	60	5	3
Soya bean	20	2	0,5

3.3.1 Deduce the impact of GM seeds over conventional seeds from the table. (1)

3.3.2 Calculate the total yield of yellow maize in kilograms for GM crops. (3)

3.3.3 Name TWO public concerns about the use of GM crops. (2)

3.4 Many weeds have developed adaptations that help them to grow in difficult conditions where other plants struggle to survive. These adaptations allow weeds to grow commonly and more easily than crop plants.

3.4.1 Suggest THREE adaptations of weeds. (3)

3.4.2 Explain the concept *Integrated Pest Management*. (2)

3.4.3 Deduce TWO reasons why IPM is regarded as a preferred method of weed control. (2)

3.5 Complete the following table on plant diseases by only writing down the number (3.5.1–3.5.4) and the missing answer.

Diseases	Symptom	Mode of transmission	Host
Bacterial wilt	Plants wilt and die	Water and soil	3.5.1
Tobacco-spot	Chlorosis/mosaics	3.5.2	Potatoes
3.5.3	Fungus-like growth on leaves	Wind	3.5.4

(4)  
[35]

**QUESTION 4: OPTIMAL RESOURCE UTILISATION**

Start this question on a NEW page.

4.1 Different factors are taken into account when a soil survey is done.

4.1.1 Deduce TWO main characteristics to consider in a soil survey. (2)

4.1.2 Precision farming describes a modern method of crop farming.  
Indicate TWO main aims of this concept. (2)

4.2 In drier parts of South Africa farmers generally use some form of irrigation to supplement rainfall so that they can grow crops. Using irrigation to supplement rainfall allows farmers to grow crops with a high water requirement that they would not normally be able to grow during the dry season. Before water is used for irrigation it is important to establish its quality.

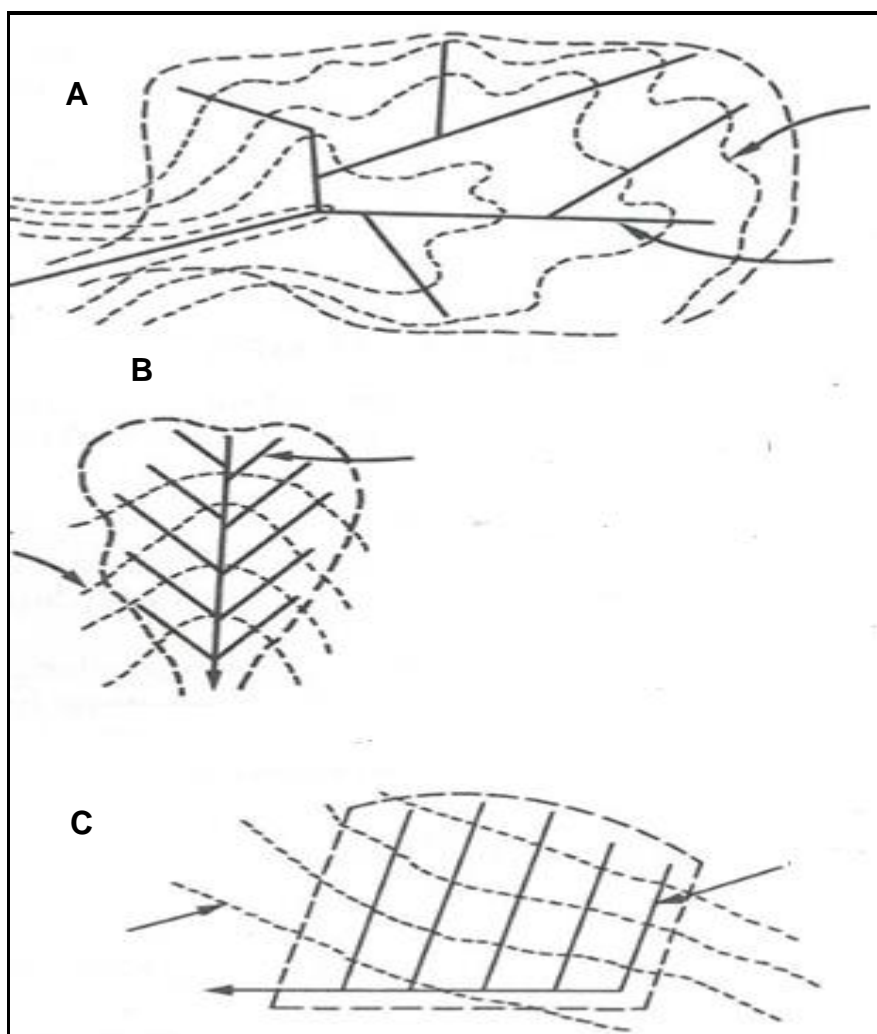
[From <http://www.daff.gov.za/doaDev/>. Accessed 20 June 2018.]

4.2.1 Mention TWO main sources of water used for irrigation. (2)

4.2.2 Explain TWO factors that have an influence on water quality. (2)

4.2.3 Centre pivot irrigation is a more sophisticated way to deliver overhead irrigation and is greatly favoured by most farmers.  
Indicate TWO disadvantages of this system. (2)

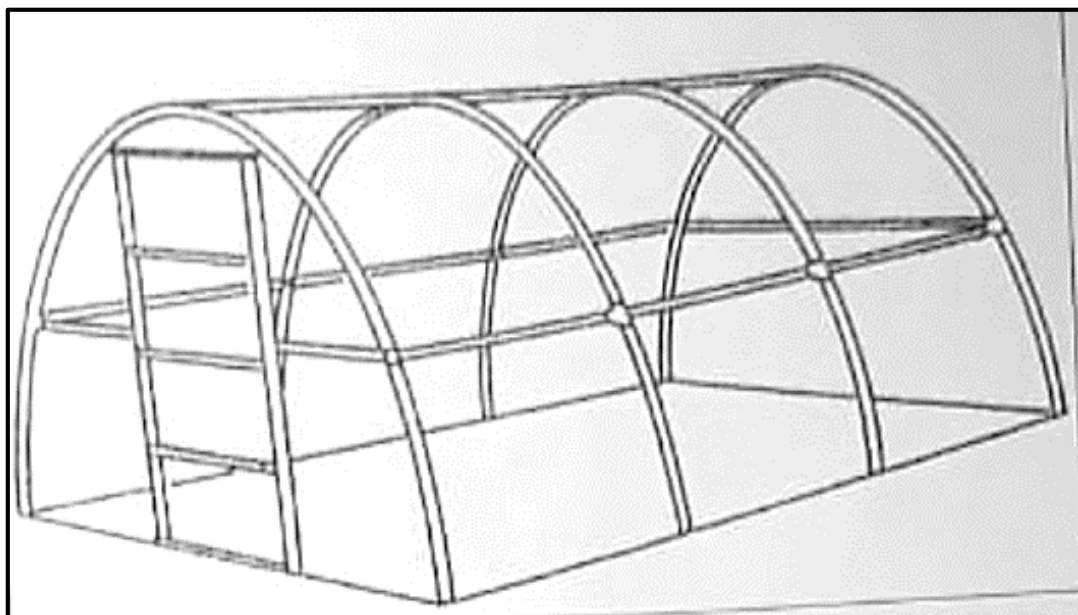
- 4.3 The diagrams below indicate the different layout that can be used when installing pipe drains.



- 4.3.1 Identify the THREE different layout areas. (3)
- 4.3.2 Suggest THREE types of topography or terrains that each of the systems chosen in QUESTION 4.3.2 would be most used for. (3)



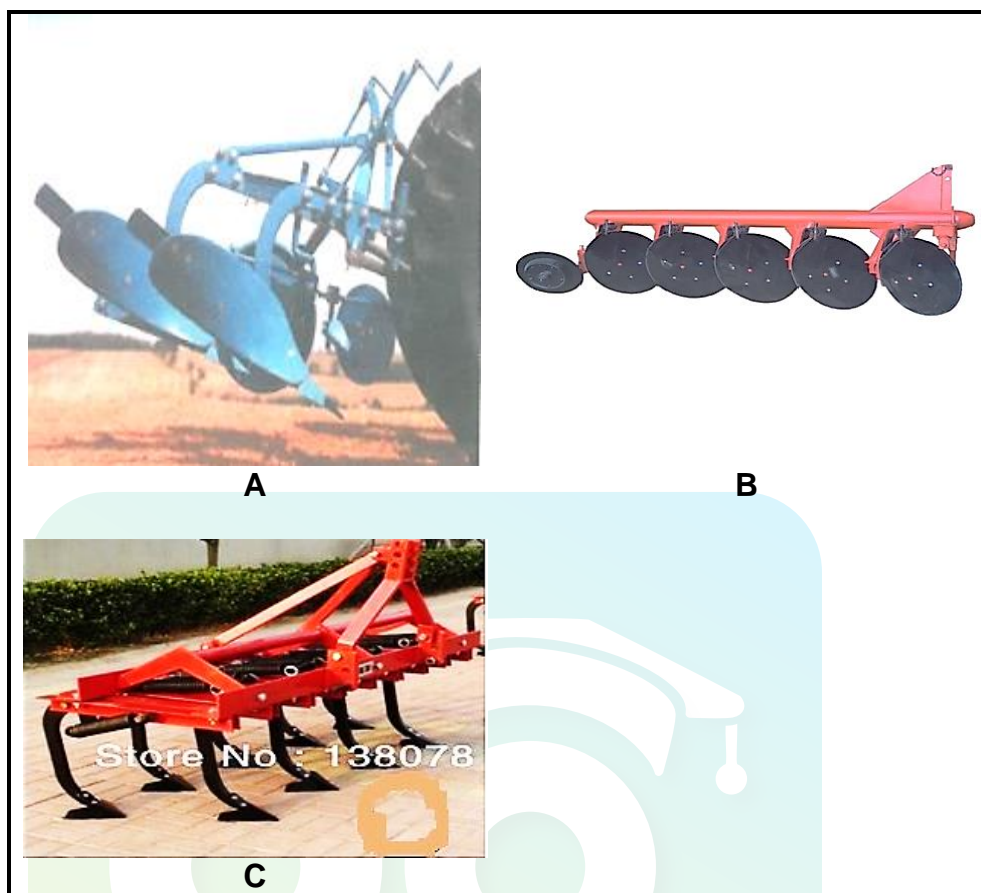
- 4.4 The following structure is used in intensive crop production enterprises. Some plants are grown in soil while some are grown in a medium other than the soil.



- 4.4.1 Identify this structure. (1)
- 4.4.2 Name TWO advantages of using the above structure. (2)
- 4.4.3 Suggest TWO growth mediums of plants other than the soil. (2)
- 4.5 Farmers who practice conservation tillage are trying to farm in a sustainable way.
- 4.5.1 Indicate TWO types of conservation practices. (2)
- 4.5.2 Tabulate the difference between monoculture and crop rotation with regard to the following:
- |                     |     |
|---------------------|-----|
| (a) Soil erosion    | (2) |
| (b) Implements used | (2) |



4.5.3 Provide the names of the implements labelled A–C.



(3)

4.5.4 Identify the implement that is used for primary cultivation.

(1)

4.6 In South Africa both freshwater and marine species are farmed in aquaculture systems and many exotic species are used.

4.6.1 Deduce the reason of farming exotic species in South Africa.

(2)

4.6.2 Mention TWO basic requirements for aquaculture to achieve higher yields.

(2)

[35]

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