



Province of the  
**EASTERN CAPE**  
EDUCATION

**NATIONAL  
SENIOR CERTIFICATE**

**GRADE 11**

**NOVEMBER 2014**

**AGRICULTURAL SCIENCES P2**

**MARKS: 150**

**TIME: 2½ hours**

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This question paper consists of 15 pages.

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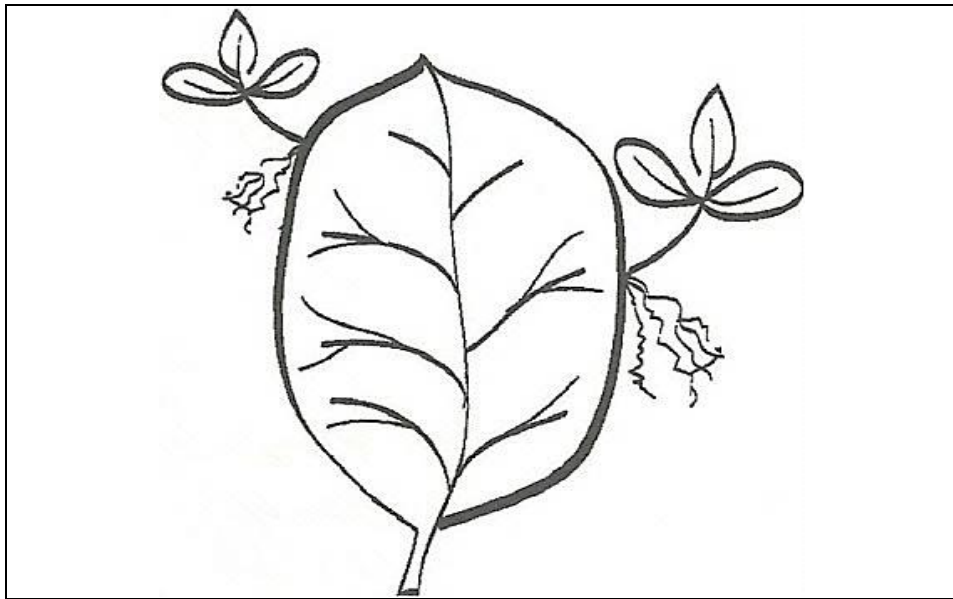
**INSTRUCTIONS AND INFORMATION**

1. This question paper consists of TWO sections, namely SECTION A and SECTION B.
2. Answer ALL the questions in the ANSWER BOOK provided.
3. Start EACH question on a NEW page.
4. Number the answers exactly as the questions are numbered.
5. Non-programmable calculators may be used.
6. Show all your calculations.
7. Write neatly and legibly.

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

- 1.1 Various possible options are provided as answers to the following questions. Choose the correct 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 D.
- 1.1.1 A simple class experiment showed a spontaneous movement of molecules from a region of high concentration to a region of low concentration. This is called ...
- A osmosis.
  - B plasmolysis.
  - C diffusion.
  - D infusion.
- (2)
- 1.1.2 The use of technology such as computers, global satellites and remote sensing devices to monitor if crops are growing at maximum efficiency is ...
- A precision farming.
  - B rotational farming.
  - C greenhouse farming.
  - D aerial farming.
- (2)
- 1.1.3 ... is the yellowing of plant leaves due to the non-production or break down of chlorophyll in plants.
- A Photolysis
  - B Chlorosis
  - C Toxicity
  - D Chloroplast
- (2)
- 1.1.4 ... refers to the transport of minerals and sugars in solution within a plant's phloem.
- A Translocation
  - B Transpiration
  - C Transportation
  - D Transverse movement
- (2)
- 1.1.5 Hand pulling, hoeing, mowing and mulching are all examples of ... control methods.
- A chemical weed
  - B preventive weed
  - C biological weed
  - D mechanical weed
- (2)

1.1.6 The best propagation method as in the illustration below is by ...



- A grafting.
  - B splitting.
  - C cutting.
  - D division.
- (2)

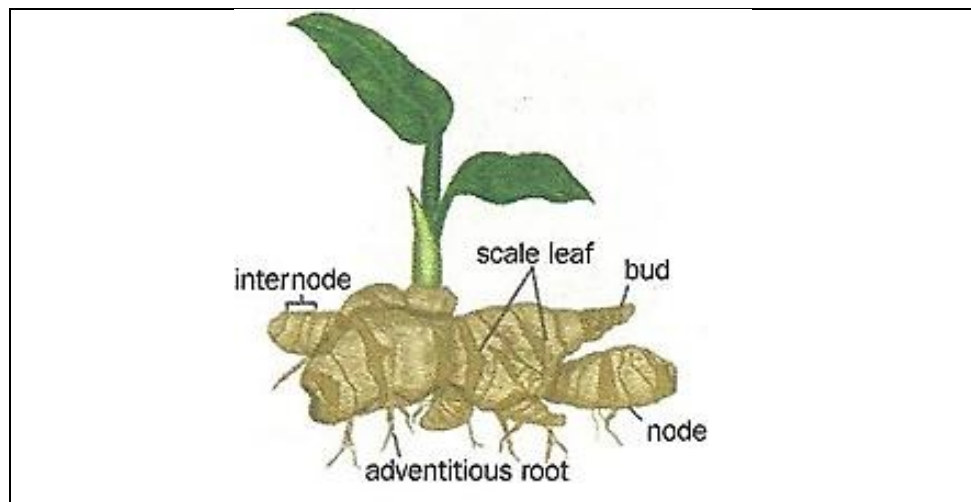
1.1.7 One of the following is not an advantage of hydroponic production systems:

- A A favourable climate can be created for plants.
  - B It is very necessary for crop rotation.
  - C Correct and optimal nutrition is provided to plants at all times.
  - D Certain characteristics of the plant can be manipulated to satisfy the consumers' needs.
- (2)

1.1.8 Grade 11 learners in a school were taught to prevent water loss or wind erosion by covering cultivated soil with organic substances like sawdust, tree bark or hay. They were practising ...

- A bare cultivation.
  - B green manuring.
  - C mulching.
  - D harrowing.
- (2)

1.1.9 The diagram of the plant below is an example of a ...



- A bulb.
- B rhizome.
- C corm.
- D runner.

(2)

1.1.10 Important requirements for aquaculture farmers to achieve high yields are:

- (i) The use of protection against predators.
- (ii) Using colder regions which are favourable for all types of fish.
- (iii) A system which will ensure efficient harvesting.
- (iv) A system which will optimise feed conversion.

More than one of the above options are correct. 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)  
(20)

- 1.2 Choose a word/term/concept/phrase from COLUMN B that best 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	Respiration	A	Bull/oxen ploughing
1.2.2	Determining when and how much to irrigate	B	Locule and septum
1.2.3	Monocot flowers	C	septum and anther
1.2.4	Ovary	D	$C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O + \text{Energy}$
1.2.5	Indigenous knowledge	E	Irrigation schedule
		F	Harrowing
		G	Lemma and palea
		H	Land irrigation
		I	Corolla and lemma
		J	$6CO_2 + 6H_2O \xrightarrow[\text{chlorophyll}]{\text{Solar energy}} C_6H_{12}O_6 + 6O_2$

(5 x 2) (10)

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

- 1.3.1 Organisms that produce their own food and obtain nutrients
- 1.3.2 The production of fruit without fertilisation of ovules, resulting in seedless fruit
- 1.3.3 The part of the new plant that grows into the stem and branches in grafting.
- 1.3.4 A special flat water-filled container with a fixed size that is used to measure the rate of water loss
- 1.3.5 An irrigation system that involves large amount of water that is brought to the field and flows on the ground among the crops

(5 x 2) (10)

- 1.4 Change the UNDERLINED WORD(S) in each of the following statements to make them TRUE. Write the appropriate word(s) next to the question number (1.4.1–1.4.5) in the ANSWER BOOK.
- 1.4.1 Carbohydrates, especially glucose ( $C_6H_{12}O_6$ ), are used by the plant for replication or stored in different plant parts for use by other living organisms.
- 1.4.2 Agrestalisation is the situation in plants and buds where they are alive but not actively growing.
- 1.4.3 In testing for oxygenation in plants, a clear plastic or cellophane bag is put over a potted plant and closed tightly around the stem. The plant is left in the sun for observation.
- 1.4.4 Hydroponics is the farming of marine and freshwater organisms.
- 1.4.5 From the roots most ions reach the leaves of plants through the phloem.
- (5 x 1) (5)
- TOTAL SECTION A: 45**

## SECTION B

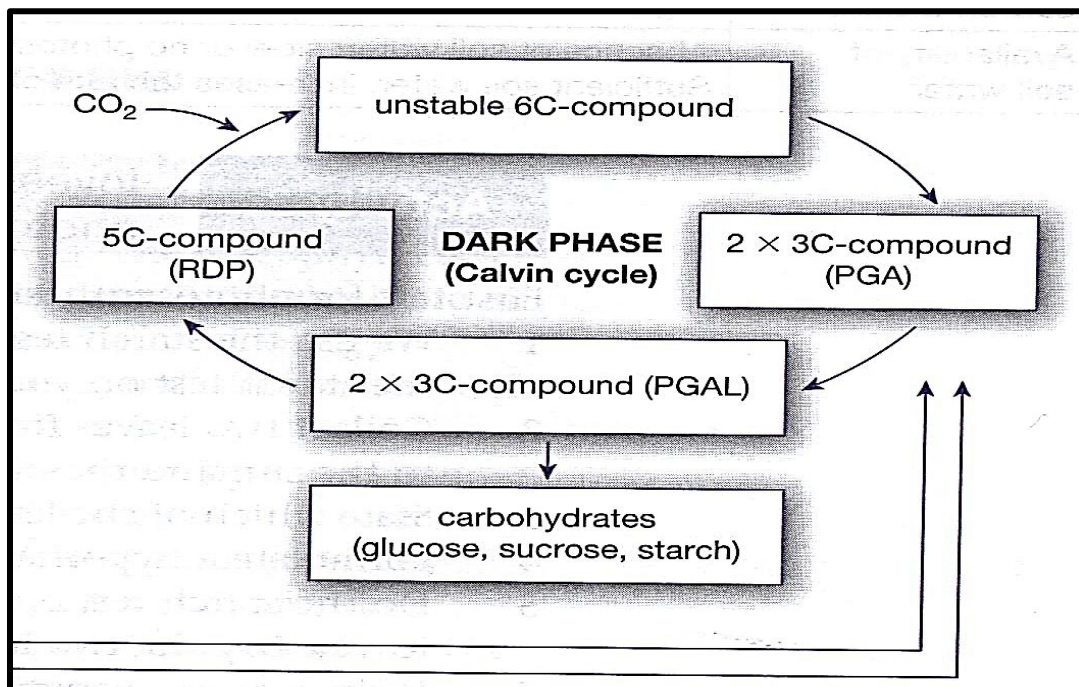
## QUESTION 2: PLANT NUTRITION

Start this question on a NEW page.

2.1 For plants to survive it is essential that they have a continuous water supply and reduce water loss through transpiration. Plants in dry regions have developed special features to reduce water loss and to ensure survival for a long time.

- 2.1.1 Give THREE reasons that justify the underlined statement in above scenario in 2.1. (3)
- 2.1.2 State TWO special adaptations of plants to reduce excessive water loss. (2)
- 2.1.3 Mention the part of the plant noted for active water and nutrient absorption. (1)
- 2.1.4 Differentiate between *transpiration pull* and *osmotic flow* in plants. (4)

2.2 The illustration below indicates the chemical process by which plants synthesise food for use and storage. The process involves both a light phase and dark phase.



- 2.2.1 Briefly discuss THREE processes of the dark phase of photosynthesis. (3)
- 2.2.2 Indicate THREE important aspects of photosynthesis for human beings. (3)
- 2.2.3 Recommend TWO ways to increase the rate of photosynthesis. (2)



2.3 The difference between micro-elements and macro-elements is only in the quantities required by plants. Nutrient element requirements differ between the elements as well as between plant species.

2.3.1 Tabulate the following plant nutrients into micro and macro elements:

Boron	
Potassium	
Zinc	
nitrogen	(4)

2.3.2 Indicate ONE function of boron to plants. (1)

2.3.3 State TWO ways in which mineral nutrient up-take occurs in plants. (2)

2.4 Organic fertilisers are made up of decayed organic matter, such as plants that have decomposed or have been digested by organisms. A debate was organised in your class, and you were called to argue in favour of the use of organic fertilisers in the school garden.

2.4.1 Give THREE reasons in favour of the use of organic fertilisers in your school garden in your argument. (3)

2.4.2 Suggest THREE characteristics of crops that could be used for green manure. (3)

2.5 A bag of compound fertiliser contains three nutrients in the following ratio: 3; 2 ; 5 (45).

2.5.1 Calculate the percentage of phosphorus in the mixture of the compound fertiliser. (3)

2.6 State ONE use for gypsum for grain farmers. (1)

**[35]**

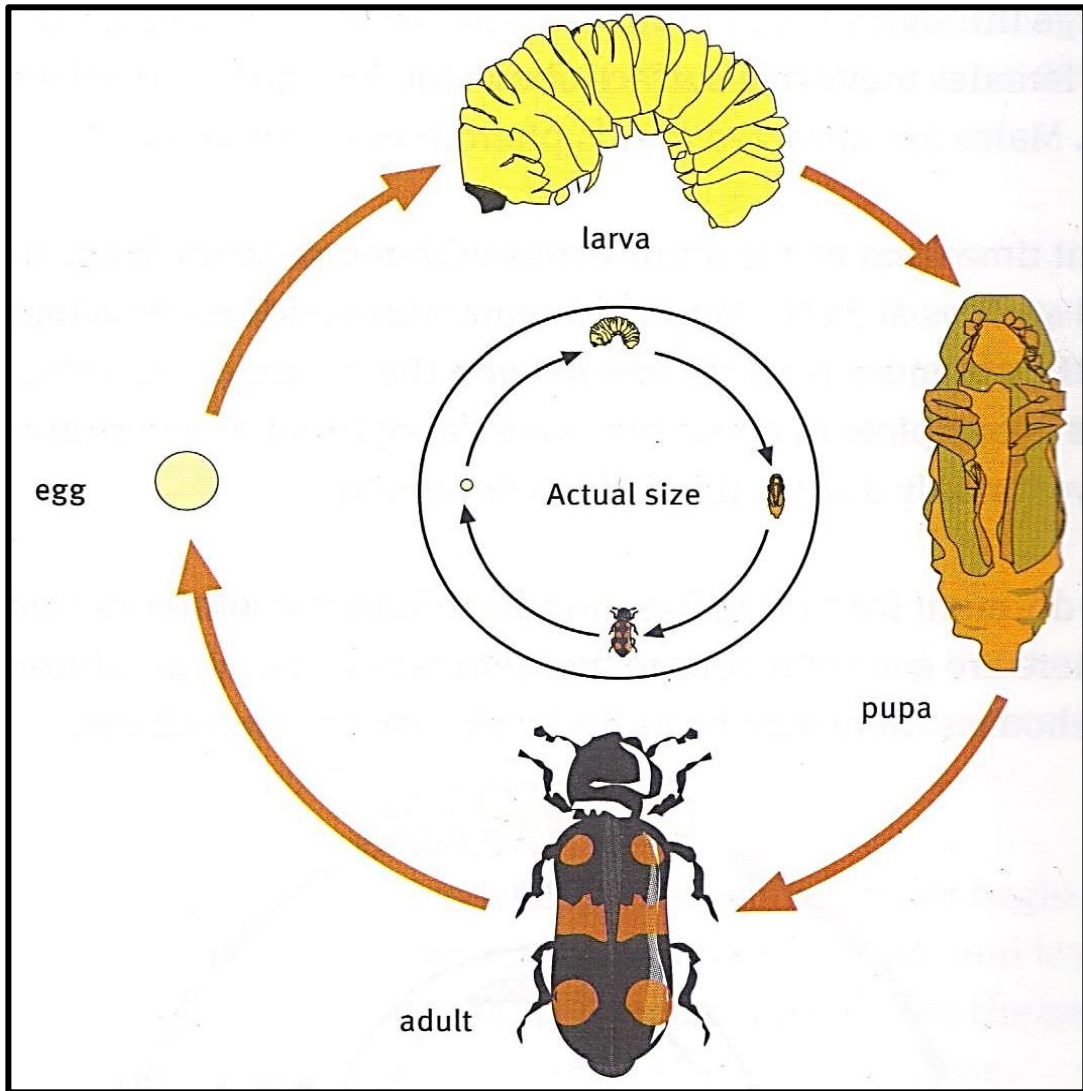
**QUESTION 3: PLANT REPRODUCTION**

- 3.1 Bees are stinging winged insects which collect nectar and pollens, producing wax and honey. They usually live in large communities and are found flying from flower to flower mostly during the spring and summer seasons.



- 3.1.1 Deduce the process in 3.1. (1)
- 3.1.2 Mention TWO other agents that perform the process in 3.1. (2)
- 3.1.3 Define the process in QUESTION 3.1.1. (3)

3.2 The illustration below is the life cycle of an insect pest. It takes two months to complete the life cycle depending on the temperature. Developing from egg to adult requires about 25 days under ideal conditions of temperature and moisture.



- 3.2.1 Identify the pest in the illustration in 3.2. (1)
- 3.2.2 State THREE insect-management methods used to prevent the infestation of insects in stored grains. (3)
- 3.2.3 Suggest an ideal temperature for the life cycle of the insect in 3.2. (1)
- 3.2.4 Describe THREE implications of heavy infestation of the insect in 3.2 in stored grains in South Africa. (3)

3.3 Asexual or vegetative propagation is of great importance in crop production, especially in horticultural crop production. This can be divided into natural or artificial vegetative propagation.

3.3.1 Categorise the following into natural and artificial vegetative methods of asexual propagation:

Stolons  
Layering  
Budding  
Corms

(4)

3.3.2 State TWO advantages of vegetative propagation.

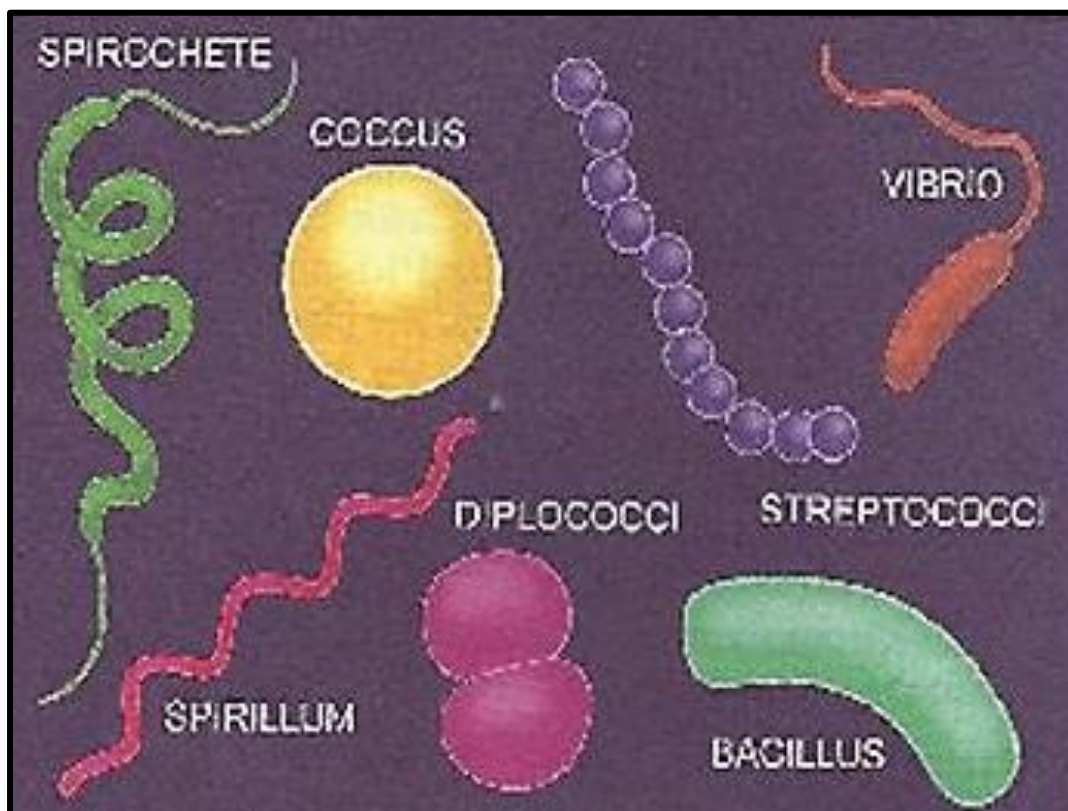
(2)

3.4 The main characteristic of GMOs (Genetically Modified Organisms) is that of their genetic make-up. GMOs have certain characteristics when compared with conventionally bred crops.

3.4.1 Indicate THREE important characteristics of GMO crops.

(3)

3.5 The picture below shows a group of organisms.



3.5.1 Give ONE name for the group of organisms illustrated above in 3.5.

(1)

3.5.2 Recommend THREE measures to prevent the spread of the organisms in plants.

(3)

3.6 A weed is generally described as any plant that is growing in the wrong place. In agriculture, this means weeds are plants that have not been planted by the farmer and are competing with the planted crops for space, sunlight and soil nutrients. Weeds can be controlled by many methods, namely mechanical, chemical, biological and through integrated management practices.

3.6.1 From the scenario, provide THREE ways in which crop plants compete with weeds on a farm. (3)

3.6.2 Suggest ONE other way (not mentioned in the scenario) in which weeds compete with crop plants on a farm. (1)

3.6.3 Differentiate between *chemical* and *mechanical weed control*. (4)

**[35]**

#### QUESTION 4: OPTIMAL RESOURCES

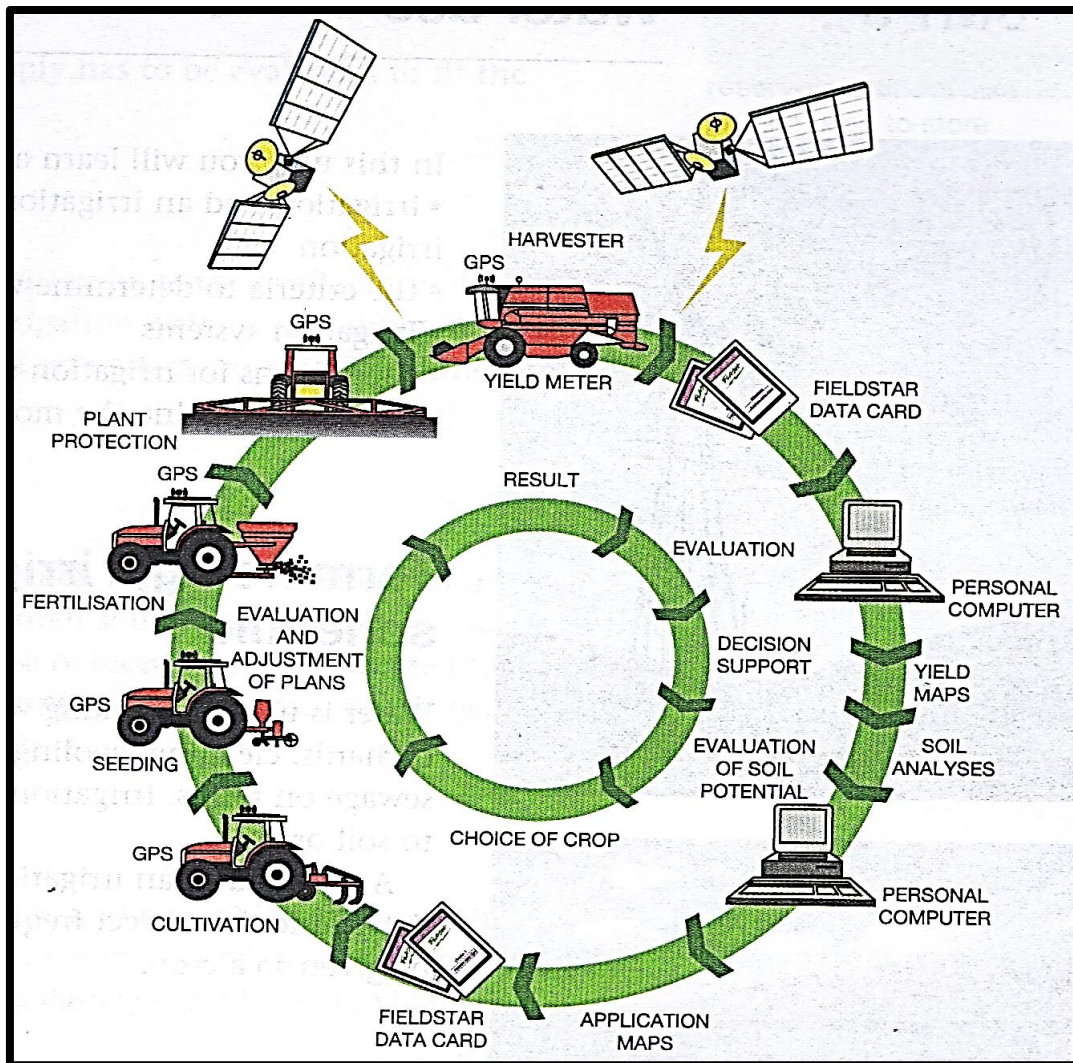
4.1 An emerging farmer has approached you for advice on the measures and steps to take in identifying an appropriate land for irrigation. In the process of the advice, a soil survey was mentioned and the emerging farmer did not know what this was.

4.1.1 Explain the concept '*soil survey*' to the emerging farmer. (2)

4.1.2 Give TWO aims of a soil survey to justify its importance. (2)

4.1.3 Indicate THREE steps to follow in the physical analysis of soil. (3)

4.2 The picture shows some of the equipment used by a commercial farmer on a farm.



4.2.1 Determine the type of farming in illustrated above in 4.2. (1)

4.2.2 State THREE aims of the farmer in adopting the method of farming in QUESTION 4.2.1 above. (3)

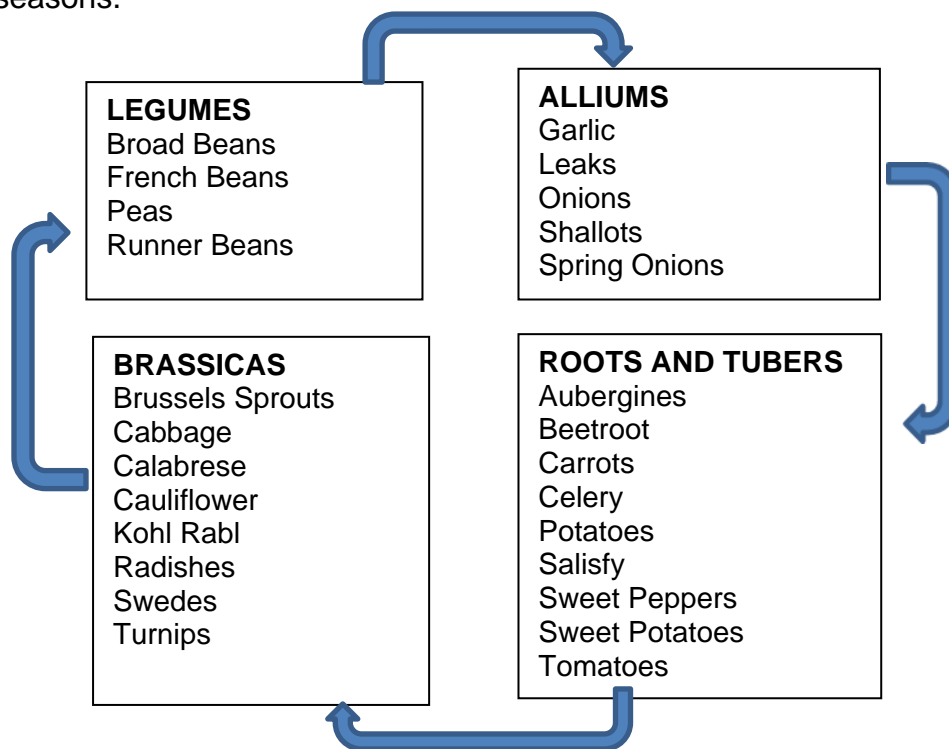
4.3 In the drier parts of South Africa, farmers generally use some form of irrigation to supplement rainfall so that they can grow crops. In marshy areas, farmers do drainage to reclaim agricultural land to grow crops.

4.3.1 Differentiate between *drainage* and *irrigation*. (4)

4.3.2 Indicate THREE criteria to determine the water quality for irrigation. (3)

4.3.3 Indicate TWO factors to consider when planning and applying an irrigation method. (2)

4.4 The illustration below shows a cropping system followed over four growing seasons.



- 4.4.1 Deduce the cropping system in 4.4. (1)
- 4.4.2 Justify your answer in QUESTION 4.4.1 by referring to the data supplied. (1)
- 4.4.3 Recommend TWO factors which play a fundamental role when a farmer plans this cropping system. (2)
- 4.4.4 State TWO benefits of the cropping system in 4.4. (2)

4.5 Modern technology has made it possible for farmers to adopt different approaches to crop production. Some of the innovations include hydroponics, aqua-culture and tunnels or green-houses for both plant and fish production.

- 4.5.1 State THREE benefits of having a greenhouse for production of high value cash crops. (3)
- 4.5.2 Define the underlined concept in QUESTION 4.5. (2)
- 4.5.3 Mention TWO growth mediums that support plants which can be used by growers in hydroponics systems. (2)
- 4.5.4 State TWO factors which may restrict farmers from choosing certain fish species for aquaculture. (2)

[35]

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