



Province of the  
**EASTERN CAPE**  
EDUCATION

**NATIONAL  
SENIOR CERTIFICATE**

**GRADE 11**

**NOVEMBER 2016**

**AGRICULTURAL SCIENCES P2**

**MARKS: 150**

**TIME: 2½ hours**



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This question paper consists of 13 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.
3. Start EACH question on a NEW page.
4. Read ALL the questions carefully and answer only what is asked.
5. Number the answers correctly according to the numbering system used in this question paper.
6. Non-programmable calculators may be used.
7. Show ALL your calculations, including formulae, where applicable and round off the answers to TWO decimal places.
8. 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 number (1.1.1–1.1.10) in your ANSWER BOOK, for e.g. 1.1.11 D.

1.1.1 The rate of photosynthesis in green plants does NOT depend on one of the following:

- A The amount of CO<sub>2</sub> in the atmosphere
- B The amount of sunlight reaching the leaf surface
- C The temperature of the atmosphere
- D The oxidation process to produce new compounds

1.1.2 One of the biological benefits of applying agricultural lime on acidic soils is that ...

- A it helps toxic salts to leach out of the root zone of plants.
- B organic matter is more rapidly decayed and humus is formed.
- C water uptake is accelerated.
- D it increases water retention in the soil.

1.1.3 Some of the characteristics to consider in soil surveying are:

- (i) Soil texture, soil depth and rockiness of the soil
- (ii) Soil depth, the amount of soil erosion, soil texture
- (iii) Soil colour, soil water, soil density
- (iv) Rockiness of soil, soil depth and soil texture

Choose the correct combination:

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

1.1.4 ... is the conversion of a chemical substance from a liquid or solid state to a gaseous or vapour state.

- A Volatilisation
- B Denitrification
- C Immobilisation
- D Ammonification

- 1.1.5 The structure within the receptive stigma that determines the growth direction of the pollen tube is called the ...
- A vegetative nucleus.
  - B generative nucleus.
  - C micropyle.
  - D polar nuclei.
- 1.1.6 The reaction or signs shown by plants towards infections by micro-organisms is referred to as ...
- A microbial modification.
  - B vectors.
  - C symptoms.
  - D mineralisation.
- 1.1.7 The physical or chemical process is used to weaken or soften the seed coat so that germination can start is ...
- A imbibition.
  - B scarification.
  - C oxygenation.
  - D genetic modification.
- 1.1.8 ... refers to the control and production of organisms in the sea, rivers, ponds, lakes and any other fresh water.
- A Hydroponics
  - B Basin cultivation
  - C Greenhouse
  - D Aquaculture
- 1.1.9 The diagram below shows a form of fertiliser application called ...



- A band placement.
- B broadcasting.
- C aerial application.
- D foliar application.

1.1.10 The practice of replanting the same crop species year after year in the same field, with no change to other crops is ...

- A crop rotation.
- B aboriculture.
- C monoculture.
- D viticulture.

(10 x 2) (20)

1.2 Choose a description from COLUMN B that matches a term 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 e.g. 1.2.6 K

COLUMN A	COLUMN B
1.2.1 Drainage	A young shoot for grafting
1.2.2 Hydroponics	B yellowing of young leaves
1.2.3 Compost	C inorganic fertiliser
1.2.4 Scion	D artificial medium e.g. water for crop production
1.2.5 Copper	E excess water removal
	F crops confined to kraals
	G organic fertilisers
	H dieback of root tips
	I a pruned stalk
	J addition of water to the soil

(5 x 2) (10)

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

1.3.1 When organic matter decomposes and is absorbed by micro-organisms, therefore preventing it from being accessible to plants

1.3.2 Chemicals that are generally used for controlling the organisms which affect plants health and production

1.3.3 The changing of the structure or genetic makeup of a gene

1.3.4 The system of irrigation where water is applied slowly and exactly in the form of single drops

1.3.5 A cultivation system when all the remains of the previous crop are either removed or ploughed into the soil

(5 x 2) (10)

- 1.4 Change the underlined word(s) in each of the following statements to make them TRUE. Write only the correct word(s) next to the question number (1.4.1–1.4.5) in the ANSWER BOOK.
- 1.4.1 Five main characteristics to consider in soil mapping are soil texture, soil depth, soil rockiness, amount of soil erosion and slope.
- 1.4.2 The method of sexual reproduction is the separation and division of specialised stems and roots.
- 1.4.3 In plasmolysis there is a movement of molecules from a region of high concentration to a low concentration until it reaches dynamic equilibrium.
- 1.4.4 A plant shows stunted growth, reduced flower, seed and fruit production as well as the appearance of purple colour in older leaves. The plant is deficient of nitrogen.
- 1.4.5 Mixed cropping is the planting of special crops on the field with the sole purpose of ploughing it back into the soil to improve soil fertility. (5 x 1) (5)

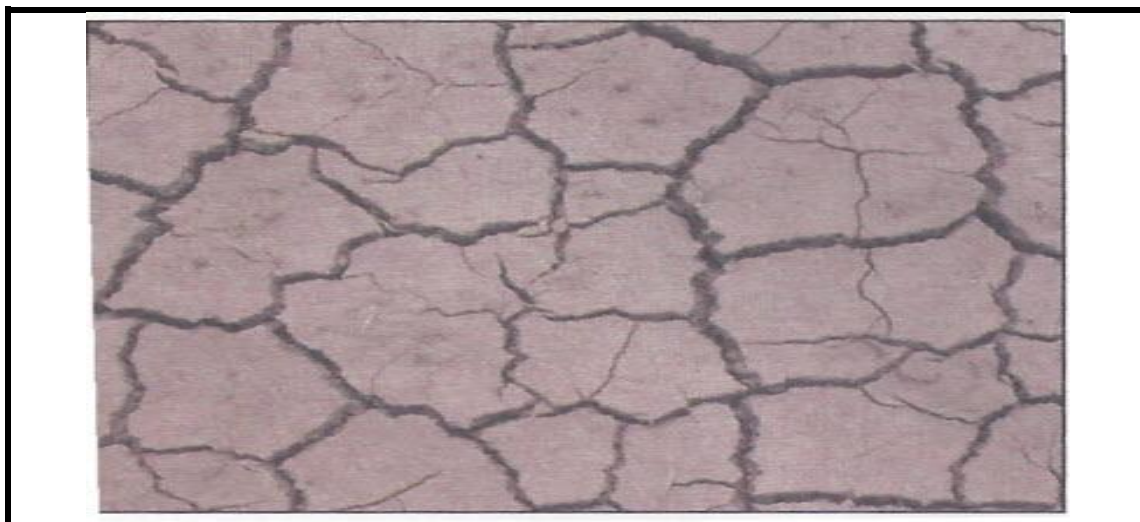
**TOTAL SECTION A: 45**

**SECTION B**

Start this question on a NEW page.

**QUESTION 2: PLANT STUDIES (NUTRITION)**

- 2.1 The sketch below shows the effect of long periods of drought on an arable land in a farming area.



- 2.1.1 Outline THREE impacts of the situation in the sketch in QUESTION 2.1 on plant nutrient uptake. (3)
- 2.1.2 Indicate ONE traditional method that could minimise or prevent the cracks in the soil. (1)
- 2.1.3 Predict TWO effects of the situation in QUESTION 2.1 on soil macro organisms. (2)
- 2.2 Two schematic representations of two chemical processes that take place in plants are indicated as follows:
- (a)  $\text{CO}_2 + \text{H}_2\text{O} + \text{energy sun} \rightarrow \text{carbohydrates} + \text{O}_2$
- (b)  $\text{Carbohydrates} + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O} + \text{chemical energy}$
- 2.2.1 Identify the processes (a) and (b) in QUESTION 2.2. (2)
- 2.2.2 Comment on the differences between the two chemical processes under the following:
- (a) Energy
- (b) Food (4)
- 2.2.3 List TWO storage organs in which excess starch, sugars, lipids or protein are stored in plants. (2)

2.3 A decrease in hydrostatic pressure in the upper parts of the plant, due to the diffusion of water out of stomata into the atmosphere, allows water to travel from the roots to the stem and leaves of plants. The process that enable water to move up a plant from the roots to the stems and leaves involve osmotic flow, root pressure and transpiration pull.

- 2.3.1 Identify TWO pressures in plants that allow water to travel from the roots to the stems and leaves from the scenario above. (2)
- 2.3.2 Differentiate between *osmotic flow* and *transpiration pull* in plants. (4)
- 2.3.3 Mention the part of the plant modified for the diffusion of water into the atmosphere. (1)

2.4 The picture below shows the development of nodules on the roots of soya bean plant (a legume).



- 2.4.1 Name the bacteria responsible for the formation of the root nodules in QUESTION 2.4. (1)
- 2.4.2 Mention the element that is fixed in the root nodules by the bacteria. (1)
- 2.4.3 State the importance of soil micro-organisms in the formation of plant nutrients. Mention TWO factors. (2 x 1) (2)



- 2.5 FIVE trials using different quantities of poultry manure on the yields of tomatoes were done in a school garden. The following data was the result of the trials:

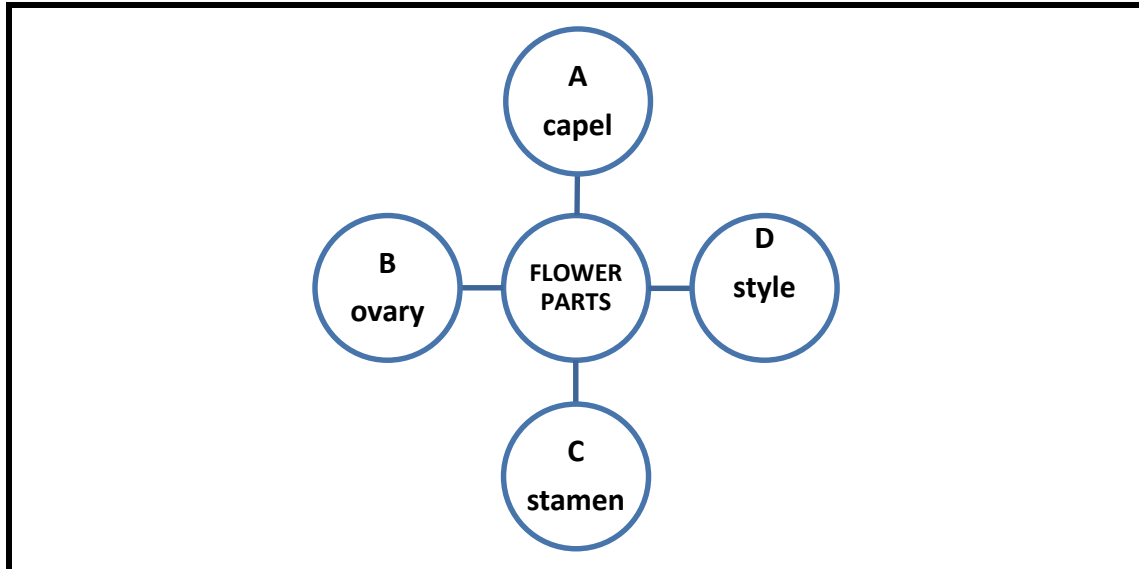
<b>Trials on sunken beds</b>	<b>Tomatoes yield in baskets</b>
Bed A	5
Bed B	30
Bed C	15
Bed D	25
Bed E	20

- Draw the findings of the trials using a line graph and give an appropriate heading to your graph. (5)
- 2.6 Explain the importance of nutrient element analysis in crop production. Mention TWO factors. (2 x 1) (2)
- 2.7 State THREE negative impacts of inorganic fertilisers on the environment. (3)
- [35]**

**QUESTION 3: PLANT REPRODUCTION**

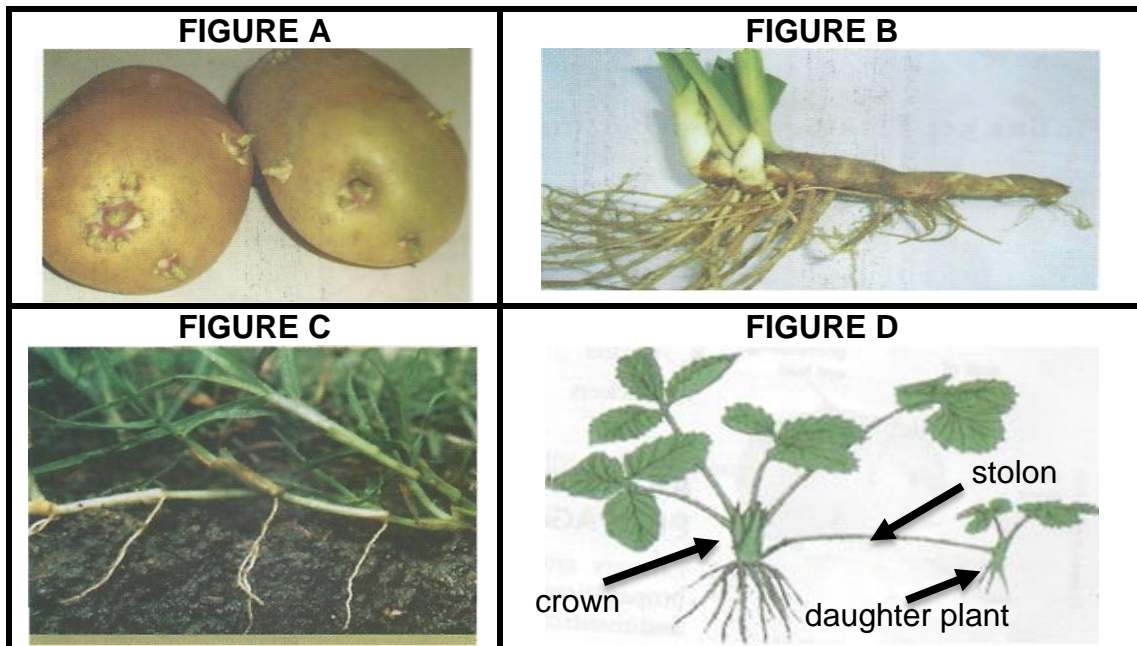
Start this question on a NEW page.

- 3.1 The circles below represent flower parts of a dicotyledonous plant. Match the letters (A to D) to the descriptions in QUESTIONS 3.1.1 to 3.1.4.



- 3.1.1 Male organ of a flower (1)
- 3.1.2 Modified floral leaves which form the pistil (1)
- 3.1.3 A part of the pistil that produces egg cells (1)
- 3.1.4 A tube connecting the stigma to the ovary (1)
- 3.1.5 Define the underlined description in QUESTION 3.1. (2)
- 3.2 Before seeds and fruits are formed, fertilisation should take place. In some cases, double fertilisation takes place. The fertilised flower gives rise to seeds and fruit. The ovule develops into a seed which feeds and protects the young embryo. The ovary itself develops into a fruit. The fruit protects the seed among other functions.
- 3.2.1 Differentiate between *fertilisation* and *double fertilisation*. (4)
- 3.2.2 Deduce ONE function of a fruit from the scenario. (1)
- 3.2.3 State TWO basic requirements for seed germination. (2)

3.3 Different plant parts may be used for vegetative reproduction. Some plant parts are shown in the illustration below:



- 3.3.1 Identify the types of asexual reproduction in FIGURE A, B, C and D above. (4)
- 3.3.2 List TWO disadvantages of using the method in FIGURE A for propagation. (2)
- 3.3.3 Outline the difference between *sexual* and *vegetative reproduction* in plants. (4)
- 3.4 Give a brief description of the following terminologies:
  - 3.4.1 Herbicides (2)
  - 3.4.2 Biotechnology (2)
- 3.5 A genetic modified organism is an organism that has undergone a change in DNA. Genes are transferred from DNA of one organism to the DNA of another organism to produce recombinant DNA. The human manipulations of genes to modify the characteristics of organisms make the modified crops unpopular to some people.
  - 3.5.1 State TWO characteristics of genetic modified crops. (2)
  - 3.5.2 Formulate TWO reasons why genetic modified crops are unpopular in some communities. (2)
- 3.6 Predict TWO conditions that could influence insect damage in stored seeds such as grains. (2)
- 3.7 State TWO harmful effects of weeds on crops. (2)

**QUESTION 4: OPTIMAL RESOURCES**

Start this question on a NEW page.

- 4.1 Soil surveys are the methodical examination, classification and description of soil by the physical examination of a soil profile. They are carried out to determine the suitability of a soil for both agricultural and non-agricultural purposes. Different factors are taken into consideration when doing soil survey. These include the physical, chemical and biological soil factor.

4.1.1 Identify ONE reason why soil surveys are done from the scenario. (1)

4.1.2 Recommend TWO factors a surveyor should consider in carrying out a soil surveying in an area from the scenario. (2)

4.1.3 State TWO benefits of soil survey to a potential farmer. (2)

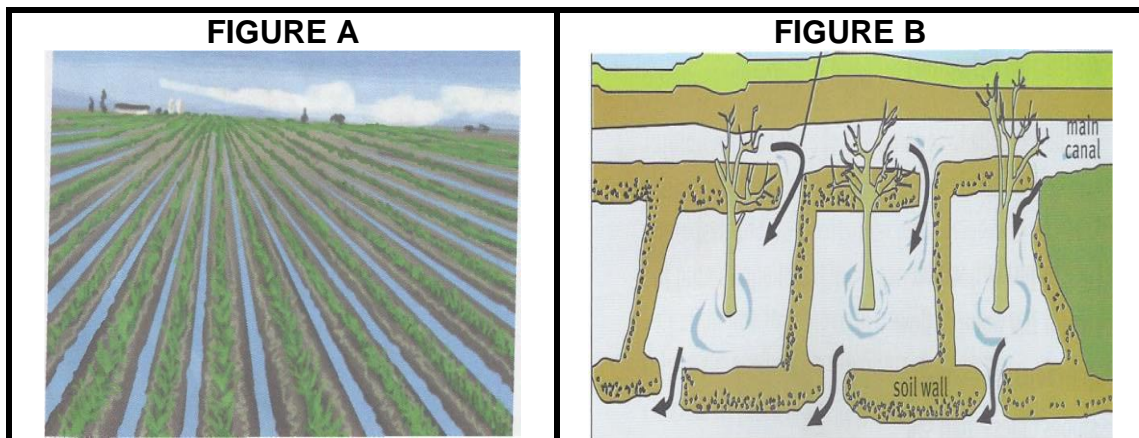
- 4.2 Some Grade 11 learners attended a workshop outside their school. They heard about a modern approach to farming in which satellites and other modern approaches are used to monitor the developments on the farm. Computers are used for records keeping; tractors and other machinery are used in the process of production. The system uses soil surveys to divide a farm into fields and each sub field is used and managed according to its characteristics.

4.2.1 Determine the type of farming practice from the scenario in QUESTION 4.2. (1)

4.2.2 Justify your answer to QUESTION 4.2.1 with ONE reason. (2)

4.2.3 Suggest TWO advantages of the farming practice in QUESTION 4.2. (2)

- 4.3 Two irrigation systems are illustrated below.



4.3.1 Identify the irrigation systems labelled A and B in QUESTION 4.3. (2)

4.3.2 Tabulate TWO disadvantages of the systems in FIGURE A and FIGURE B. (5)

4.4 Soil cultivation is necessary for a range of reasons. It involves both primary and secondary soil cultivation. It allows water and air to penetrate to the deeper soil layers. Regular cultivation assists in weed control, maximum nutrient up-take by crops and destroys harmful insects and nematodes among others. Conventional tillage may be practiced. Light and heavy implements such as rippers and ploughs are used.

4.4.1 List TWO advantages of conventional tillage. (2)

4.4.2 Suggest THREE aims of primary and secondary soil cultivation from the scenario. (3)

4.4.3 Mention ONE traditional way used for primary soil cultivation. (1)

4.5 The structure below represents a farming system that requires a lot of skills and expertise to succeed. Examine the system critically and answer the questions that follow.



4.5.1 Identify the structure in QUESTION 4.5. (1)

4.5.2 State ONE advantage of the system above to future fish farmers. (1)

4.5.3 List TWO basic requirements to achieve high yields of fish in marine fish farming. (2)

4.5.4 Indicate TWO ways why a good location is advantageous to a fish farmer. (2)

4.6 Differentiate between a *hydroponics system* and *open field system* of vegetable production in South Africa. (4)

4.7 List TWO factors (apart from environmental factors) a farmer should consider in locating an area to build a greenhouse. (2)

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





