



Province of the
EASTERN CAPE
EDUCATION

**NATIONAL
SENIOR CERTIFICATE**

GRADE 10

NOVEMBER 2018

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. Read ALL the questions correctly and answer 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 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 number (1.1.1 – 1.1.10) in your ANSWER BOOK, for example 1.1.11 D.

1.1.1 One of the following is a characteristic of primary minerals.

- A Formed through oxidation
- B Formed during the crystallisation of rocks
- C Present in clay particles
- D Formed with free oxygen

1.1.2 Identify the type of feed shown below.



- A Hay
- B Silage
- C Pasture
- D Dried pellets

1.1.3 The building blocks of life are ...

- A cells.
- B tissues.
- C organs.
- D systems.

1.1.4 One of the following is not a feature of topography.

- A Altitude
- B Angle of slope
- C Time
- D Aspect

- 1.1.5 Oval or disc shaped organelle containing carotenoids.
- A Chloroplast
 - B Chlorophyll
 - C Chromoplast
 - D Leucoplast
- 1.1.6 ... is not a control measure for soil degradation.
- A Application of compost
 - B Leaving crop residues on fields
 - C Application of manure
 - D Removal of crop residues from the fields
- 1.1.7 Root vegetables require the following soil conditions:
- (i) Deep, light sandy loam soil
 - (ii) High water table as they cannot tolerate dry conditions
 - (iii) Well-drained soil
 - (iv) Dark coloured clay soil
- Choose the correct combination:
- A (i), (ii) and (iii)
 - B (i), (iii) and (iv)
 - C (i), (ii) and (iv)
 - D (ii), (iii) and (iv)
- 1.1.8 One of the following is not a cultivation property of soil formed from metamorphic rock:
- A Sticky and difficult to cultivate
 - B Suitable for cultivating winter cereals
 - C Soil is acidic
 - D Easily compacted
- 1.1.9 Which of the following is not a sustainable way of using water?
- A Minimum amount of water for irrigation is used
 - B Rainfall water harvesting
 - C Planting crops with broad leaves to increase evapotranspiration
 - D Growing drought tolerant crops
- 1.1.10 ... is an example of a tropical fruit.
- A Banana
 - B Apple
 - C Grapes
 - D Tomato
- (10 x 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	Originally came from Kenya in East Africa and used as a pasture grass	A	Metaphase
1.2.2	The solid shell of the earth	B	Mineral
1.2.3	 King Protea	C	Rye grass
1.2.4	Chromosomes attached to the spindle by centromere line up along the equator	D	Hydrosphere
1.2.5	Solid inorganic substance found in rocks and soil	E	Kikuyu grass
		F	Fynbos flower
		G	Magma
		H	Anaphase
		I	Lithosphere
		J	Deciduous fruit

(5 x 2) (10)

1.3 Give ONE word/term/concept/phrase 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 Amount of water vapour in the atmosphere

1.3.2 Planting of the same crop on the same piece of land season after season

1.3.3 Crops that are used to feed livestock

1.3.4 Movement of air in the soil

1.3.5 Capsules that contain seeds in bean plants

(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 number (1.4.1–1.4.5) in the ANSWER BOOK.

1.4.1 Indigenous plants are not originally from that given area.

1.4.2 Humification is a soil that has a high inorganic content and a low organic content.

1.4.3 The hardening of the soil surface is called soil compaction.

1.4.4 Tissue is a part of the body that performs a particular function.

1.4.5 Acidity is the presence of excess salt in the soil.

(5 x 1) (5)

TOTAL SECTION A: 45

SECTION B**QUESTION 2: SOIL SCIENCES**

Start this question on a new page.

2.1 Soil is made up of a mixture of rock particles, organic matter, minerals, living organisms, air and water. Good agricultural soil should contain all these components in the correct proportions. The size of soil particles and their proportions will in turn determine the texture of a soil.

2.1.1 Identify from the passage above the soil component which is responsible for each of the following:

- (a) Decompose and mix dead plant material with the soil (1)
- (b) Influences the colour of the soil (1)
- (c) Enable respiration of plant roots and soil microbes (1)
- (d) Enables transportation of nutrients and is involved in chemical processes such as photosynthesis (1)

2.1.2 Classify the bacteria found in the roots of legumes that is responsible for transforming atmospheric nitrogen into inorganic compounds usable by plants. (1)

2.1.3 Explain the influence of fine textured soil on the movement of air in the soil. (2)

2.1.4 Describe THREE functions of soil in an ecosystem. (3)

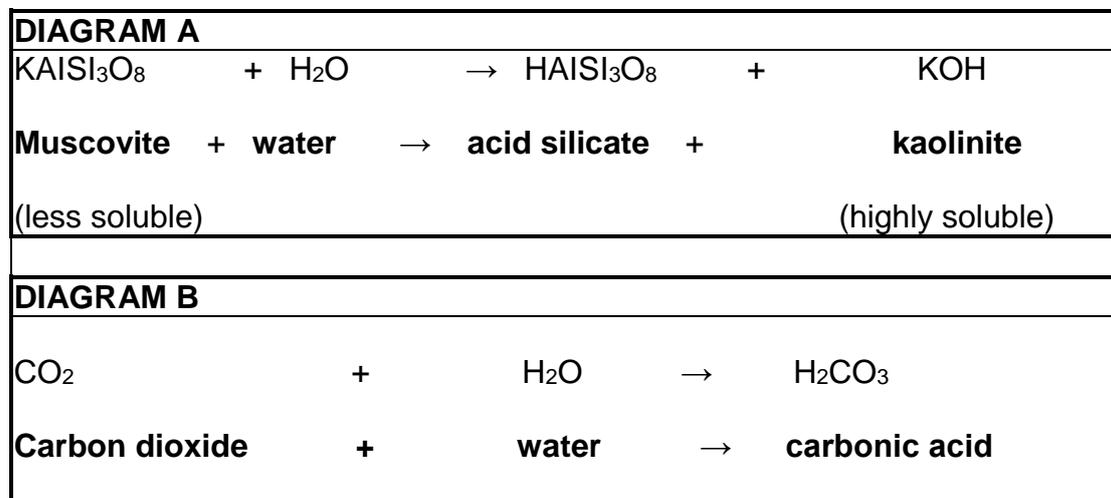
2.2 A geologist conducted a research study on TWO different farms, one located in the North and the other in the Southern part of the region. The following soil characteristics were identified:

FARM A	FARM B
<ul style="list-style-type: none"> • Low soil temperature • Minerals found are softer, finer and have a layered structure • Illite and vermiculite minerals are present in the soil 	<ul style="list-style-type: none"> • High soil temperature • The chemical composition of minerals found in sand, silt and parent rocks are similar • Feldspar and apatite minerals are present in the soil

2.2.1 Classify the minerals found on Farm A as primary or secondary. (1)

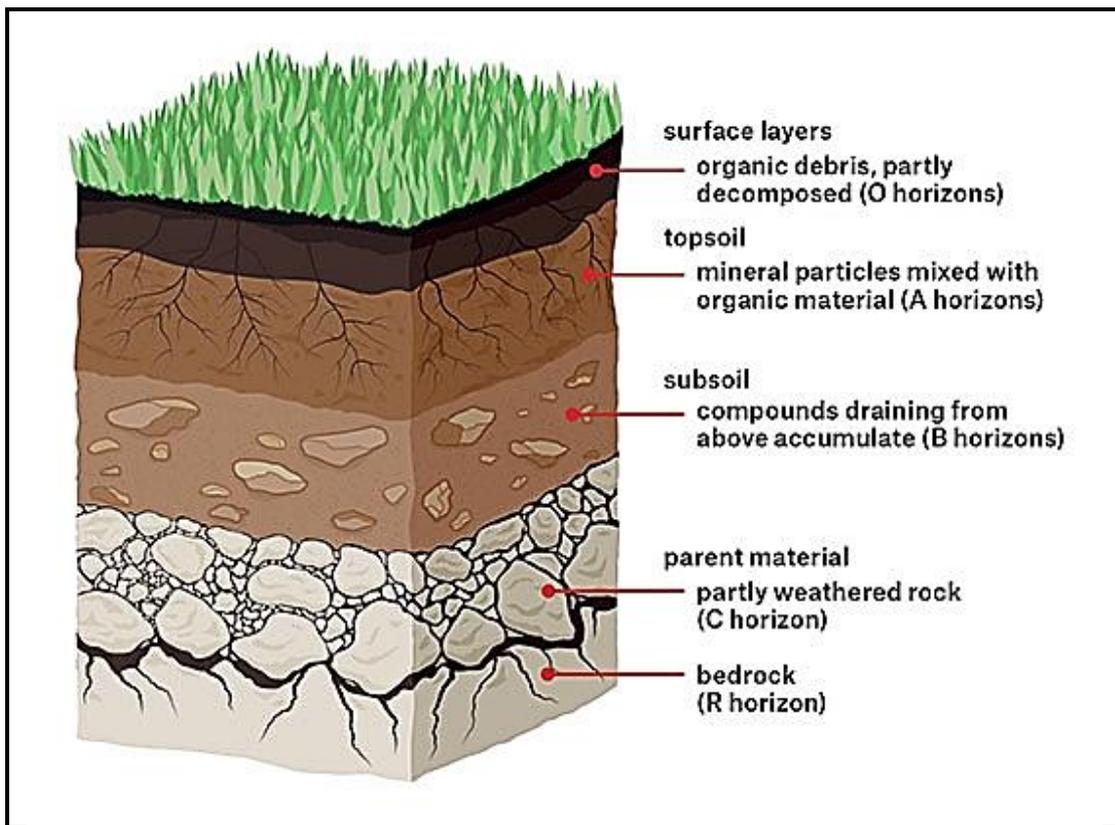
2.2.2 Give any TWO examples of the mineral type mentioned in QUESTION 2.2.1, apart from those in the table. (2)

- 2.2.3 State ONE physical characteristic of the minerals found on farm **B**. (1)
- 2.2.4 According to function, differentiate between *precious minerals* and *soil nutrients*. (2)
- 2.3 Classify the mineral identification characteristic associated with each of the following actions:
- 2.3.1 Scratching a mineral with a glass cutter (1)
- 2.3.2 Hitting and breaking a montmorillonite mineral with a hammer to see the lines along which the mineral will split (1)
- 2.4 Diagrams A and B below show examples of chemical reactions which contribute to rock chemical weathering.



- 2.4.1 Identify the types of chemical weathering shown in each of the diagrams **A** and **B** above. (2)
- 2.4.2 Explain how the chemical reaction in diagram **A** speeds up the process of weathering. (2)
- 2.4.3 Identify the end product of soil microbe respiration from diagram **B**. (1)
- 2.4.4 List THREE classes of igneous rocks. (3)

2.5 The diagram below shows master horizons in soil.



2.5.1 Identify the diagram above. (1)

2.5.2 Motivate your answer to QUESTION 2.5.1. (2)

2.5.3 Identify the horizon from the diagram above where illuviation occurs. (1)

2.5.4 Justify your answer for QUESTION 2.5.3 with ONE reason from the diagram. (1)

2.5.5 Give TWO agents that can cause biological weathering of rocks in the R and C horizons. (2)

2.6 Soil formation can be represented by the equation: $S = f(P,R,CL,O,T)$

Provide LETTERS from the equation that represent the following soil forming factors.

(a) Biology (1)

(b) Geology and mineralogy (1)

[35]

QUESTION 3: PLANT STUDIES

Start this question on a new page.

3.1 The table below shows THREE examples of field crops.

Maize	Sunflower	Sugar cane
		
A	B	C

3.1.1 Classify the crops in the pictures above into industrial, oil or grain crops. (3)

3.1.2 Explain why the crops on the diagram above are classified as field crops. (2)

3.1.3 Maize is one of the most important crops grown in South Africa. Justify this statement with THREE reasons. (3)

3.1.4 Describe any THREE factors that can influence the success of a crop production venture. (3)

3.2 Limpopo is a big province in South Africa. It is a fertile region with tropical and subtropical agriculture taking place in a 20 000 km² area.

The valley of Limpopo yields red apples and grapes. Bananas, avocado pears and citrus fruits are also common crops in the area, with the province producing the majority of the country's mangoes, macadamia nuts, paw-paws, tea and coffee.

The surrounding mountain slopes are heavily forested with pine and Eucalyptus plantations and as a result close to 40 sawmills operate in the area.

3.2.1 Refer to the scenario above and identify the crop which matches with each of the following descriptions:

(a) Originally came from a type of woody vine from an area that is now known as Turkey in Europe (1)

(b) Excellent source of mono-unsaturated fats, lots of protein and potassium (1)

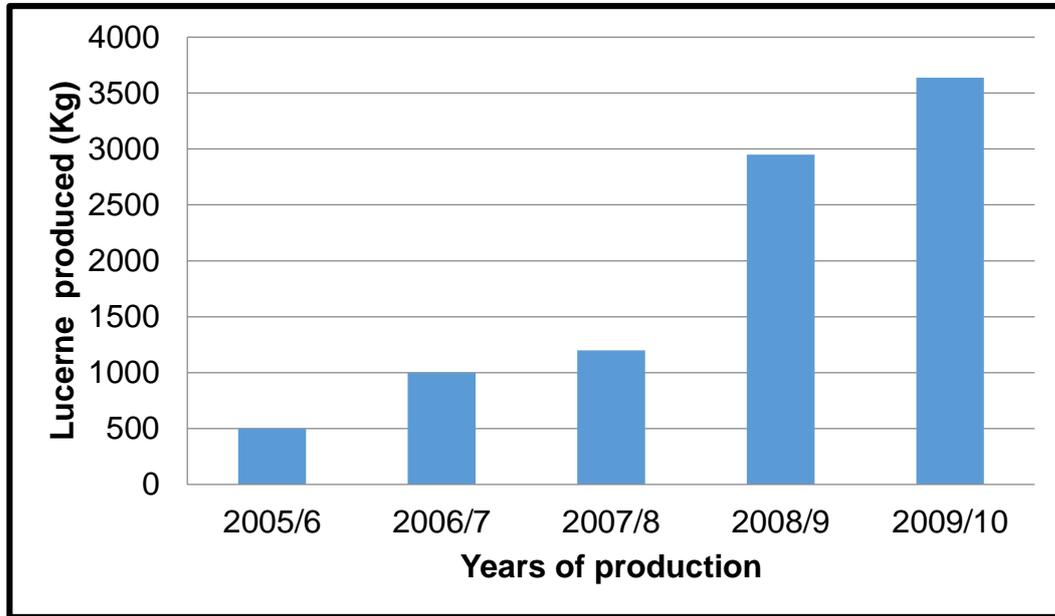
(c) Have a spongy or leathery rind, juicy pulp and divided into sections (1)

(d) Softwood tree with evergreen and needle shaped leaves (1)

3.2.2 Give ONE climatic requirement for the growth of bananas. (1)

3.2.3 Outline TWO vitamins that bananas contain. (2)

3.3 The bar graph below illustrates the quantity of hay produced from lucerne cultivated on 35 hectares of land by a dairy farmer from 2005 to 2010.



3.3.1 Name the nutrient provided by lucerne to dairy cattle. (1)

3.3.2 Present the information in the graph above in the form of a table. (5)

3.3.3 Deduce the trend of lucerne production from 2005 to 2010. (2)

3.3.4 Predict by calculating, the quantity of lucerne that would have been produced in 2006/7 if the farmer had 105 ha of land. (3)

3.4 The management of trees forms part of conservation.

3.4.1 State the legislation that deals with invasive alien plants management in South Africa. (1)

3.4.2 Describe THREE reasons for promoting the growing of protected trees. (3)

3.4.3 Provide TWO examples of protected forest trees in South Africa. (2)

[35]

QUESTION 4: SUSTAINABLE NATURAL RESOURCE UTILISATION AND BIOLOGICAL CONCEPTS

Start this question on a NEW page.

4.1 The picture below shows the consequences of poor soil management.



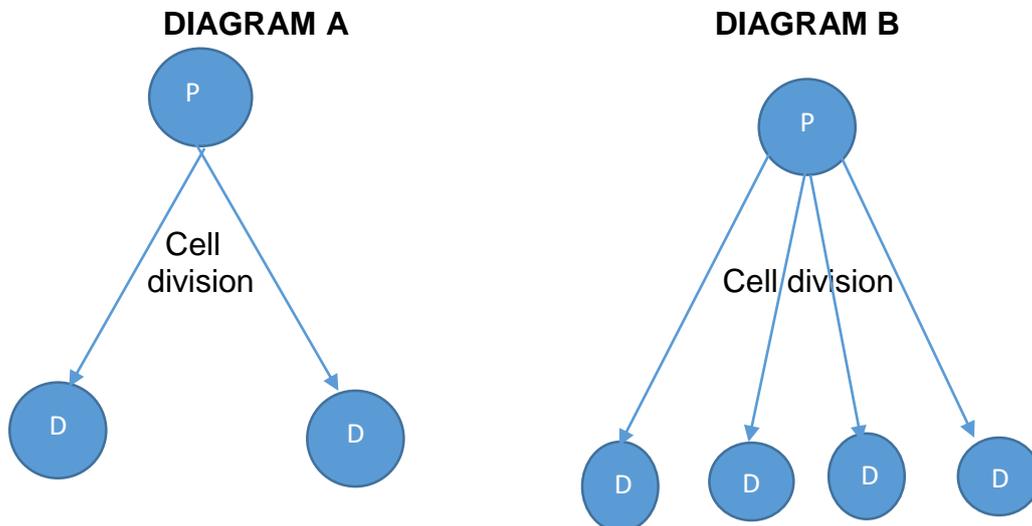
- 4.1.1 Identify the phenomenon displayed in the picture above. (1)
- 4.1.2 Suggest TWO adverse effects of the phenomenon in QUESTION 4.1.1 to the farmer. (2)
- 4.1.3 Give any THREE measures that can be employed by the farmer to prevent the phenomenon. (3)
- 4.1.4 Describe THREE possible causes of the problem displayed in the picture. (3)
- 4.1.5 Supply any THREE negative effects of the incorrect disposal of agricultural waste on soil quality. (3)

4.2 Analyse the diagram below and answer the questions which follow.



- 4.2.1 Identify the source of water in the picture above. (1)
- 4.2.2 Classify energy used to draw water in the diagram above from the ground, as renewable or non-renewable. (1)
- 4.2.3 Describe THREE management and conservation strategies of the National Water Act in South Africa. (3)

4.3 The diagrams below illustrate TWO types of cell division.



KEY:- P – parental cell
D – daughter cells

- 4.3.1 Identify the types of cell division in diagrams **A** and **B**. (2)
- 4.3.2 Justify your answer to QUESTION 4.3.1. (2)

- 4.3.3 What is the name given to cells produced by the type of cell division in diagram **B**? (1)
- 4.3.4 Refer to the diagrams and identify the type of cell division that produces diploid cells. (1)
- 4.3.5 Predict **THREE** consequences to life if there was no meiosis. (3)
- 4.4 The following are components of a plant and animal cells.

nucleus; cytoplasm; cell membrane; mitochondria; ribosomes
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- 4.4.1 Match the cell components above to **EACH** of following functions:
- A Controls the functioning of a cell
 - B Produces proteins for the cell
 - C Controls the substances that enter and leave the cell
 - D Gives the cell its shape
 - E Break down glucose molecules during respiration (5)
- 4.4.2 Differentiate with **ONE** example each, between *multicellular* and *unicellular living organisms*. (4)

[35]

TOTAL SECTION B: 105
GRAND TOTAL: 150