Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE 10

NOVEMBER 2020

AGRICULTURAL SCIENCES P2 (EXEMPLAR)

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 The process whereby rocks break down as a result of physical, chemical and biological processes:

A Sedimentation
B Leaching
C Weathering
D Exfoliation

1.1.2 Soil water found tightly bound to the soil particles and plants cannot absorb it:

A Free water
B Gravitational water
C Hygroscopic water
D Capillary water

1.1.3 Minerals that are formed at low temperatures and pressure through oxidation:

A Tertiary minerals
B Primary minerals
C Secondary minerals
D Precious minerals

1.1.4 Metamorphic rock soils have the following characteristics:

(i) Very fertile
(ii) Poorly drained
(iii) Heavy and difficult to cultivate
(iv) Well aerated

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 An example of grain fields that are mostly grown by commercial and small-scale producers in South Africa:

A Wheat
B Sunflower
C Maize
D Sorghum

1.1.6 … is a fodder crop that is mainly given to farm animals because it has more proteins.

A Lucerne
B Kikuyu
C Fescue
D Rye grass

1.1.7 Wheat is a crop that grows well in … environments.

A hot
B humid
C cool
D dry

1.1.8 … trees are evergreen trees such as pines and firs with needle-like leaves.

A Soft wood
B Invasive
C Lead wood
D Hard wood

1.1.9 The following farming practices cause soil erosion:

(i) Rotational grazing
(ii) Monoculture
(iii) Marginal cultivation
(iv) Overgrazing

Choose the correct combination:

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

1.1.10 The phase of mitosis where the cytoplasm divides to form two new cells:

A Anaphase
B Telophase
C Metaphase
D Prophase

(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–I) next to the question numbers (1.2.1–1.2.5) in the ANSWER BOOK, for example 1.2.6 J.

COLUMN A		COLUMN B	
1.2.1	Water is absorbed between the plates of clay colloids making it softer and easier to weather	A	Horticulture
1.2.2	A good example of a primary mineral	B	Biotite
1.2.3	The science and art of growing fruit, vegetables, shrubs trees and flowers	C	Hydrolysis
1.2.4	Crops grown to be used mainly to feed domesticated livestock	D	Illite
1.2.5	A condition where the soil pH is generally less than 4,5	E	Hydration
		F	Aquaculture
		G	Acidification
		H	Fodder
		I	Salinisation

(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 The accumulation of materials leached from upper horizons

1.3.2 Plant species that cause a significant loss of indigenous flora and fauna

1.3.3 The sudden surge in nutrients in the receiving of water bodies result in the growth of algal bloom

1.3.4 A large circular body found in the cytoplasm which contains genetic information

1.3.5 The cell division process that results in formation of four haploid daughter cells (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 Podzolisation is the mixing of sediments by burrowing organisms.

1.4.2 Apples are fruit crops that are mainly used in wine production.

1.4.3 Chemical degradation of soil takes place when the soil structure is destroyed.

1.4.4 Karyokinesis is where the cytoplasm containing all the organelles divides into two cells.

1.4.5 A gamate is a genetic unit which contains specific characteristics that are inherited from parents.

(5 x 1) (5)

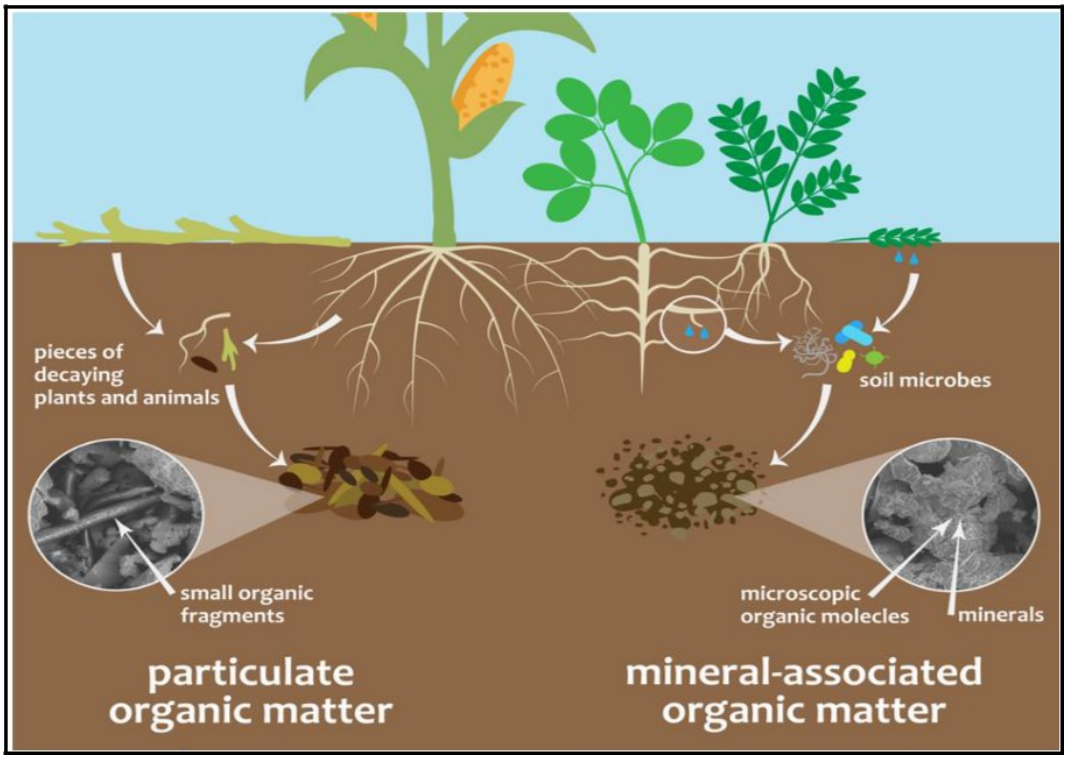
TOTAL SECTION A: 45

SECTION B

QUESTION 2: SOIL SCIENCES

Start this question on a NEW page.

2.1 The picture below shows the relationship between soil, plant and animals.



2.1.1 Describe TWO ways in which soil benefit from plants. (2)

2.1.2 State TWO functions of soil to plants. (2)

2.1.3 Explain TWO ways in which animals benefit from soil. (2)

2.1.4 Identify the soil component and the percentage that consists of living, and non-living animals and plant materials. (2)

2.2 The table below shows examples of minerals in two groups.

GROUP A	GROUP B
Quarts	Kaolinite (candites)
Mica (Muscovite)	Montmorillonite
Calcite	Vermiculite

2.2.1 Identify the class of minerals in group **A** and those in group **B** from the table above. (2)

2.2.2 Explain how minerals in group **B** are formed. (1)

2.2.3 Give TWO characteristics that minerals are mainly responsible for in soil. (2)

2.2.4 State ONE example of each of the following:

(a) Precious stones (1)

(b) Mineral ores (1)

2.2.5 Provide TWO main characteristics used by geologists in identifying minerals. (2)

2.3 The table below shows THREE different types of rocks:

sedimentary rock; igneous rock; metamorphic rock

2.3.1 Indicate the type of rock from the table above that is applicable to each of the following statements:

(a) Formed from layers of rocks and organic matter that settles under forces of gravity (1)

(b) Formed when volcanoes erupt (1)

(c) Examples include basalt and granite (1)

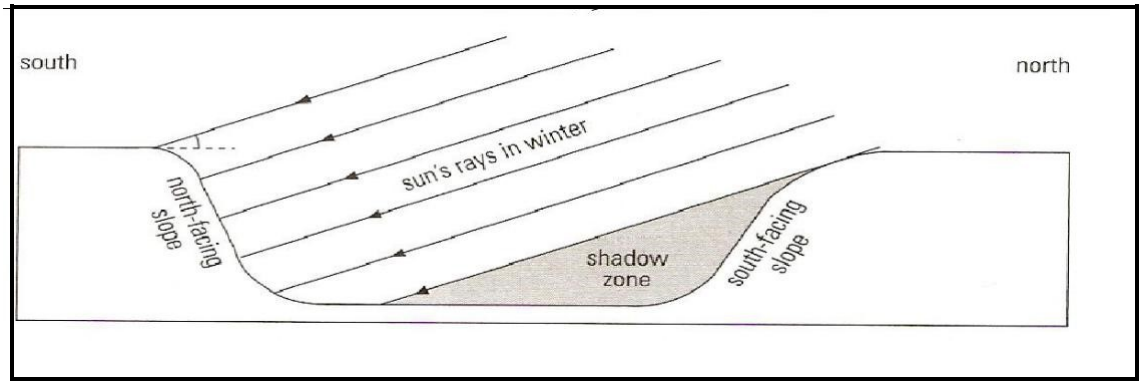
(d) Soil formed from this rock is not deep because it is easily compacted (1)

2.4 Weathering of rocks is when rocks are broken down into smaller pieces.

2.4.1 State TWO reasons for the importance of weathering of rocks. (2)

2.4.2 Differentiate between *hydrolysis* and *carbonation.* (2)

2.5 Study the diagram of a topographical factor below and answer the questions that follow.



2.5.1 Identify the slope that will be warmest. (1)

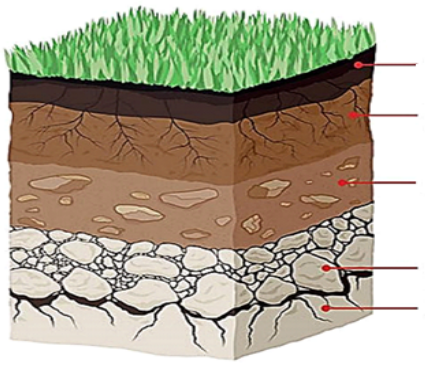
2.5.2 Motivate your answer in QUESTION 2.5.1. (1)

2.5.3 Name the topographical factor that is illustrated by the diagram above. (1)

2.5.4 Explain how the topographical factor named in QUESTION 2.5.3 affect soil formation on the north facing slope. (2)

2.5.5 Mention any TWO climatic factors that affects soil formation. (2)

2.6 The picture below shows one of the soil forming processes.



2.6.1 Identify the horizon where the following processes takes place:

(a) Eluviation (1)

(b) Illuviation (1)

2.6.2 Explain the effect of leaching of nutrients to agricultural production. (1)

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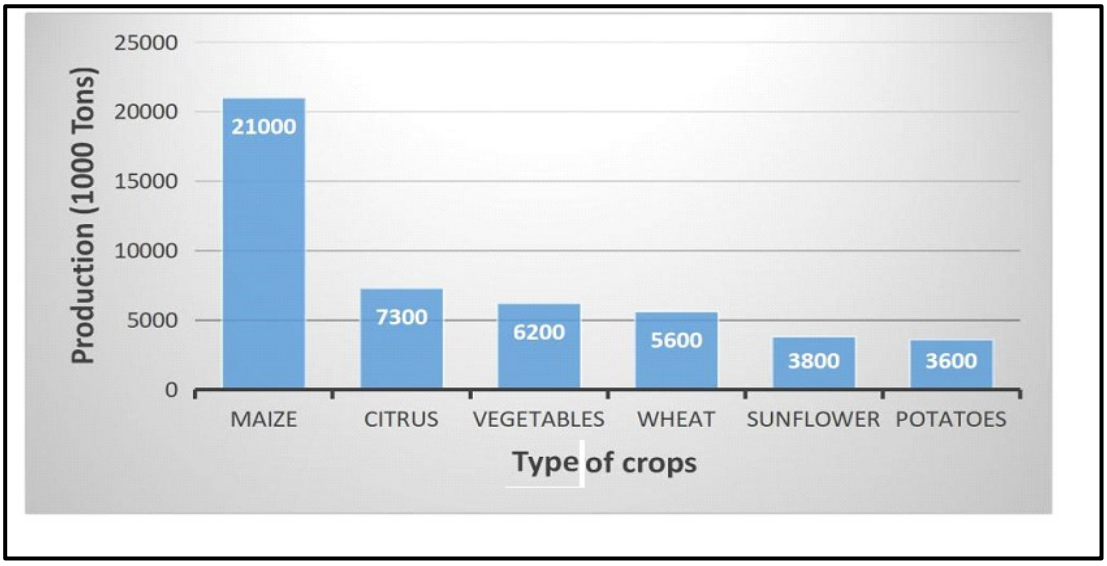
QUESTION 3: PLANT STUDIES

Start this question on a NEW page.

3.1 The graph below shows the production volumes of some field and horticultural crops produced in 2008.



3.1.1 From the above graph identify the following:

(a) Field crop with the highest demand in the bakery industry (1)

(b) The field crop that is the main staple food in South Africa (1)

3.1.2 Analyse the above graph and calculate the total production volumes for all horticultural crops. Show ALL your calculations. (2)

3.1.3 State TWO basic soil requirements for growing of potatoes. (2)

3.1.4 Translate the information of the field crops from the above graph into a table format. (5)

3.1.5 Explain THREE ways in which crops contribute to the economy of South Africa. (3)

3.2 An industrial crop is a crop that is grown to sell rather than to be consumed by the producer.

3.2.1 Identify any TWO main industrial crops grown in South Africa. (2)

3.2.2 Provide the end product of each of the industrial crops identified in QUESTION 3.3.1. (2)

3.2.3 State ONE use of fodder crops and give ONE example of a legume fodder crop. (2)

3.2.4 Describe TWO reasons for promoting the growing of protected trees. (2)

3.3 The table below shows different classes of vegetables and their examples.

A 	**B** 
C 	**D** 

3.3.1 Classify the vegetables represented by **A, B, C** and **D** in the above table into their agronomic characteristics. (4)

3.3.2 Mention the textural class of soil that is best suited for growing the crop represented in **D**. (1)

3.3.3 Classify apples and bananas as tropical, subtropical or deciduous fruit crops. (2)

3.3.4 State the production area where apples are mainly grown in South Africa. (1)

3.3.5 Give any TWO uses of grapes. (2)

3.3.6 State ONE climatic condition favourable for production of grapes. (1)

3.3.7 Give TWO importance of growing protea flowers. (2)

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QUESTION 4: SUSTAINABLE USE OF NATURAL RESOURCES AND BIOLOGICAL CONCEPTS

Start this question on a NEW page.

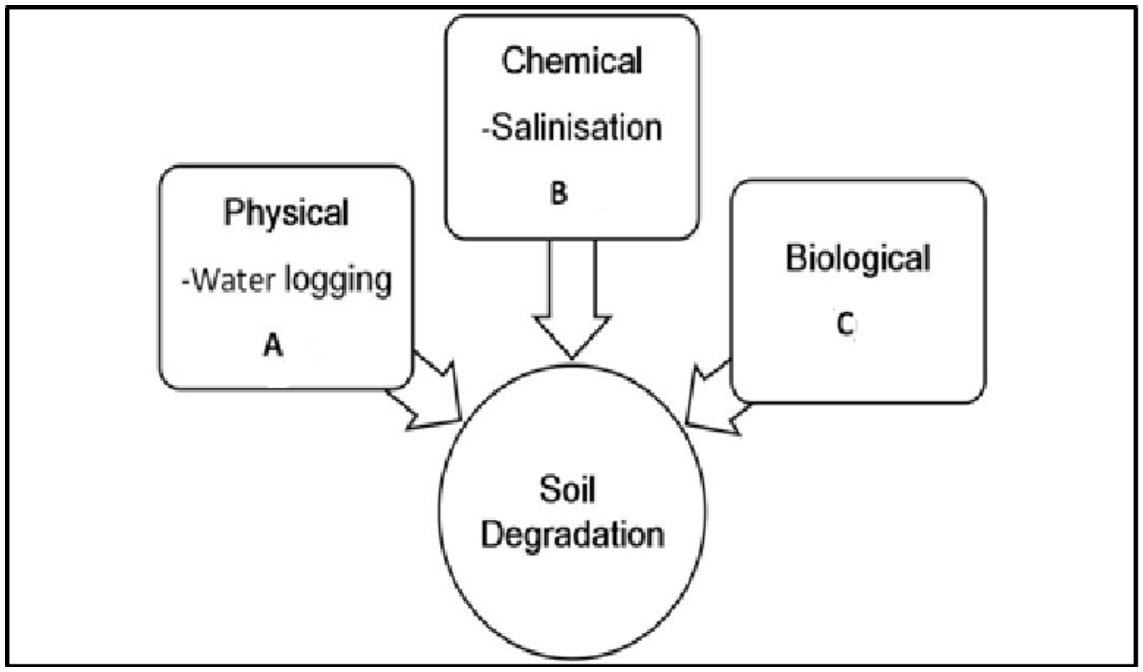
4.1 Agricultural resources are all inputs that are necessary for agricultural production.

4.1.1 Explain the difference between *primary* and *secondary resources* and give ONE examples for each. (4)

4.1.2 Explain why soil is classified as a non-renewable resource. (1)

4.1.3 Suggest THREE ways in which farmers can utilize water in a sustainable way. (3)

4.2 Analyse the diagram below showing three main types of soil degradation.



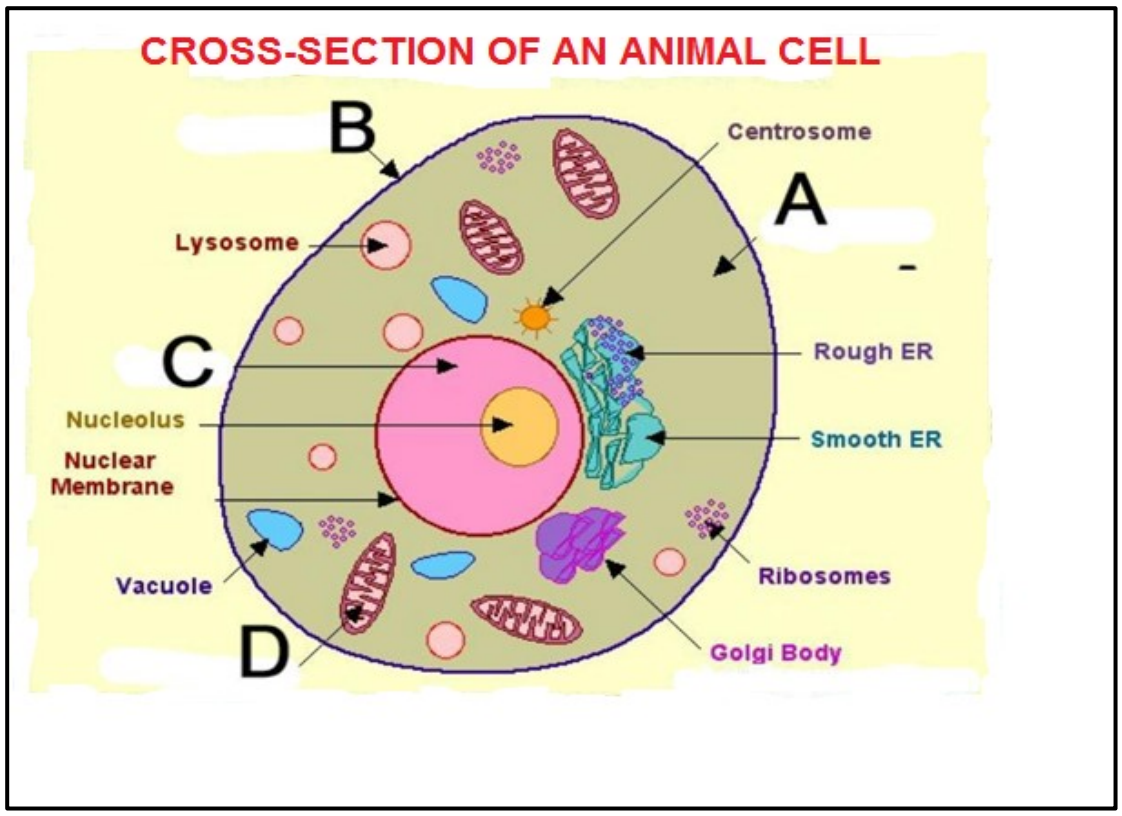
4.2.1 Identify other examples of soil degradation represented by letters **A**, **B** and **C** in the diagram above. (3)

4.2.2 Give TWO agricultural practices that causes soil degradation in agricultural land. (2)

4.2.3 Recommend TWO control measures that can be implemented to reduce surface run-off in arable lands. (2)

4.2.4 Outline TWO main issues addressed by the National Water Act of South Africa. (2)

4.3 The diagram below shows the basic structure of an animal cell.



4.3.1 Identify the organelle labelled **A, B** and **C** from the above diagram. (3)

4.3.2 Write the name of the structure where the following takes place:

(a) Breaks down glucose during the process of respiration (1)

(b) Holds the cell together and gives it shape (1)

4.3.3 Tabulate TWO main differences between *animal cell* and *plant cell*. (4)

4.3.4 Explain with an example what animal specialised cells are. (2)

4.4 Cell division is a process by which a single cell divides to form new cells called daughter cells.

4.4.1 Identify the type of cell division that is explained by the following

(a) Formation of haploid daughter cells (1)

(b) Division that forms diploid daughter cells (1)

4.4.2 State TWO importance of the cell division that forms diploid daughter cells. (2)

4.4.3 Describe what happens in Metaphase I stage in cell dividing to form haploid cells. (2)

4.4.4 Identify a section of a DNA molecule that contains information of a specific genetic characteristic. (1)

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TOTAL SECTION B: 105
GRAND TOTAL: 150