education

Department:
Education
North West Provincial Government
REPUBLIC OF SOUTH AFRICA

PROVINCIAL ASSESSMENT

GRADE 10

AGRICULTURAL SCIENCES P2
NOVEMBER 2024

MARKS: 150

TIME: 2 ½ hours

This question paper consists of 15 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. Start EACH question on a NEW page.
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 answer and write only the letter (A–D) next to the question numbers (1.1.1 to 1.1.10) in the ANSWER BOOK, e.g. 1.1.11 B.

1.1.1 The vertical layers that can be observed on a soil profile are called:

A Soil forming processes
B Soil horizons
C Soil components
D Soil crusts

1.1.2 The minerals listed below are examples of primary minerals except:

A Calcite
B Goethite
C Muscovite
D Quartz

1.1.3 The mineral that is very hard and forms sand fraction when it weathers:

A Mica
B Apatite
C Feldspar
D Quartz

1.1.4 The cereal crop that is used by millers to produce cake flour:

A Barley
B Oats
C Wheat
D Rye

1.1.5 Lucerne has the following characteristics:

(i) It is a protein rich legume fodder
(ii) Primarily cultivated for hay and can be grown in various climates
(iii) Fodder crop that provides bulk, carbohydrates and roughage
(iv) It may cause bloating when animals graze it as pasture

Choose the CORRECT combination

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

1.1.6 Carrots can be classified as:

A Fodder crop
B Root vegetable
C Forest crop
D Leaf vegetable

1.1.7 An example of a non-renewable resource in agriculture is:

A Sunlight
B Soil
C Air
D Water

1.1.8 … are groups of cells with similar structures and functions.

A. Tissues
B Organs
C Systems
D Cell nutrients

1.1.9 A farming practice that prevents the risk of soil erosion is:

A Overgrazing
B Over cultivation
C Contour cultivation
D Veld fires

1.1.10 … is a Secondary resource.

A Air
B Soil
C Computer
D Water (10 x 2) (20)

1.2 Choose a description from COLUMN B that matches a term/phrase in COLUMN A. Write only the letter (A–H) next to the question numbers (1.2.1 to 1.2.5) in the ANSWER BOOK, eg 1.2.6 I

COLUMN A		COLUMN B
1.2.1	The example of igneous rock	A. Climate
1.2.2	Soil forming factors associated with water, humidity and wind	B. Soil
1.2.3	A crop that can improve nitrogen content of the soil	C. Granite
1.2.4	An example of primary agricultural resources	D. Limestone
1.2.5	Sustainable use of water	E. Peanuts
		F. Growing drought resistant crops
		G. Buildings
		H. Tractors

(5 x 2) (10)

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

1.3.1 A way of farming that does not deplete resources

1.3.2 A resource that comes from the environment such as water or soil

1.3.3 The rocks that are formed when igneous or sedimentary rocks are placed under high pressure and intense heat

1.3.4 Minerals that occur in nature and are still under original form

1.3.5 Plants that were introduced from other countries (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 numbers (1.4.1 to 1.4.5) in the ANSWER BOOK.

1.4.1 Carbonation is a physical weathering process.

1.4.2 The A-horizon is made up of mainly organic matter, fresh at the top and decomposing lower down.

1.4.3 Tissues are the building blocks of life.

1.4.4 Sorghum is an industrial crop.

1.4.5 Vegetables, fruits, flowers and shrubs are classified as forest crops.

(5 x 1) (5)

TOTAL SECTION A: 45

SECTION B

QUESTION 2: SUSTAINABLE NATURAL RESOURCE UTILISATION

Start this question on a NEW page.

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

2.1.1 Identify the type of soil degradation shown in the picture above. (1)

2.1.2 Depict the example of soil degradation identified in QUESTION 2.1.1. (2)

2.1.3 Suggest THREE adverse effects of the example of soil degradation in QUESTION 2.1.2 to the farmer. (3)

2.1.4 Describe TWO possible causes of the problem displayed in the picture above. (2)

2.2 Analyze the pictures below that show different agricultural resources used in farming and answer the questions that follow.

2.2.1 Identify the type of agricultural resources displayed in pictures **A, B,** and **C**, and provide a specific name for each resource. (6)

2.2.2 Classify whether the agricultural resource in picture **A** is renewable or non-renewable resource. (2)

2.2.3 Justify your answer in QUESTION 2.2.2. (1)

2.3. Read the following case study and answer questions that follow.

Low-cost bio-gas digesters bring big advantages to farmers in developing countries.

Bio-gas digesters have been widely used for many years in developing countries, such as India and China, where firewood for cooking has become scarce.

Farm waste such as animal dung or abattoir waste, is stored in specially built containers where it is digested. Bio-gas digester systems can use manure as a liquid, slurry or semi-solid depending on the reactor design. Bio-gas digesters take biodegradable feedstock, and turn it into two useful products: gas for lighting and cooking and digestate which can be used as a fertilizer.

Source: Focus on Agricultural Sciences Grade 10

2.3.1 Define the term biodegradable feedstock (2)

2.3.2 Mention TWO countries where bio-gas digesters have been widely used from the case study. (2)

2.3.3 Explain the meaning of the term scarce. (2)

2.3.4 Name THREE ingredients of the bio-gas digester mentioned in the case study. (3)

2.3.5 Provide the name of the gas produced in the bio-gas digester. (1)

2.3.6 Recommend any THREE agricultural waste management techniques other than the biogas digester technology. (3)

2.4 The table below shows information about agricultural water pollution and the ways in which a stream in Soshanguve, near Pretoria is polluted.

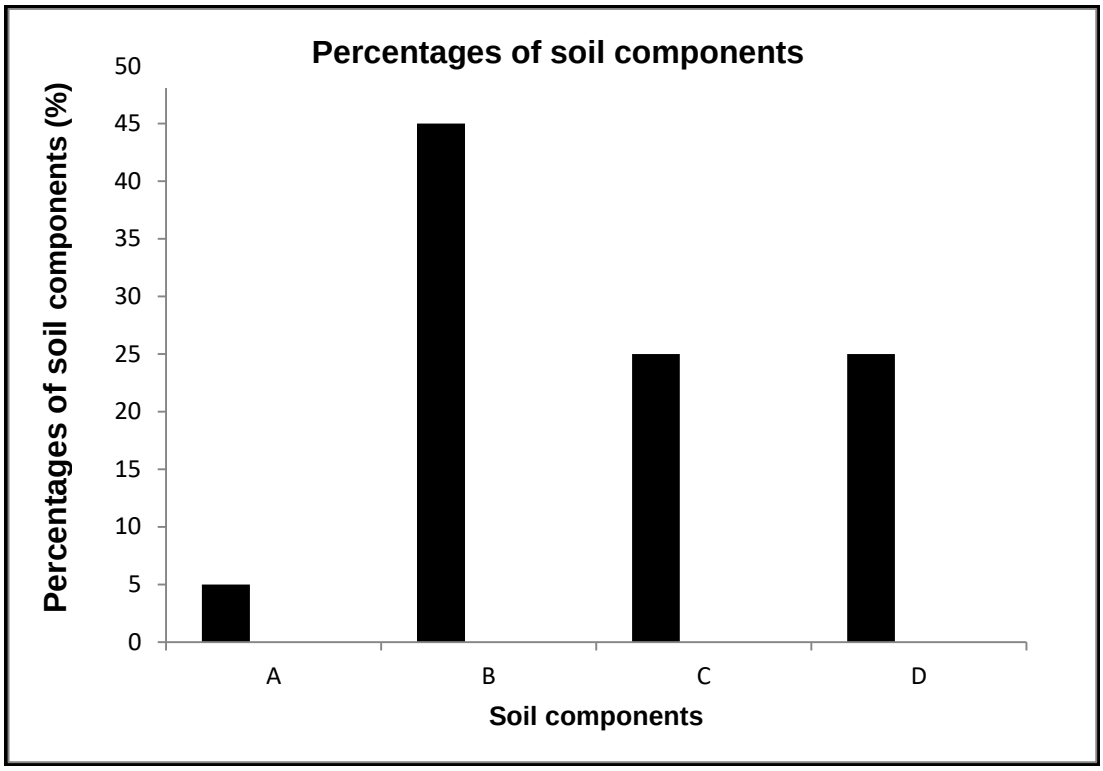
TYPES OF POLLUTANTS	PERCENTAGE OF WATER POLLUTED (%)
Pesticides	15
Fertiliser runoff	60
Sediments	10
Household	30

Use the information in the table above to draw a bar graph of the percentages of water polluted and the types of pollutants. (6)
[35]

QUESTION 3: SOIL SCIENCES

Start this question on a NEW page.

3.1 Study the bar graph about the soil components below and answer the questions that follow.



3.1.1 Draw a table and write down the names of the soil components **A-D.** (4)

3.1.2 Provide THREE functions of the soil component labelled **B** on the bar graph above. (3)

3.1.3 Calculate the total percentages of the soil components **A, B, C** and **D.** (2)

3.2 Study the table below of **FARM A** and **FARM B.**

FARM A	FARM B
• Kaolinite, montmorillonite and haematite minerals are present	• Quartz, mica, and calcite are present in the soil.
• Minerals are softer, fine and have a layered structure	• Minerals are coarse and very hard

3.2.1 Classify the minerals on North farm and South farm as primary and secondary mineral. (2)

3.2.2 Distinguish between primary and secondary minerals under the headings: *temperature* and *pressure*. (2)

3.3 The main characteristics used to identify mineral are listed below:

- Purity
- Moh's scale
- Streak
- Cleavage
- Lustre

Match these characteristics with the descriptions below:

(a) The lines along which a mineral can split (1)

(b) The unit for measuring the hardness or softness of a mineral (1)

(c) A particular type of mineral may exhibit a number of different colours (1)

(d) The mark left behind on an unpolished surface when a mineral is drawn Hard against the surface (1)

(e) Refer to how shiny a material is in light. (1)

3.4 The equations **A** and **B** below show examples of reactions which contribute to rock chemical weathering.

EQUATION A
KAISI_3O_8 + H_2O → HAISI_3O_8 + KOH
Muscovite + water → acid silicate + Kaolinite
EQUATION B
CO_2 + H_2O → H_2CO_3
Carbon dioxide + water → Acid C

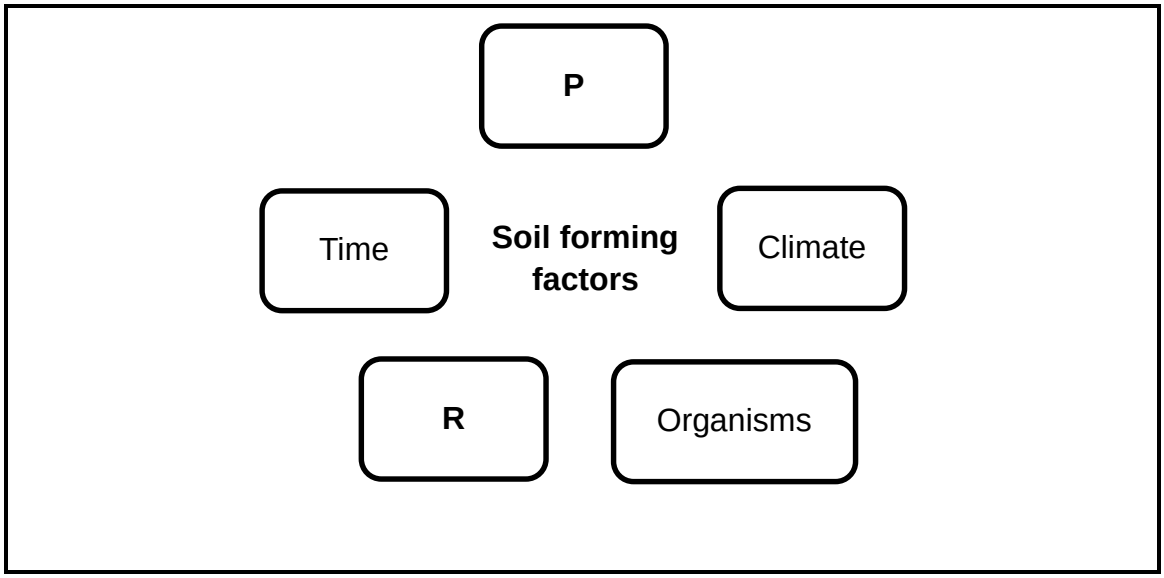
3.4.1 Define the term chemical weathering. (2)

3.4.2 Name the type of chemical weathering represented by the equation **B.** (1)

3.4.3 Indicate the name of acid **C.** (1)

3.4.4 Describe in detail how the type of chemical weathering in equation **A** leads to weathering of rocks. (2)

3.5 Study the diagram below that show the various soil forming factors and answer the questions that follow.



3.5.1 Identify the soil forming factors represented by **P** and **R.** (2)

3.5.2 Supply any ONE feature of the soil forming factor labelled **R** in the diagram above. (1)

3.5.3 State any ONE human impact that has a direct impact on soil formation. (1)

3.5.4 There are THREE types of rocks namely igneous, sedimentary and metamorphic.
Match and select the rock type that bests suit the descriptions below:

(a) Rocks are formed from layers of rocks and organic matter, called sediment. (1)

(b) Rocks are formed when volcanoes erupt. (1)

(c) Rocks have undergone structural, material and chemical change caused by high temperatures and pressure. (1)

3.6 The following is a list of different types of igneous, sedimentary and sedimentary rocks: basalt, feldspar and shale.

3.6.1 Classify these rocks as igneous, sedimentary and metamorphic rocks. (3)

3.6.2 Describe ONE characteristic associated with soils from metamorphic rocks that makes them unsuitable for root crop cultivation. (1)

[35]

QUESTION 4: PLANT STUDIES

Start this question on a NEW page.

4.1 The pictures below show different crops grown in South Africa

A

B

4.1.1 Provide the name for plant labelled **A** in the picture above. (1)

4.1.2 Justify with a reason why crop **A** is considered as one of the most important crops in South Africa. (1)

4.1.3 Give any ONE province in South Africa known for producing the crop named in QUESTION 4.1.1. (1)

4.1.4 The plant in picture **B** is an invasive species and falls under category 1 invaders (declared weeds).

(a) Define the term invasive species. (2)

(b) Suggest a reason why the plant is a declared weed. (1)

(c) Give the name of the Act in South Africa under which the plant in picture **B** is classified. (1)

4.2 Forest crops are crops grown for their wood. Forest crops in South Africa can be natural forests of indigenous trees or plantations of exotic trees.

4.2.1 Provide names for any TWO exotic plants. (2)

4.2.2 Give TWO points of importance of natural forests in South Africa. (2)

4.3 Read the case study below and answer the questions that follow.

Amaranthus- an African Vegetable

South Africa rural communities often use vegetables, such as Morogo (Amaranthus), in their diet. Indigenous vegetables have the advantage that they are suited to South African climate and soil conditions. They can tolerate high temperatures. The leaves are used in the same way as spinach and may be eaten raw or cooked. Scientific analysis has shown that these plants are excellent in terms of nutritional value. They contain up to 30% protein which is very high. It is important that we preserve this resource for future generations. It could be cultivated in rural areas and could help to reduce malnutrition in children.

Source: Focus on Agricultural Sciences grade 10

4.3.1 Identify the group of vegetables Morogo belongs to? (1)

4.3.2 Name the edible part of Morogo. (1)

4.3.3 Supply one KEY property that makes Morogo easier to grow than spinach in parts of South Africa. (1)

4.3.4 Explain the importance of Morogo for people and children in rural communities. (1)

4.3.5 Indicate the soil type(s) best suited to the growth of vegetables. (1)

4.3.6 Provide the temperature range for optimum growth of vegetables. (1)

4.4 The table below illustrates the quantity of oranges produced on 40 hectares of land by a farmer in Limpopo from 2019 to 2023.

YEARS OF PRODUCTION	QUANTITY OF ORANGES PRODUCED (KG)
2019	500
2020	1000
2021	1300
2022	2900
2023	3600

4.4.1 Describe the economic importance of oranges. (2)

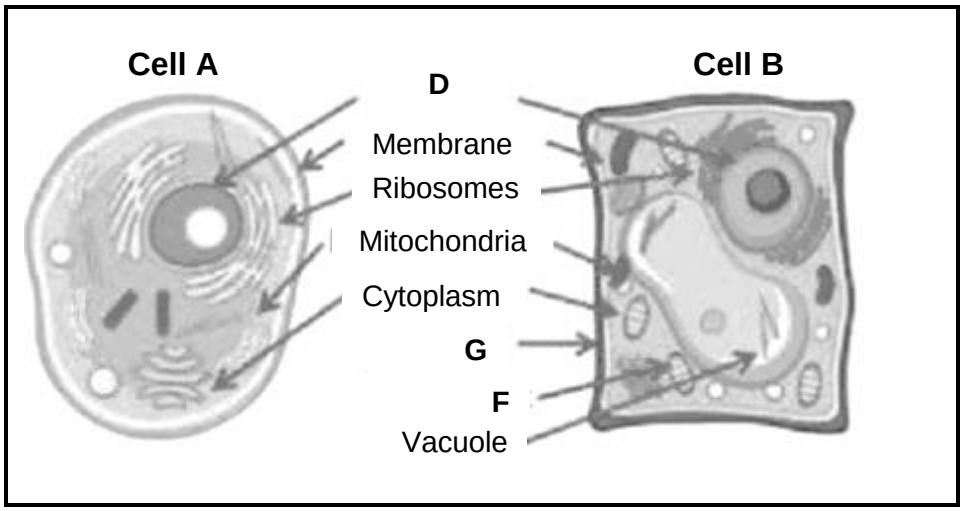
4.4.2 Deduce the trend of orange production from 2019 to 2023. (2)

4.4.3 Predict by performing a calculation, on the quantity of oranges that would have been produced in 2021 if 60 hectares of land were used. (2)

4.4.4 Calculate the average quantity of oranges in kilograms produced annually from 2019 to 2023. (1)

4.4.5 Tabulate the differences between avocado and orange in terms of the temperature range for optimum growth. (2)

4.5 Analyze the diagrams below that shows two types of cells and answer the questions that follow.

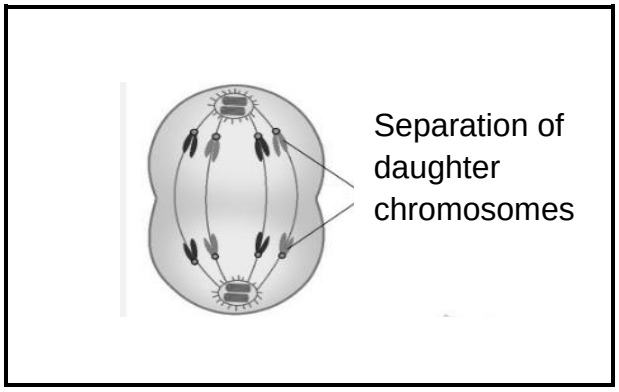


4.5.1 Identify structure (**A or B**) represents a plant cell? (1)

4.5.2 Give ONE visible reason to support your answer in QUESTION 4.5.1. (1)

4.5.3 Name the type of nucleic acid found in part labelled **D.** (1)

4.6 Study the phase of mitosis shown below.



4.6.1 Identify the phase of mitosis illustrated above. (1)

4.6.2 Supply ONE visible reason to support your answer. (1)

4.6.3 Arrange the phases of mitosis that come before the one illustrated in QUESTION 4.6.1 in ascending order. (2)

[35]

TOTAL SECTION B: 105
GRAND TOTAL: 150