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GRADE 10

NOVEMBER 2017

AGRICULTURAL SCIENCES P2

MARKS: 150

TIME: $2\frac{1}{2}$ 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. A non-programmable calculator may be used.
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 Vertical layers of soil visible on a soil profile are called...

- A soil crusts.
- B soil components.
- C oil horizons.
- D soil forming processes.

1.1.2 Which ONE of the following fruits is an example of a tropical fruit?

- A Banana
- B Lemon
- C Apples
- D Grapes

1.1.3 ... is a control measure for water logging.

- A Cultivation of wetlands
- B Use of heavy machinery
- C Installation of drainage systems
- D Over irrigation

1.1.4 ... are groups of cells with similar structures and functions.

- A Tissues
- B Organs
- C Systems
- D Cells Nutrients

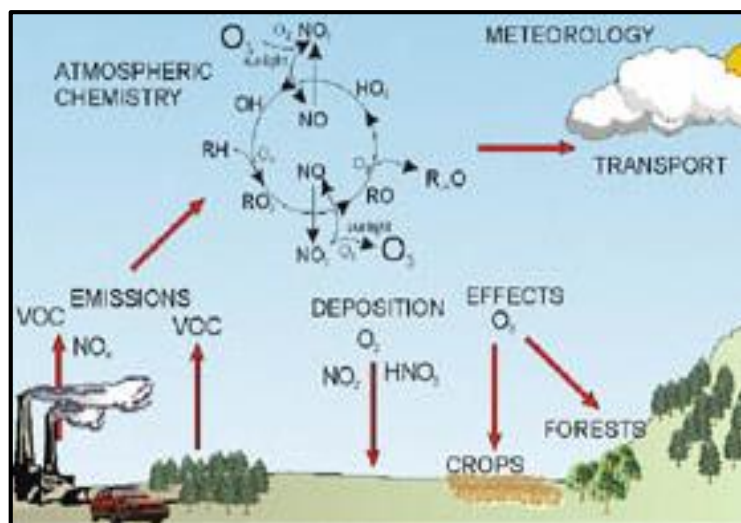
1.1.5 Vermiculite can be classified as a ... mineral.

- A secondary
- B primary
- C tertiary
- D precious

1.1.6 Which of the following statements does not describe the properties of maize?

- A Originally came from Mexico in South America
- B Summer crop that requires a summer rainfall of between 450 mm and 900 mm per year
- C Staple food for most African people
- D Is also known as guinea corn

1.1.7 Identify the type of pollution shown on the diagram below:



- A Soil pollution
- B Air pollution
- C Water pollution
- D Land pollution

1.1.8 Bioturbation can be defined as ...

- A the washing out of soluble substances from the soil.
- B the rise of water table.
- C the downward movement of dissolved material within the soil.
- D mixing of soil by organisms.

1.1.9 A winter cereal that is used to produce cake flour is...

- A wheat.
- B barley.
- C oats.
- D rye.

1.1.10 Sedimentary rocks have the following properties:

- (i) Can be rough or smooth
- (ii) Are translucent
- (iii) Have a layered structure
- (iv) Are the softest group of rocks

Choose the correct combination:

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

(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 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 Breeding stock	A Fodder crop that provides bulk, energy and roughage
1.2.2 Lucerne	B Crops that are usually used as staple foods
1.2.3 Soil	C Needed to prune, plant and pick the harvest
1.2.4 Grain crops	D Provides water to plants, which is absorbed by the roots
1.2.5 Mitosis	E Animals selected for their desirable characteristics
	F Chromosome number remains the same
	G Protein rich legume fodder crop
	H Chromosome number is reduced to half
	I Found in the R horizon
	J Deciduous crop

(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 A double membrane that surrounds the nucleus

1.3.2 Release of minerals during the decomposition process by bacteria and fungi

1.3.3 Plants that were introduced from other countries

1.3.4 Release of harmful substances into the environment

1.3.5 Medium-sized organisms living in the soil, for example nematodes and mites

(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 in the ANSWER BOOK.
- 1.4.1 The process whereby rocks are broken down to small particles to form soil is known as precipitation.
- 1.4.2 Somatic cells have a haploid number of chromosomes.
- 1.4.3 Angle is the direction a slope faces.
- 1.4.4 Vegetables, fruits, flowers and shrubs are classified as forest crops.
- 1.4.5 Fynbos such as rooibos and honeybush are the small bushes grown for making tea and medicines.

(5 x 1)

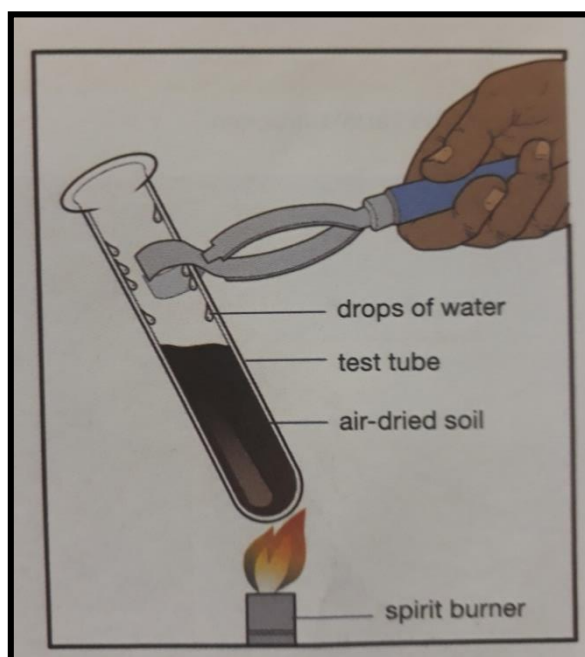
(5)

TOTAL SECTION A:**45**

SECTION B**QUESTION 2: SOIL SCIENCES**

Start this question on a new page.

- 2.1 A grade 10 learner half-filled a test tube with an air dry soil sample. The learner then held the test tube over an open flame as shown in the diagram below. After some time water started to condense against the upper end of the test tube.



- 2.1.1 Deduce the type of soil water which accumulates as droplets in the test tube from the diagram above. (1)
- 2.1.2 Motivate the answer you gave in QUESTION 2.1.1 above. (2)
- 2.1.3 Deduce whether the soil water depicted in the diagram above is accessible to plants. Explain your answer. (2)
- 2.1.4 Identify a safety precaution taken by the learner which is visible on the diagram above. (1)
- 2.1.5 Suggest the other TWO types of soil water that are not depicted in the diagram above. (2)

- 2.2 The following are some of the main characteristics that are used in mineral identification.

crystalline structure; cleavage; purity; lustre; density; tenacity

- 2.2.1 Match and select the mineral identification characteristics above with the following:

- | | | |
|---|---|-----|
| A | The definite parallel lines along which a mineral splits | (1) |
| B | How shiny a mineral appears in light | (1) |
| C | Whether a mineral is made up of only one type of a substance | (1) |
| D | The resistance a mineral offers to breaking, crushing, bending or cutting | (1) |
| E | An object's mass relative to its volume | (1) |

- 2.2.2 Provide any THREE characteristics of primary minerals. (3)

- 2.3 Rocks break down to form and release nutrients that are required by plants for growth. These rocks can either be igneous, sedimentary or metamorphic. The suitability of a soil for crop cultivation therefore depends on the bedrock from which it was formed.

- 2.3.1 Identify a soil forming factor that is mentioned in the passage above. (1)

- 2.3.2 Classify the following rocks into **igneous**, **sedimentary** and **metamorphic** rocks:

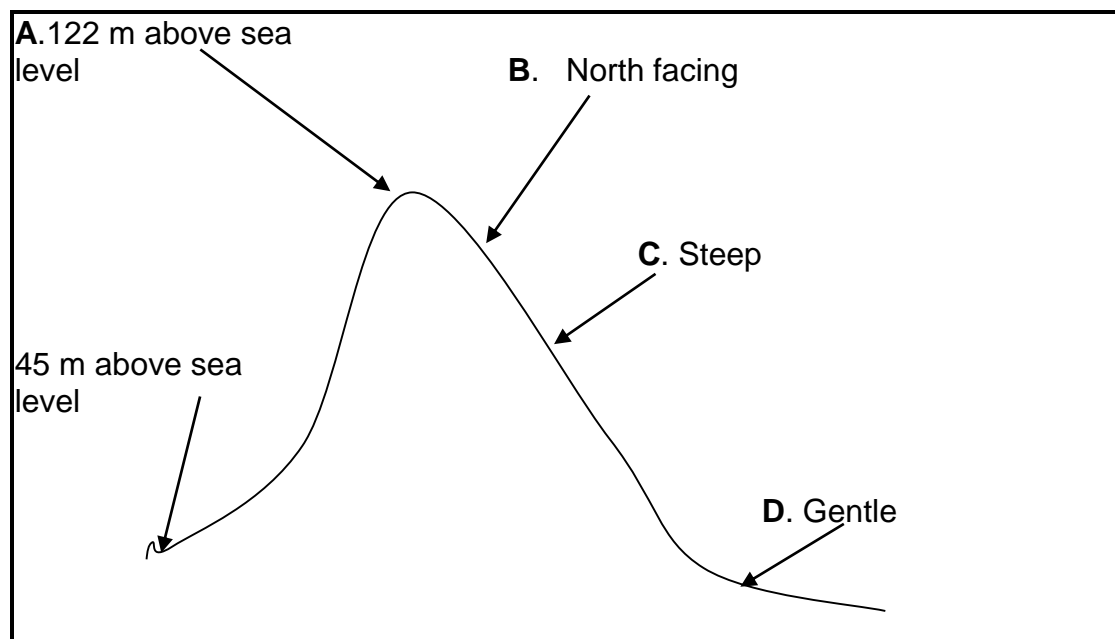
- | | | |
|---|-----------|-----|
| A | Sandstone | (1) |
| B | Marble | (1) |
| C | Dolomite | (1) |

- 2.3.3 Deduce any THREE cultivation properties of soils formed from sedimentary rocks. (3)

- 2.4 Igneous rocks are divided into extrusive, intrusive and plutonic rocks.

- 2.4.1 Distinguish *intrusive rocks* from *extrusive igneous rocks*. (2)

2.5 The diagram below shows various features of a soil forming factor.



- 2.5.1 Identify the soil forming factor that is shown in the diagram above. (1)
- 2.5.2 Suggest where the soil will be deeper, point C or D. (1)
- 2.5.3 Briefly explain why there is a difference in soil depth between points C and D. (2)
- 2.5.4 Supply the name of each of the features A, B and C of the soil forming factor shown in the diagram above. (3)
- 2.5.5 State any THREE human activities that have a direct impact on soil formation. (3)

[35]

QUESTION 3: PLANT STUDIES

Start this question on a new page.

3.1 Listed below are different categories of crop plants.

grain crops; oil seed crops; industrial crops; fodder crops; forest crops

3.1.1 Match the crop classes above to EACH of the following descriptions:

- A Crops that are grown as commodities or as raw materials for manufacturing (1)
- B Plants that provide grazing for livestock and hay production (1)
- C Sunflower, canola and peanuts (1)
- D Mainly used for making timber and paper (1)

3.1.2 Crops play a big role in the South African economy. Validate this statement with THREE reasons. (3)

3.2 The table below shows the volumes of field crops produced in South Africa from 2005 to 2010.

Crop	Volume of crop production (t)				
	2005/6	2006/7	2007/8	2008/9	2009/10
Maize	6 000	7 000	12 000	12 050	13 043
Wheat	500	1 000	1 200	2 950	3 637
Sorghum	900	3 000	5 000	6 760	7 220
Sunflower seeds	2 010	1 200	8 325	801	516
Soya beans	5 200	22 700	4 000	516	560
Lucerne	25 000	525 000	3 250	2 260	21 780
Cotton	51 200	419 800	32 060	420	360

3.2.1 Use the table above to draw a line graph showing the volumes of wheat production from 2005 to 2010. (6)

3.2.2 Deduce the trend of wheat production from 2005 to 2010. (2)

3.2.3 Calculate the total volume of grains produced in the 2005/6 season. (2)

3.2.4 Refer to the table above and identify ONE legume fodder crop that is rich in proteins. (1)

3.2.5 Briefly explain why legumes are rich in proteins. (2)

3.3

ORANGES

Oranges are fruits that have been used for food and medicine for many years. These fruits can be used on a sustainable basis to produce income for both rural communities and commercial farmers.

Orange pulp is an excellent source of vitamin C which enables the body to fight flu infections. The leaves of orange trees have medicinal value as they can be used to treat nausea.

Like most citrus fruits, oranges do well under moderate temperatures between 15,5 – 29 °C and require considerable amounts of sunshine and water. They are sensitive to frost, and as a result, they grow well in the Limpopo, Mpumalanga and Northern Cape provinces of South Africa. Oranges can be marketed in their raw form or processed into fruit juice.

3.3.1 Name the vitamin that oranges contain. (1)

3.3.2 Describe any TWO health benefits of oranges given in the passage above. (2)

3.3.3 Suggest any THREE benefits of processing oranges to fruit juice. (3)

3.4

The Conservation of Agricultural Resources Act of 1983 classifies invader species into three categories, namely: Category 1, Category 2 and Category 3.

3.4.1 Identify the invader category from the passage above that is relevant to each of the following descriptions:

A Invaders that are useful as shade and ornamental trees in urban areas (1)

B Wattle trees can be planted in certain demarcated areas with permission from the government (1)

C Pose a very high risk and may not be planted or sold anywhere in the country (1)

3.4.2 Justify the eradication of invader plants with TWO reasons. (2)

3.4.3 Differentiate between *softwood* and *hardwood* trees. Give ONE example of each. (4)

[35]

QUESTION 4: SUSTAINABLE USE OF NATURAL RESOURCES AND BIOLOGICAL CONCEPTS

Start this question on a new page.

- 4.1 The pictures below show examples of the resources that are used by farmers in agricultural production.



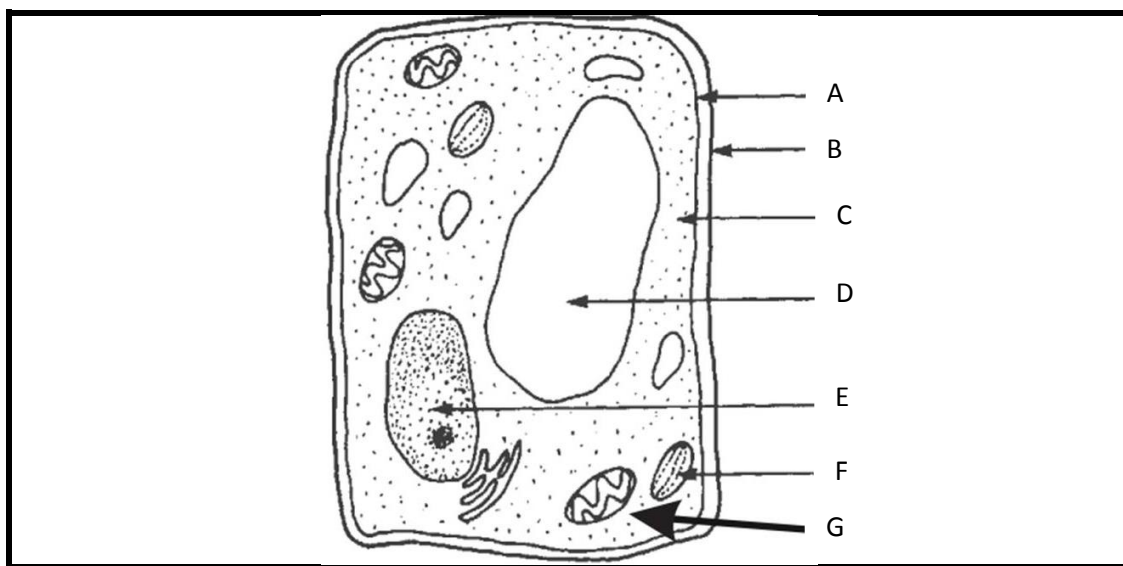
- 4.1.1 Identify ONE example of a non-renewable natural resource from the pictures above. (1)
- 4.1.2 Briefly explain why the resource you mentioned in QUESTION 4.1.1 is regarded as non-renewable. (2)
- 4.1.3 Choose the soil cultivation method between A and B that is more environmentally sustainable. (1)
- 4.1.4 Justify your choice in QUESTION 4.1.3 with THREE reasons. (3)

- 4.2 South Africa receives an average of 500 mm of rain per year. The limited water supply makes it a water scarce country. The suitability of the available water for use by humans, animals and aquatic organisms depends on its quality. Salinity, pesticide concentration, turbidity and the presence of pathogens are some of the factors affecting water quality.

- 4.2.1 Identify ONE physical property of water mentioned in the passage above. (1)

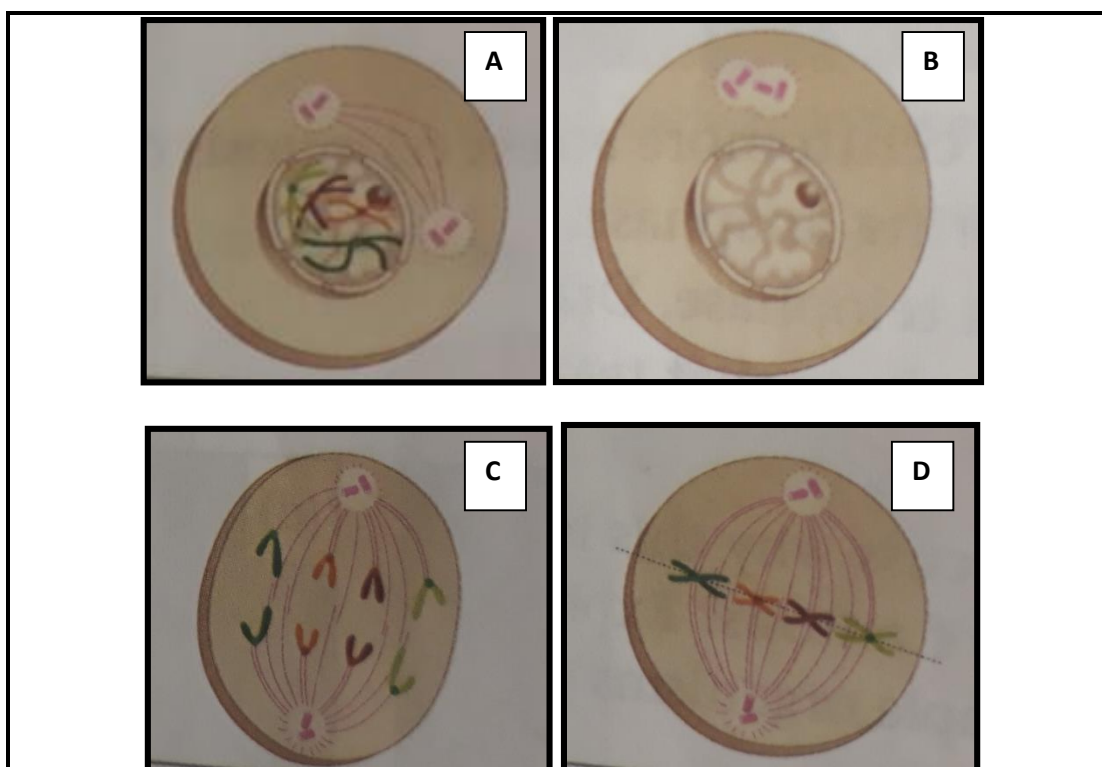
- 4.2.2 Define the physical property of water mentioned in QUESTION 4.2.1. (1)
- 4.2.3 Indicate any THREE issues that affect the supply and quality of water in South Africa. (3)
- 4.2.4 State ONE published Act that regulates the use, protection and conservation of water resources in South Africa. (1)
- 4.2.5 Supply any THREE effects of soil pollution on natural resources. (3)
- 4.2.6 List any TWO methods that can be used by farmers to dispose of non-biodegradable waste. (2)

4.3 Below is a diagram of a plant cell. Answer the questions based on it.



- 4.3.1 Identify the names of the parts labelled A, B, D and E. (4)
- 4.3.2 State any TWO functions of part E. (2)
- 4.4 Tabulate the differences between plant and animal cells under the following headings:
- 4.4.1 Outer protective layer (2)
- 4.4.2 Vacuole (2)

- 4.5 Analyse the phases of mitosis shown below and answer the questions that follow.



- 4.5.1 Identify the phases of mitosis that are represented by labels A, B, C and D. (4)
- 4.5.2 Outline any THREE roles of mitotic cell division in living organisms. (3)
- [35]

TOTAL SECTION B: 105
GRAND TOTAL: 150