

education

Department:
Education
REPUBLIC OF SOUTH AFRICA

SENIOR CERTIFICATE EXAMINATION - 2007

AGRICULTURAL SCIENCE P1

STANDARD GRADE

FEBRUARY/MARCH 2007

802-2/1

MARKS: 150

TIME: 2 hours

AGRICULTURAL SCIENCE SG: Paper 1



802 2 1E

SG

X05



This question paper consists of 9 pages.



INSTRUCTIONS AND INFORMATION

1. Answer ALL the questions.
2. This question paper consists of TWO sections: SECTION A and SECTION B.
3. Answer ALL the questions in the agricultural science context in the ANSWER BOOK provided.
4. Start each question on a NEW page.
5. Number the answers exactly as the questions are numbered.
6. Read the questions carefully and answer what is asked.
7. Write neatly and legibly.
8. Non-programmable calculators may be used.

SECTION A**QUESTION 1**

- 1.1 Various possible options are provided as answers for the following questions. Write only the letter (A – D) of the most correct answer next to the question number (1.1.1 – 1.1.5) in the answer book, for example 1.1.6 D.

- 1.1.1 The type of soil water that is most available to plants is ...
A hygroscopic water.
B free water.
C capillary water.
D dead water. (2)
- 1.1.2 The soil horizon which consists of solid rock is ...
A horizon C.
B horizon B.
C horizon R.
D horizon A. (2)
- 1.1.3 Which of the following treatments will NOT result in stimulative parthenocarpy?
A Fertilisation
B Hormone treatment
C Pollination
D Stimulation of fruit without fertilisation (2)
- 1.1.4 ... are propagated by using rhizomes.
A Potatoes
B Onions
C Ginger
D Strawberries (2)
- 1.1.5 Accumulation of sodium to more than 15% of cation exchange capacity causes ... in the soil.
A acidity
B alkalinity
C neutrality
D salinity (2)

- 1.2 Choose a description from COLUMN B that best matches a word in COLUMN A. Write only the letter (A – H) next to the question number (1.2.1 – 1.2.5) in the answer book, for example 1.2.6 I.

COLUMN A		COLUMN B	
1.2.1	Cobalt	A	constituent of cysteine
1.2.2	Calcium	B	shortage thereof leads to 'small leaf' disease
1.2.3	Iron	C	results in luxuriant/vegetative growth of crops
1.2.4	Zinc	D	'whip disease' in cauliflower
1.2.5	Sulphur	E	necessary for chlorophyll pigment
		F	shortage thereof leads to green V-pattern on leaf base
		G	required by <i>Rhizobium</i> bacteria
		H	constituent of middle lamella (5 x 2)

(10)

- 1.3 Write the correct agricultural term for each of the following statements next to the question number (1.3.1 – 1.3.5) in the answer book:

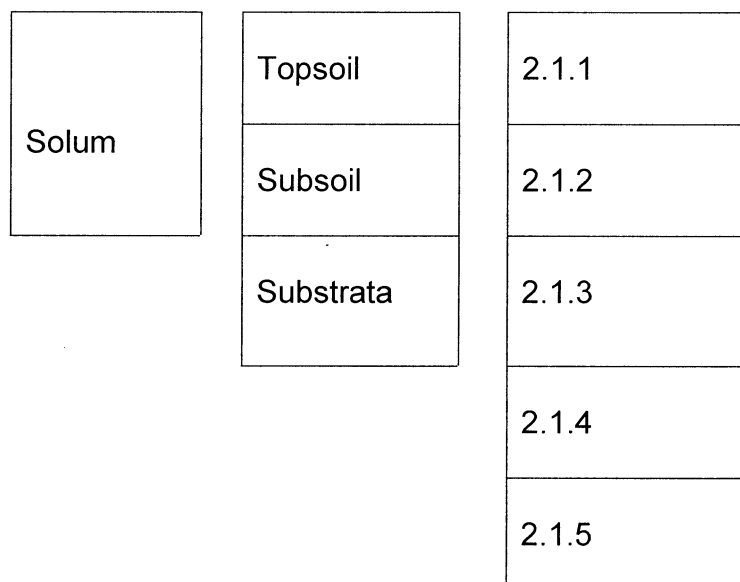
- 1.3.1 The aggregation of soil particles as a result of the binding effect of organic matter and clay particles. (2)
- 1.3.2 The small soil particle that is less than 0,002 mm in diameter. (2)
- 1.3.3 The grouping of soils with the same diagnostic properties into categories. (2)
- 1.3.4 The ability of soil to hold a given quantity of water after complete saturation and drainage has taken place. (2)
- 1.3.5 A developed ripened plant ovary. (2)

TOTAL SECTION A: 30

SECTION B**QUESTION 2: SOIL SCIENCE**

Answer this question on a NEW page.

- 2.1 The diagram below represents the soil profile. Identify the sections numbered 2.1.1 to 2.1.5.



- 2.2 Soil colour can take several forms. Name the soil colour that you would associate with each of the following:
- 2.2.1 Iron compounds in the soil with a favourable air : moisture ratio (1)
 - 2.2.2 Iron in the soil in the absence of oxygen with an excess of water (1)
 - 2.2.3 Sandy soil containing very little iron (1)
 - 2.2.4 Soil containing a high percentage of organic matter (1)
- 2.3 List THREE classes of soil based on relative amounts of particle size. (3)
- 2.4 Briefly describe how the following factors influence the development of soil structure:
- 2.4.1 Climate (3)
 - 2.4.2 Plant roots (2)
 - 2.4.3 Organic matter (1)
- 2.5 Indicate FOUR ways of reducing run-off. (4)

- 2.6 A farmer approaches you on a very hot day complaining about the condition of his/her crops in the afternoon. During the day the leaves appear to be drying out.
- 2.6.1 Provide the farmer with a term that is used to explain this condition. (1)
- 2.6.2 What is the cause of the problem? (2)
- 2.7 A soil that has enough macropores is beneficial to plant growth. Give TWO reasons to support this statement. (2)
- 2.8 List THREE factors that influence the water holding capacity of soil. (3)
- [30]**

QUESTION 3: SOIL SCIENCE

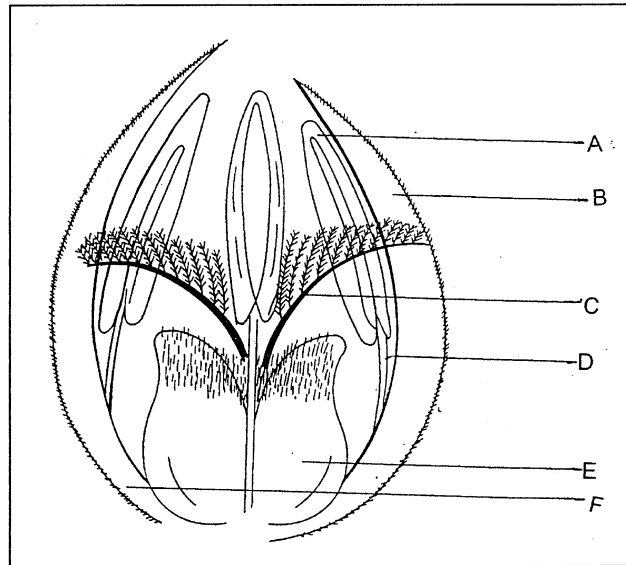
Answer this question on a NEW page.

- 3.1 State FIVE major factors influencing soil-forming processes. (5)
- 3.2 Name FOUR base-forming cations that are found in the soil. (4)
- 3.3 Organic matter is important in the soil. State FOUR chemical effects of organic matter in the soil. (4)
- 3.4 The South African binomial soil classification system consists of TWO categories. Name these categories. (2)
- 3.5 Discuss TWO functions of carbon dioxide in the soil. (4)
- 3.6 Give FIVE reasons for the classification of soils in South Africa. (5)
- 3.7 Name THREE chemical criteria that are used to describe the soil series. (3)
- 3.8 Indicate whether the following pH levels are **Strongly acid, Strongly alkaline and Neutral** using the following pH values:
- 3.8.1 pH 7 (1)
- 3.8.2 pH 3 (1)
- 3.8.3 pH 9 (1)
- [30]**

QUESTION 4: PLANT REPRODUCTION

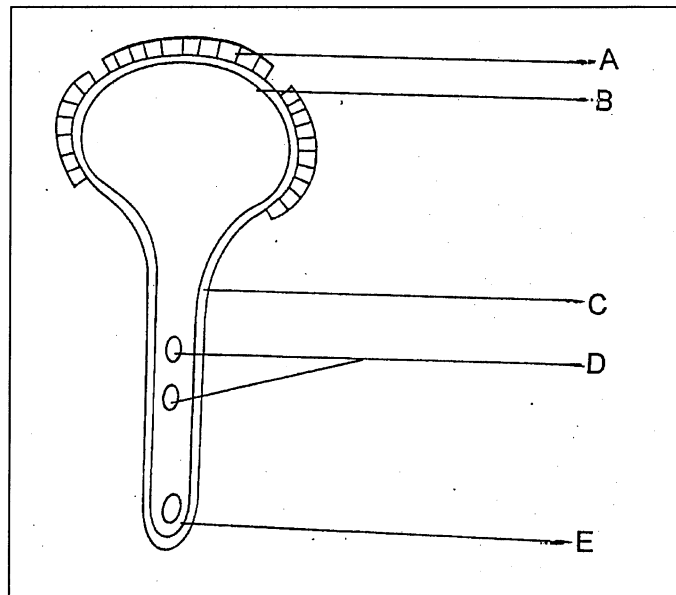
Answer this question on a NEW page.

- 4.1 The diagram below represents the structure of a wheat flower. Answer QUESTIONS 4.1.1 to 4.1.7 based on the diagram.



- 4.1.1 What is the sex of this flower? Motivate your answer. (2)
- 4.1.2 What is the main function of the parts labelled A and F? (2)
- 4.1.3 What is the inflorescence of a wheat plant called? (1)
- 4.1.4 Name the structure of a wheat flower, which perform the same function as the sepals of a dicotyledonous flower. Name the function of this structure. (2)
- 4.1.5 Identify the part labelled C. (1)
- 4.1.6 Give TWO reasons why the petals are absent in the wheat flower. (2)
- 4.1.7 Why is the stigma of the wheat flower feathery? (2)

4.2 Answer questions 4.2.1 and 4.2.2 that are based on the diagram below.



4.2.1 Identify this diagram. (1)

4.2.2 Provide names for labels A to E. (5)

4.3 Plant growth stimulants can be applied to produce seedless fruits.

4.3.1 Name TWO known agricultural crops, which produce seedless fruits. (2)

4.3.2 Give the name of a plant hormone, which is sprayed on plants to obtain bigger fruits. (1)

4.3.3 Name THREE agents of cross-pollination. (3)

4.4 A farmer with little knowledge of asexual reproduction approaches you for some advice. Which vegetative reproduction method would you recommend in each of the following cases?

4.4.1 Strawberries (1)

4.4.2 Lilies (1)

4.4.3 Grapes (1)

4.5 Briefly explain how the spraying of trees with chemicals will influence ablation of flowers. (3)

[30]

QUESTION 5: PLANT NUTRITION

Answer this question on a NEW page.

- 5.1 A crop farmer wants to fertilise crops using a phosphate fertiliser. The local supplier sells superphosphate (11,3%) at R1 865,00/ton. Calculate the unit value of this fertiliser and show the formula used. (4)
- 5.2 Name THREE examples of organic fertilisers. (3)
- 5.3 A farmer can manipulate his/her crops in various ways to increase the rate of photosynthesis. List FOUR of these ways. (4)
- 5.4 Give THREE factors that determine the availability of phosphorus. (3)
- 5.5 There are various factors which affect the composition of farm manure. State FOUR of these factors. (4)
- 5.6 Why are fertilisers sometimes applied in liquid form? Give FIVE reasons. (5)
- 5.7 Which fertiliser would you recommend in each of the following cases:
- 5.7.1 An acid soil which has a deficiency of phosphates (1)
- 5.7.2 A brackish soil with a shortage of potassium (1)
- 5.7.3 The soil is low in pH and plants suffer from magnesium shortage (1)
- 5.7.4 The acid, sandy soil poor in nitrogen (1)
- 5.7.5 Broadcasting with nitrogenous fertilisers on lawns and pastures (1)
- 5.8 Why would a farmer apply dolomitic agricultural lime on the soil? (2)
- [30]**

TOTAL SECTION B: 120

GRAND TOTAL: 150