

Province of the

**EASTERN CAPE**

EDUCATION

**NATIONAL**

**SENIOR CERTIFICATE**

**GRADE 11**

**NOVEMBER 2010**

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| **AGRICULTURAL SCIENCES P2** |

**MARKS: 150**

**TIME: 2½ hours**

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| This question paper consists of 12 pages and an answer sheet. |

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| **INSTRUCTIONS AND INFORMATION** | |  |
|  |  |  |
| 1. | Answer ALL the questions. |  |
|  |  |  |
| 2. | SECTION A (QUESTION 1) must be answered on the attached ANSWER SHEET. |  |
|  |  |  |
| 3. | SECTION B (QUESTIONS 2 to 4) must be answered in the ANSWER BOOK. |  |
|  |  |  |
| 4. | Start EACH question from Section B on a NEW page. |  |
|  |  |  |
| 5. | Read ALL the questions carefully and make sure you answer only what is asked. |  |
|  |  |  |
| 6. | Number the answers correctly according to the numbering system used in this question paper. |  |
|  |  |  |
| 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 make a cross (X) in the block (A – D) next to the question number (1.1.1 – 1.1.10) on the attached ANSWER SHEET. |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 1.1.11 | A | B | C | D |

Example:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 1.1.1 | A period of resting when the seed will not germinate even if the environmental conditions are good is called … | |  |
|  |  |  | |  |
|  |  | A | pollination. |  |
|  |  | B | hibernation. |  |
|  |  | C | dormancy. |  |
|  |  | D | fumigation. |  |
|  |  |  |  |  |
|  | 1.1.2 | A deficiency of this mineral nutrient causes internal corking in apples and black heart in root crops. | |  |
|  |  |  |  |  |
|  |  | A | boron |  |
|  |  | B | zinc |  |
|  |  | C | copper |  |
|  |  | D | iron |  |
|  |  |  |  |  |
|  | 1.1.3 | Planting of more than one crop on a single piece of land with the aim of increasing plant density is known as … | |  |
|  |  |  |  |  |
|  |  | A | crop rotation. |  |
|  |  | B | monoculture. |  |
|  |  | C | intercropping. |  |
|  |  | D | green manuring. |  |
|  |  |  |  |  |
|  | 1.1.4 | Traditional farmers used one of the following fertilizers to supply organic nutrients to their crops. | |  |
|  |  |  |  |  |
|  |  | A | gypsum |  |
|  |  | B | guano |  |
|  |  | C | superphosphate |  |
|  |  | D | urea |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 1.1.5 | The nucleus which controls the growth direction of the developing pollen tube is the ... | |  |
|  |  |  |  |  |
|  |  | A | vegetative nucleus. |  |
|  |  | B | male gamete. |  |
|  |  | C | generative nucleus. |  |
|  |  | D | female gamete. |  |
|  |  |  |  |  |
|  | 1.1.6 | An underground, horizontal stem of a plant that often sends out roots and shoots from its nodes is called the ... | |  |
|  |  |  |  |  |
|  |  | A | bulb. |  |
|  |  | B | rhizome. |  |
|  |  | C | runner. |  |
|  |  | D | tubers. |  |
|  |  |  |  |  |
|  | 1.1.7 | One of the following methods is NOT a traditional plant improvement method. | |  |
|  |  |  |  |  |
|  |  | A | Selection |  |
|  |  | B | Hybridization |  |
|  |  | C | Use of mutations |  |
|  |  | D | Layering |  |
|  |  |  |  |  |
|  | 1.1.8 | One of the following resources can be described as a non-renewable resource. | |  |
|  |  |  |  |  |
|  |  | A | Plants |  |
|  |  | B | Soil |  |
|  |  | C | Water |  |
|  |  | D | Animals |  |
|  |  |  |  |  |
|  | 1.1.9 | A form of agriculture that relies on organic sources of inputs in order to create a naturally-balanced ecosystem is known as ... | |  |
|  |  |  |  |  |
|  |  | A | permaculture. |  |
|  |  | B | horticulture. |  |
|  |  | C | viticulture. |  |
|  |  | D | precision farming. |  |
|  |  |  |  |  |
|  | 1.1.10 | One of the following pests attack stored grains and seeds of crops like maize, wheat or sorghum. | |  |
|  |  |  |  |  |
|  |  | A | Termites |  |
|  |  | B | Aphids |  |
|  |  | C | Nematodes |  |
|  |  | D | Weevils (10 x 2) | (20) |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1.2 | In the table below, a statement and two possible answers are given. Decide whether the statement in COLUMN B relates to A only, B only, both A and B or none of the answers in COLUMN A and make a cross in the appropriate block next to the question number (1.2.1 – 1.2.5) on the attached ANSWER SHEET. | | | | | | |  |
|  |  | | | | | | |  |
| EXAMPLE: | | **COLUMN A** | | | **COLUMN B** | |
|  | | A: | Green manure | | Inorganic fertilizers | |
|  | | B: | compost | |
|  | |  |  | |  | |
| ANSWER: | | The statement refers to: | | | | |
|  | | **Only A** | | **Only B** | **A and B** | **None** |
|  | | **A** | | **B** | **C** | **D** |

|  |  |  |  |
| --- | --- | --- | --- |
| **COLUMN A/Answers** | | **COLUMN B/Statements** | |
| 1.2.1 | A | Older leaves develop chlorosis | Symptoms of phosphorus deficiency | |
| B | Leaves develop a purple discolouration |
| 1.2.2 | A | Plants that are exotic to South Africa | Alien plants | |
| B | Plants that are indigenous to South Africa |
| 1.2.3 | A | Have the male and female flowers on separate plants | Bisexual flowers | |
| B | They are called dioecious plants |
| 1.2.4 | A | A science of growing plants without soil in nutrients solution | Hydroponics | |
| B | Plants grown in structures under controlled climatic conditions |
| 1.2.5 | A | Poisonous gases that kill pests and diseases in the soil | Fumigants | |
| B | A mixture of a pesticide and a type of food |
|  | (5 x 2) | | | (10) |

|  |  |  |  |
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| 1.3 | Give ONE term/phrase for each of the following descriptions. Write only the term/phrase next to the question number (1.3.1 – 1.3.5) on the attached ANSWER SHEET. | |  |
|  |  | |  |
|  | 1.3.1 | A pointed garden tool used for making holes in the soil when planting seeds or seedlings. |  |
|  |  |  |  |
|  | 1.3.2 | A method of biotechnology that changes or modifies an organism’s genetic material to change its inherited characteristics. |  |
|  |  |  |  |
|  | 1.3.3 | Joining the stem of one plant with buds to the rootstock of another plant of the same species so that they grow together as one plant. |  |
|  |  |  |  |
|  | 1.3.4 | A pest control programme in which different methods of control work together to optimise pest control, |  |
|  |  |  |  |
|  | 1.3.5 | The process whereby plants reproduce without fertilization of a pollen grain and an ovule. (5 x 2) | (10) |
|  |  |  |  |
| 1.4 | Change the underlined words in the following statements to make them TRUE. Write only the appropriate word next to the question number (1.4.1 – 1.4.5) on the attached ANSWER SHEET. | |  |
|  |  |  |  |
|  | 1.4.1 | The minimum temperature is the temperature at which growth is the fastest. |  |
|  |  |  |  |
|  | 1.4.2 | The development of fruit without fertilization is called ablactation. |  |
|  |  |  |  |
|  | 1.4.3 | Permaculture is the form of agriculture that uses advanced technology like computers and satellite images to optimise farm production. |  |
|  |  |  |  |
|  | 1.4.4 | Living organisms that damage crops in some way for example insects, fungi, bacteria etc. are called invaders. |  |
|  |  |  |  |
|  | 1.4.5 | Subsistence farming is a farming system where farmers produce their products for selling. (5 x 1) | (5) |
|  |  |  |  |
|  |  | **TOTAL SECTION A:** | **45** |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **SECTION B** | | | |  |
|  | | | |  |
| **QUESTION 2** | | | |  |
|  |  |  | |  |
| 2.1 | Some essential plant nutrients are indicated in the table below. Answer the questions that follow: | | |  |
|  |  | | |  |
|  | | Sulphur  Molybdenum  Zinc  Nitrogen  Copper  Calcium |  | |
|  |  | | |  |
|  | 2.1.1 | Tabulate the nutrients into macro and micro nutrients. | | (6) |
|  |  |  | |  |
|  | 2.1.2 | Indicate which nutrient from the above is obtained from guano. | | (1) |
|  |  |  | |  |
|  | 2.1.3 | The deficiency of each of the above nutrients could cause the following deficiency symptoms: | |  |
|  |  |  | |  |
|  |  | 1. Dieback disease in citrus fruit. | |  |
|  |  |  | |  |
|  |  | 1. Very poorly formed roots and shoots. | |  |
|  |  |  | |  |
|  |  | 1. Small plants with yellow leaves. | |  |
|  |  |  | |  |
|  |  | 1. Buds and new leaves turn yellow. | | (4) |
|  |  |  | |  |
| 2.2 | The following diagram is a bag of fertiliser. Inorganic fertilisers are grouped into complete fertilisers and straight fertilisers. Analyse this illustration and answer questions that follow. | | |  |
|  |  | | |  |
|  |  | | |  |
|  |  | | |  |
|  | 2.2.1 | Indicate whether this fertiliser is a complete fertiliser or a straight fertilizer. Justify your answer. | | (3) |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 2.2.2 | Which ONE of the two mentioned in QUESTION 2.2.1 would you recommend to correct a particular nutrient deficiency in your garden? | | (1) |
|  |  |  | |  |
|  | 2.2.3 | Calculate the quantity of the nutrient represented by 3 in the ratio indicated on the bag. | | (4) |
|  |  |  | |  |
| 2.3 | One of the most important and best indigenous practices among South African farmers is the use of organic fertilisers. The following information is about both organic and inorganic fertilisers. Analyse this information and answer questions that follow: | | |  |
|  |  | | |  |
|  | * Dissolve in water and release nutrients immediately. * The level of nutrients available is difficult to measure. * Release nutrients slowly and are not readily available to plants. * The level of nutrients added to the soil can be measured accurately. | | |  |
|  |  | | |  |
|  | 2.3.1 | Differentiate between the two groups of fertilisers using the information provided in the box above. | | (4) |
|  |  |  | |  |
|  | 2.3.2 | Give TWO examples of organic fertilisers that traditional farmers are still using on their farms. | | (2) |
|  |  |  | |  |
| 2.4 | A group of Grade 8 learners were confused about how the mechanisms involved in the flow of water through the stem work. They approached you as a Grade 11 learner for help. | | |  |
|  |  |  | |  |
|  | 2.4.1 | Name THREE mechanisms involved in the flow of water through the stem to the learners. | | (3) |
|  |  |  | |  |
|  | 2.4.2 | Mention the specialised tissue in plants that is responsible for the upward movement of water in plants. | | (1) |
|  |  |  | |  |
|  | 2.4.3 | Indicate TWO adaptations that plants have to reduce water loss through transpiration. | | (2) |
|  |  |  | |  |
| 2.5 | Photosynthesis is chemically a complex process consisting of a series of reactions. Four major things are required for this process to take place. Four items are listed in the box below | | |  |
|  |  | | |  |
|  | | Soil  Animals  Leaves  Sun |  | |
|  |  | | |  |
|  | 2.5.1 | Suggest the requirements each of the FOUR items in the box contribute during the process of photosynthesis. | | (4) |
|  |  |  | | **[35]** |

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| --- | --- | --- | --- |
| **QUESTION 3** | | |  |
|  |  |  |  |
| 3.1 | Below is a diagram showing the reproductive parts of a plant | |  |

|  |
| --- |
|  |

|  |  |  |  |
| --- | --- | --- | --- |
|  | 3.1.1 | Identify the parts labelled D, A, E and G. | (4) |
|  |  |  |  |
|  | 3.1.2 | Which labelled part develops into a fruit? | (1) |
|  |  |  |  |
|  | 3.1.3 | What is the primary importance of the part labelled F? | (1) |
|  |  |  |  |
|  | 3.1.4 | Some plants do not bear seeds. Suggest THREE ways by which plants can be propagated without using the seed. | (3) |
|  |  |  |  |
| 3.2 | Farmers always remove plants that grow where they are not wanted. Most of the time large sums of money are used to control weeds using chemicals. This is because weeds have a number of negative effects on crops. | |  |
|  |  |  |  |
|  | 3.2.1 | Deduce THREE reasons why you think weeds are always controlled by farmers. | (3) |
|  |  |  |  |
|  | 3.2.2 | Recommend THREE precautionary measures you will take while spraying pesticides on your crops. | (3) |
|  |  |  |  |
| 3.3 | Integrated Pest Management (IPM) is based on THREE principles. | |  |
|  |  |  |  |
|  | 3.3.1 | State the THREE principles of IPM. | (3) |
|  |  |  |  |
|  | 3.3.2 | Suggest THREE ways by which farmers can reduce or eliminate plant diseases on their farms. | (3) |
|  |  |  |  |
|  | 3.3.3 | Mention TWO methods/ways to eradicate alien plants in South Africa. | (2) |

|  |  |  |  |
| --- | --- | --- | --- |
| 3.4 | The production of Genetically Modified (GM) crops has raised serious ethical and cultural debates amongst farming communities involved in agricultural production. Some people believe that GM crops hold a key to ending world hunger and should be encouraged. | |  |
|  |  |  |  |
|  | 3.4.1 | Justify this statement by suggesting advantages of the GM crops. | (4) |
|  |  |  |  |
| 3.5 | The following diagrams show different types of pollination in plants.  Answer the questions that follow. | |  |

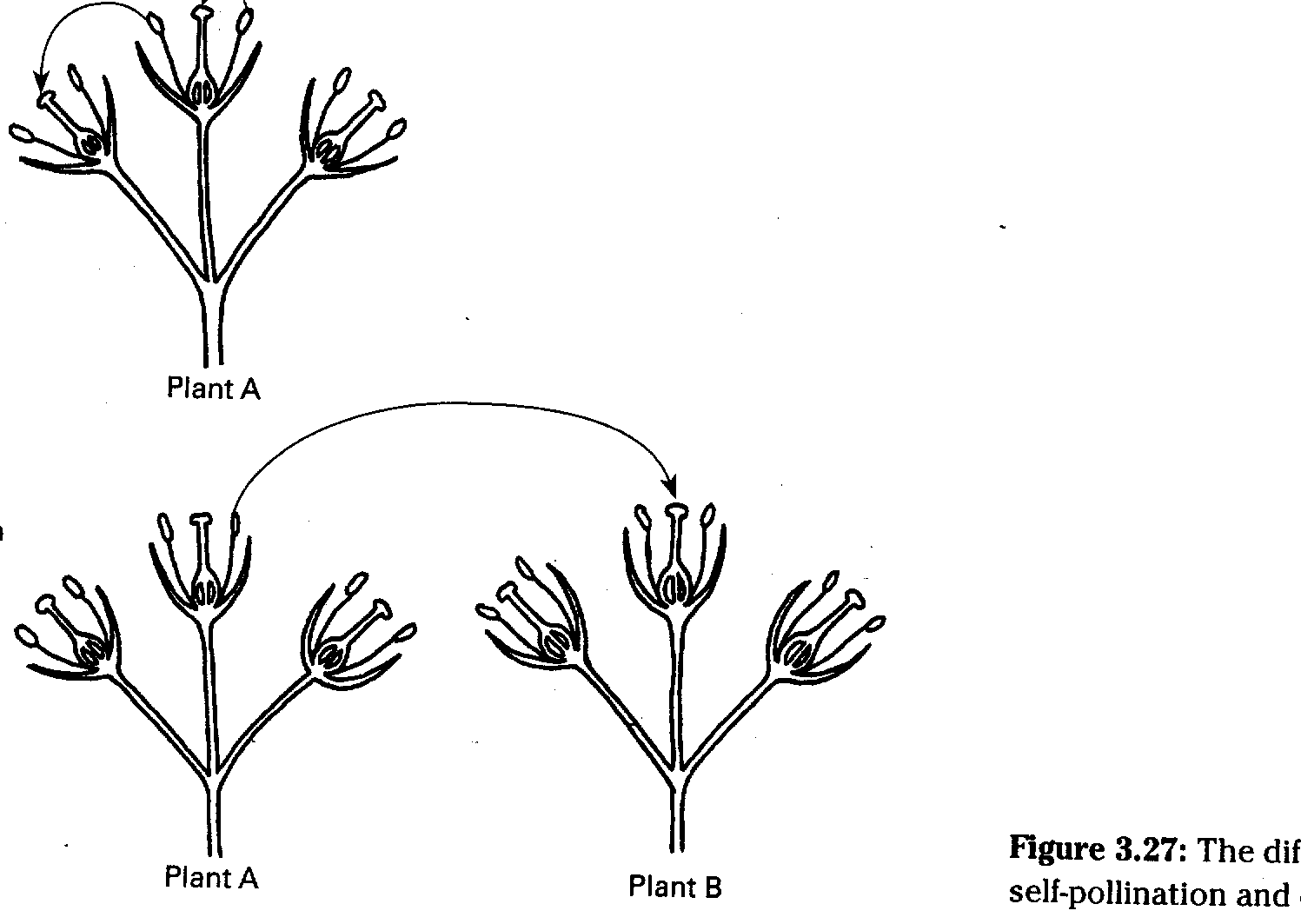


Diagram 1

Diagram1

Diagram 2

|  |  |  |  |
| --- | --- | --- | --- |
|  | 3.5.1 | Identify the type of pollination illustrated in Diagram 1 and Diagram 2. | (2) |
|  |  |  |  |
|  | 3.5.2 | Based on the diagrams shown above, explain the difference in the TWO forms of pollination. | (4) |
|  |  |  |  |
|  | 3.5.3 | Why do botanists use tape when they do grafting? | (2) |
|  |  |  | **[35]** |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **QUESTION 4** | | | | |  |
|  |  |  | | |  |
| 4.1 | Six descriptions are given in the table below: | | | |  |
|  |  | | | |  |
|  | * For family members needs only * Uses very advanced technology * Relies on organic sources inputs only * Computers and satellite images are used * Creates a naturally-balanced ecosystem. * Oldest level of farming | | | |  |
|  |  | | | |  |
|  | 4.1.1 | Classify the above information or items into the following three farming systems. | | |  |
|  |  |  |  |  |  |
|  |  | **Permaculture** | **Precision farming** | **Subsistence farming.** |  |
|  |  |  |  |  |  |
|  |  |  |  |  | (6) |
|  |  |  | | |  |
|  | 4.1.2 | Young and inexperienced farmers are not sure of following crop rotation or mixed cropping in order to ensure optimal utilisation of land. Motivate them to use crop rotation by suggesting advantages of this cropping system. | | | (4) |
|  |  |  | | |  |
|  | 4.1.3 | State THREE rules that an inexperienced farmer should remember when planning a crop rotation system. | | | (3) |
|  |  |  | | |  |
| 4.2 | Traditional farmers who are mostly resident in the rural areas harvest wild plants for many purposes. Overharvesting of the plants leads to bare lands which cause soil erosion. | | | |  |
|  |  |  | | |  |
|  | 4.2.1 | Indicate THREE purposes for harvesting wild plants in the location. | | | (3) |
|  |  |  | | |  |
| 4.3 | Livestock farming activities have an impact on the natural resources especially the natural vegetation and this may lead to different forms of soil erosion. | | | |  |
|  |  |  | | |  |
|  | 4.3.1 | Indicate the negative impact that livestock will have on vegetation. | | | (3) |
|  |  |  | | |  |
|  | 4.3.2 | Suggest THREE practical measures that can be applied by rural farmers to minimise or prevent soil erosion. | | | (3) |

|  |  |  |  |
| --- | --- | --- | --- |
| 4.4 | Read and analyse the following scenario and then answer questions that follow: | |  |
|  |  | |  |
|  | There is an agricultural system of controlled-environment farming that is called ‘growing without soil’. Instead of growing plants in the soil they are grown in a sterile growth medium or substrate such as gravel. The costs for setting up structures are too high, plants are supplied with all the nutrients and water they need as well as optimal growing conditions are created. Although this modern system of cropping looks good, it demands high or specialised management. | |  |
|  |  |  |  |
|  | 4.4.1 | Tabulate advantages and disadvantages of the system described in the above scenario. | (4) |
|  |  |  |  |
|  | 4.4.2 | Suggest THREE reasons why green houses are becoming popular in South Africa. | (3) |
|  |  |  |  |
| 4.5 | Irrigation systems are used in agriculture to promote intensive crop production. Answer the questions that follow. | |  |
|  |  |  |  |
|  | 4.5.1 | Mention THREE advantages of sprinkler irrigation. | (3) |
|  |  |  |  |
|  | 4.5.2 | Irrigation scheduling involves planning when and how much water to irrigate cultivated crops. List THREE factors affecting this process. | (3) |
|  |  |  | **[35]** |
|  |  | |  |
|  | **TOTAL SECTION B:** | | **105** |
|  |  | |  |
|  | **GRAND TOTAL:** | | **150** |