This question paper consists of 16 pages.
INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions:

1. Answer ALL the questions.
2. SECTION A (Question 1) must be answered on the attached ANSWER SHEET.
3. SECTION B (Questions 2, 3 and 4) must be answered in the ANSWER BOOK.
4. Start each question from SECTION B on a NEW page.
5. Read the instructions carefully for each question and answer only what is required.
6. Begin with the question for which you think you'll get the best marks.
7. Number the answers correctly according to the numbering system used in this question paper.
8. Except where other instructions are given, answers must be in full sentences.
9. The mark allocation of each question will determine the length of your answer. Give enough facts to earn the marks allocated. Don't waste time by giving more information than required.
10. Please write neatly – we cannot mark illegible handwriting.
11. Place the completed ANSWER SHEET for SECTION A (Question 1) inside the ANSWER BOOK.
12. Any student caught cheating will have his or her question paper and notes confiscated. The College will take disciplinary measures to protect the integrity of these examinations.
13. If there is something wrong with or missing from your question paper or your answer book, please inform your invigilator immediately. If you do not inform your invigilator about a problem, the College will not be able to rectify it afterwards, and your marks cannot be adjusted to allow for the problem.
14. This question paper may be removed from the examination hall after the examination has taken place.

This question paper consists of TWO sections: Section A and Section B. Answer ALL the questions.

<table>
<thead>
<tr>
<th>Question</th>
<th>Section</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A: Answer the question</td>
<td>45</td>
</tr>
<tr>
<td>2</td>
<td>B: Answer all the questions</td>
<td>105</td>
</tr>
<tr>
<td>TOTAL:</td>
<td></td>
<td>150 MARKS</td>
</tr>
</tbody>
</table>
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. NO marks will be awarded if more than one cross (X) appears for an answer.

**EXAMPLE:**

1.1.1 An important requirement for pesticides to be registered is the . . .

A. degradability of the pesticide.
B. period of activity.
C. toxicity of the pesticide.
D. proposed price.

1.1.2 This method of irrigation can easily cause the wash-away of soil:

A. cannon spray irrigation
B. blooded irrigation
C. sprinkler irrigation
D. centre pivot irrigation

1.1.3 Which **ONE** of the following conditions does **NOT** pollute the environment?

A. the use of pesticides in too high concentrations
B. the unnecessary use of pesticides
C. conventional cultivation
D. overgrazing

1.1.4 Plants absorb minerals in the form of . . .

A. anions.
B. auxins.
C. atoms.
D. ions.
1.1.5 A change in the genetic characteristics of a plant is known as . . .

A. runners.  
B. layering.  
C. cuttings.  
D. mutation.

1.1.6 The system of crop production where a growth medium other than soil is used, is known as . . .

A. hydroponics.  
B. aquaculture.  
C. viniculture.  
D. tunnel-production.

1.1.7 _____ is a factor that determines the spacing of drainage pipes in a pipe drainage system.

A. The slope of the soil  
B. Permeability of soil  
C. Soil colour  
D. The run-off rate

1.1.8 The term "terrain" includes the gradient and drainage of a region, which determine the suitability of the region for . . .

A. crop cultivation.  
B. game farming.  
C. the building of roads.  
D. the erecting of buildings.

1.1.9 When land surveys are undertaken, the first step is to . . .

A. map the soil.  
B. make profile test holes.  
C. study the characteristics of soil.  
D. take aerial photographs.

1.1.10 In the ovule, the ripe ovum is situated between . . .

A. the auxiliary cells.  
B. the endosperm cells.  
C. the antipodal cells.  
D. the nucellus cells.  

(10 × 2 = 20)
1.2 In the table below a statement and two answers are given. Decide whether the statement in COLUMN B relates to ONLY A, ONLY B, both A and B, or NONE of the answers in COLUMN A. Choose the correct answer and make a cross (X) in the appropriate box next to the question number (1.2.1 – 1.2.5) on the attached ANSWER SHEET.

**EXAMPLE:**

<table>
<thead>
<tr>
<th>COLUMN A</th>
<th>COLUMN B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2.6 A: calcium</td>
<td>small leaf disease</td>
</tr>
<tr>
<td>B: zinc</td>
<td></td>
</tr>
</tbody>
</table>

**ANSWER:**

The statement refers to:

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>ONLY A</td>
<td>ONLY B</td>
<td>A and B</td>
<td>NONE</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>COLUMN A</th>
<th>COLUMN B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2.1 A: no soil</td>
<td>growers do not use soil media</td>
</tr>
<tr>
<td>B: vermiculite</td>
<td></td>
</tr>
<tr>
<td>1.2.2 A: building costs</td>
<td>disadvantage of growing crops in greenhouses</td>
</tr>
<tr>
<td>B: crop out of season</td>
<td></td>
</tr>
<tr>
<td>1.2.3 A: ladybird</td>
<td>natural enemies to keep pest numbers down</td>
</tr>
<tr>
<td>B: bee</td>
<td></td>
</tr>
<tr>
<td>1.2.4 A: self-pollination</td>
<td>pollination by different plants of the same species</td>
</tr>
<tr>
<td>B: cross-pollination</td>
<td></td>
</tr>
<tr>
<td>1.2.5 A: micro-nutrients</td>
<td>elements that are needed in large quantities</td>
</tr>
<tr>
<td>B: trace elements</td>
<td></td>
</tr>
</tbody>
</table>

(5 × 2 = 10)
1.3 Give ONE agricultural term / word for each of the following descriptions. Write only the term / word next to the question number (1.3.1 – 1.3.5) on the attached ANSWER SHEET.

1.3.1 The structure formed when the male gamete unites with the female gamete

1.3.2 The tissue in the seed that serves as food for the embryo

1.3.3 The type of lime to use on an acid soil that is poor in magnesium

1.3.4 The pressure that occurs in plant cells as a result of water absorption

1.3.5 Lands that only get water when it rains (5 × 2 = 10)

1.4 Change the UNDERLINED WORD(S) to make the statements TRUE. Write the appropriate word(s) next to the question number (1.4.1 – 1.4.5) on the attached ANSWER SHEET.

1.4.1 Physically modified crops are resistant to pest and diseases and thus reduce the need for chemical sprays.

1.4.2 Veld management deals with the utilization and conservation of trees to ensure maximum production.

1.4.3 International biotechnology is when the farmer brings together different control methods to optimize pest control.

1.4.4 Organic fertilisers have been blamed for environmental damage, including the poisoning of birds and animals.

1.4.5 When a farmer practices mulching, it results in a decrease in water infiltration. (5 × 1 = 5) [45]

TOTAL SECTION A: 45
QUESTION 2

2.1 Briefly explain how each of the following factors will influence the biochemical process of photosynthesis:

2.1.1 Sufficient carbon dioxide

2.1.2 Suitable temperature

2.1.3 Optimal soil moisture content

2.2 The following information about PNRR 6477 and CRNU 6304 maize cultivars mainly used for silage production was presented to the agronomist who intends to plant them and maximize production per hectare.

<table>
<thead>
<tr>
<th>MAIZE CULTIVAR</th>
<th>GROWTH HABIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>PNRR 6477</td>
<td>Shorter and inclined to form sprouts</td>
</tr>
<tr>
<td>CNRU 5304</td>
<td>Upright and not inclined to form sprouts</td>
</tr>
</tbody>
</table>

2.2.1 Suggest a suitable cultivar (from the above) that may be planted according to EACH of the following types of plant population and give ONE reason or your choice:

A. High-density planting / narrow spacing  
B. Low-density planting / wide spacing

2.2.2 Name TWO ways by which the agronomist may manipulate the maize plants to increase the rate of photosynthesis in the field.

2.3 The following nitrogenous fertilisers and their prices per ton are available to a farmer:

<table>
<thead>
<tr>
<th>Fertiliser</th>
<th>Price per ton (1 000 kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAN (28%N)</td>
<td>2 200,00</td>
</tr>
<tr>
<td>UREA (46%N)</td>
<td>2 600,00</td>
</tr>
</tbody>
</table>

2.3.1 Determine the unit price of the fertilisers mentioned above. Show ALL your calculations.
2.3.2 Which **ONE** of the above nitrogenous fertilisers would you recommend to the farmer? Briefly motivate your choice.  

2.3.3 Indicate the availability of the nitrogenous components of limestone ammonium nitrate (LAN) in the soil water after application.

2.3.4 State **TWO** methods of application of limestone ammonium nitrate (LAN), and indicate when in the crop production process this application is done.

2.4 Answer the following questions in connection with water absorption of plants:

2.4.1 State the function of the following root regions:

A. root hairs
B. extensions region
C. cell division region

2.4.2 Name the tissue that transports water through the plant.

2.4.3 State **TWO** forces involved in the upward movement of water.

2.5 Suggest a fertiliser that you would recommend in **EACH** of the following cases:

2.5.1 A soil with a high content of sodium and a shortage of potassium

2.5.2 An acid, sandy soil, poor in nitrogen

2.5.3 Phosphoric fertilizer consisting of monocalcium phosphate and gypsum
QUESTION 3

3.1 The diagram below represents an ovule:

3.1.1 Indicate the names of the parts labelled A, B, C, D and G. (5)

3.1.2 Name the part of the flower where the above structure of the ovule occurs. (1)

3.1.3 Name the substance that is formed when a male gamete fuses with the part marked D, and say what advantages this would have for the ovule. (2)

3.1.4 Indicate the cells that disappear after fertilisation. (2)

3.1.5 Give the function of the part marked A, after fertilization. (2)

3.2 Write a short sentence to describe each of the following methods of asexual or vegetative propagation of plants:

3.2.1 layering (2)

3.2.2 cutting (2)

3.2.3 division (2)
3.3. From time to time farmers and other plant growers need to control pests and diseases. Some of the ways or methods used to control pests and diseases are represented in the diagrams below. Answer the following questions based on the diagrams:

3.3.1 Identify the pest control methods in DIAGRAM A and DIAGRAM B. (2)

3.3.2 Which of the two pest control methods is NOT eco-friendly? (1)

3.3.3 Justify your answer to QUESTION 3.3.2 by supplying THREE reasons. (3)

3.3.4 Give ONE other example similar to the method of pest control in DIAGRAM A. (1)

3.4 Read the case study and answer the questions that follow:

**Why do farmers plant Bt maize?**

The use of Bt maize, which uses bacterial gene to provide resistance to the stalk borer larvae, continues to increase globally. To date most genetically manipulated crops have delivered benefits primarily to farmers. The key result is that insect resistant Bt maize has production benefits for farmers, health advantages for humans and animals and reduces the impact of insecticides on the environment.

3.4.1 Identify THREE advantages that Bt maize has for the environment. (3)

3.4.2 Name TWO methods of cultivating genetically modified plants. (2)

3.4.3 Explain in your own words, how genetically modified plants are created. (2)
3.4.4 Stipulate THREE public concerns about genetically modified plants.  

QUESTION 4

4.1 Irrigation is inevitable in South Africa because rainfall is very low.

4.1.1 Name the most important factor that determines the quality of water for irrigation purposes.  

4.1.2 Provide the names of THREE main types of irrigation the farmer can choose from.  

4.1.3 Provide the irrigation method suitable for each of the situations mentioned below:

A. On areas where even distribution of water is required  
B. The cultivation of row crops with a restricted amount of water  

4.2 Study the diagram below and answer the questions that follow:

4.2.1 Identify the method of cultivation as shown in the diagram above.  

4.2.2 Give THREE advantages of this cultivation method.
4.2.3 Under which TWO circumstances is monoculture preferred over the illustrated cultivation method? (2)

4.3 About 14 million people in South Africa do not always have enough food to eat. In about 20% of these people, the percentage of children who are too small for their age is approximately 40%. This situation has been worsened by using good arable lands for the cultivation of bio-fuel crops.

A greater proportion of them live in rural areas as subsistence farmers. These farmers use indigenous farming methods where production systems are not adapted to scientific methods, and farming is rain-fed.

4.3.1 Name TWO examples of crops that are cultivated as bio-fuels. (2)

4.3.2 Critically discuss TWO ways through which agriculture output among the rural farming community can be improved. (4)

4.4 Read the article below and answer the questions that follow:

TECHNOLOGY IS THE KEY TO SOUTH AFRICAN COMPETITIVENESS

Experts say South Africa must use modern technology if it wants to remain competitive in agricultural markets.

According to Professor Johan Willems of the Department of Agricultural Economics at the University of the Free State, biotechnology is one of the tools South Africa can use to compete with a rising agricultural power like China.

'With our policy of open markets and trade, we won't be able to compete if we don't use these technologies,' Willemse said.

He said that farmers must realise that biotechnology is just one of the latest technologies at their disposal. 'We have to practise precision-farming and we have to use the best technology available to compete,' he said.

[Farmer's Weekly, 13 October 2005]
4.4.1 Name the type of farming illustrated in the diagram above. (2)

4.4.2 Name the aims of this illustrated farming system. (3)

4.4.3 How does this system differ from permaculture? (2)
4.5 The following diagrams illustrate the lay-out of three different ways in which pipe drains can be planned. Study the illustrations and answer the questions that follow.

4.5.1 Identify the soil systems illustrated by numbers A, B and C. (3)

4.5.2 State the type of terrain on which each of the illustrated systems should be used. (3)

4.5.3 Deduce from the systems labelled A – C the one that would be the most suitable to use on a sports field at a school (for example a soccer field). Give a valid reason for your answer. (3)

TOTAL SECTION B: 105
ANSWER SHEET FOR SECTION A
GRADE 11 FINAL EXAMINATION
*Please detach and hand in with your answer book*

STUDENT NAME: __________________________________________________________

STUDENT NUMBER: ________________________________________________________

QUESTION 1

1.1.1 A B C D
1.1.2 A B C D
1.1.3 A B C D
1.1.4 A B C D
1.1.5 A B C D
1.1.6 A B C D
1.1.7 A B C D
1.1.8 A B C D
1.1.9 A B C D
1.1.10 A B C D

(10 × 2 = 20)

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2.1</td>
<td>A</td>
<td>B</td>
<td>A and B</td>
<td>None</td>
</tr>
<tr>
<td>1.2.2</td>
<td>A</td>
<td>B</td>
<td>A and B</td>
<td>None</td>
</tr>
<tr>
<td>1.2.3</td>
<td>A</td>
<td>B</td>
<td>A and B</td>
<td>None</td>
</tr>
<tr>
<td>1.2.4</td>
<td>A</td>
<td>B</td>
<td>A and B</td>
<td>None</td>
</tr>
<tr>
<td>1.2.5</td>
<td>A</td>
<td>B</td>
<td>A and B</td>
<td>None</td>
</tr>
</tbody>
</table>

(5 × 2 = 10)
<table>
<thead>
<tr>
<th>Section</th>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.3.1</td>
<td></td>
</tr>
<tr>
<td>1.3.2</td>
<td></td>
</tr>
<tr>
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<td></td>
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<tr>
<td>1.3.4</td>
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<td>1.4.5</td>
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</tbody>
</table>

(5 × 2 = 10)

(5 × 1 = 5) [45]

**TOTAL SECTION A: 45**