education

Department:
Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 10

LIFE SCIENCES P2

EXEMPLAR PAPER

MARKS: 150

TIME: 2 hours

This question paper consists of 12 pages.

151 2 E

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions:

1. Answer ALL the questions.
2. Write ALL the answers in the ANSWER BOOK.
3. Start the answer to each question at the top of a NEW page.
4. Number the answers correctly according to the numbering system used in this question paper.
5. Write neatly and legibly.
6. If answers are NOT presented according to the instructions of each question, candidates will lose marks.
7. ALL drawings should be done in pencil and labelled in blue or black ink.
8. Only draw diagrams or flow charts when requested to do so.
9. The diagrams in this question paper may NOT necessarily be drawn to scale.
10. The use of graph paper is NOT permitted.
11. Non-programmable calculators, protractors and compasses may be used.

SECTION A

QUESTION 1

1.1 Various possible options are provided as answers to the following questions. Choose the correct answer and write only the letter (A - D) next to the question number (1.1.1 - 1.1.6) in the answer book, for example 1.1.7 D.

1.1.1 The biotic component of an ecosystem is its ...

A plants and animals.
B nitrogen.
C temperature.
D mineral salts.

1.1.2 The five kingdom classification, was suggested by ...

A Mayer.
B Linnaeus.
C Pasteur.
D Darwin.

1.1.3 Which of the following processes occur during the nitrogen cycle?

(i) Consumption of plant protein by herbivores
(ii) The decay of dead organisms by decomposers
(iii) The conversion of nitrates to nitrites by bacteria
(iv) The absorption of nitrates by plants

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

1.1.4 When a jackal kills and eats a rabbit, the jackal is the ...

A producer.
B prey.
C predator.
D saprophyte.

1.1.5 The close relationship between two different organisms, is called ...

A ecology.
B symbiosis.
C predation.
D a food chain.

1.1.6 Organisms that live in water, are called ...

A terrestrial.
B xerophytes.
C buoyant.
D aquatic. **(6 x 2)** **(12)**

1.2 Give the correct biological term for each of the following descriptions. Write only the term next to the question number (1.2.1 - 1.2.8).

1.2.1 The type of interaction among two or more organisms for limited resources

1.2.2 The place in which an organism lives

1.2.3 Example of a saprophyte which cannot produce its own food

1.2.4 Species that is not indigenous to an area

1.2.5 A large region with uniform climax vegetation and climate

1.2.6 All the ecosystems of the world in which organisms exist

1.2.7 The measure of the level of acidity or alkalinity of substances in solution

1.2.8 Factors which include aspect, slope and altitude **(8)**

1.3 Match the descriptions in COLUMN A with the items in COLUMN B. Write only the letter (A - J) next to the question number (1.3.1 - 1.3.7).

COLUMN A		COLUMN B	
1.3.1	Recycle nutrients for a community	A	parasitism
1.3.2	Humus, pH and water capacity	B	prokaryotes
1.3.3	Unicellular organisms	C	edaphic factors
1.3.4	Species that no longer exist	D	decomposers
1.3.5	Plants adapted to live in water	E	carbon dioxide
1.3.6	A gas released during combustion of fossil fuels	F	protozoa
1.3.7	A tick feeding on the blood of a dog	G	eukaryotes
		H	oxygen
		I	extinct
		J	hydrophytes

(7)

1.4 Read the following passage and answer the questions that follow:

Kwashiorkor is caused by a lack of protein in the diet, especially in young children. The symptoms of the disease are as follows: swollen abdomen, stick-like legs and arms, hair that may have an orange tinge to it, crying and moaning for no known reason, slowing down of mental and physical development. The children may look fat and have swollen abdomens. The abdomen enlarges because fluid collects in a tissue, which causes organs such as the liver to enlarge. Kwashiorkor occurs when there is not enough food because of drought and war, or food sources are destroyed by diseases and pests, or people are very poor and cannot afford to buy expensive food, or people are not well-informed on a balanced diet.

1.4.1 Why is kwashiorkor regarded as a deficiency disease? (1)

1.4.2 From the passage, list THREE causes of kwashiorkor. (3)

1.4.3 Kwashiorkor is common phenomenon found in children of poor communities. Suggest THREE ways in which the department of health can try to solve this problem. (3)

(7)

1.5 In 1950 an American scientist, Thomas Park, carried out an investigation using organisms that seemed to compete for the same resource. He used two different species of beetle (A and B) that eat flour. He set up an investigation as follows:

* He put the same amount of flour into each of the jars.
* He put the same number of beetles of species A and B into each of the jars.
* He kept the jars under different temperature conditions.
* He bred the beetles for several generations.
* After the same period of time, he removed the beetles from the jars and counted them.

The following tables shows the data that he collected:

Temperature (ºC)	% of species A left in the jar	% of species B left in the jar
0	0	100
10	13	87
20	50	50
30	86	14
40	100	0

1.5.1 Which variable did Thomas Park change to see the effect? (1)

1.5.2 Which TWO variables did he keep constant to make sure it was a fair test? (2)

1.5.3 At which temperature did 50% of species B survive? (2)

1.5.4 Which species of beetle could survive a high temperature the best? (1)

1.5.5 What general conclusion can you make from this investigation? (2)
(8)

1.6 Differentiate between the following:

1.6.1 Mutualism and commensalism (4)

1.6.2 Producers and consumers (4)
(8)

TOTAL QUESTION 1: 50

TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1 Three soil samples, (A, B and C), from different places in a garden, were analysed for water content, permeability to water (ml of water passing through 100 g soil) and the humus content.

The results are indicated in the table below:

Factor analysed	Soil Samples		
	A	B	C
Water content (%)	30	10	60
Permeability	25	50	05
Humus content (%)	15	05	10

2.1.1 Which soil sample is considered best for plant growth? (1)

2.1.2 Explain your answer in QUESTION 2.1.1. (2)

2.1.3 Which ONE of the three soils would most easily become water-logged? (1)

2.1.4 Explain your answer in QUESTION 2.1.3. (2)

2.1.5 Explain why plants will wilt the quickest in sample B. (2)

2.1.6 List TWO reasons why soil should contain sufficient air. (2)
(10)

2.2 A learner wanted to determine whether ferns prefer to grow in the shade or in direct sunlight. He planted the same number and type of ferns on both the north and south sides of the school's buildings. He also watered the plants regularly.

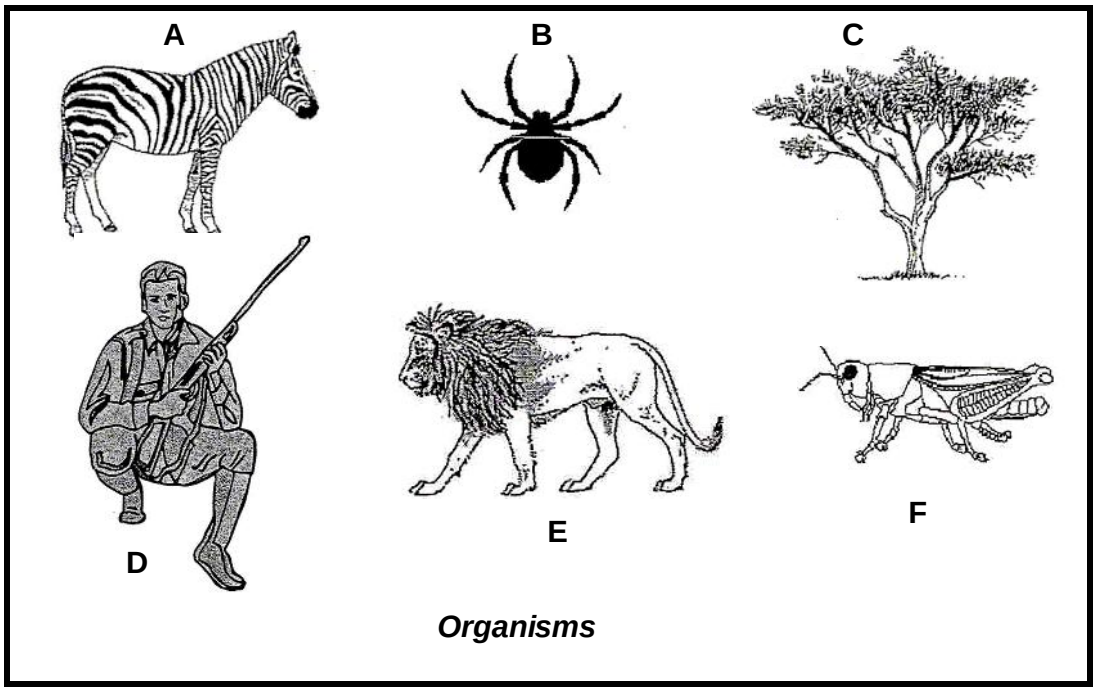
2.2.1 Write a hypothesis for the learner's investigation. (2)

2.2.2 After he designed and conducted the investigation, what results would indicate that the hypothesis mentioned in QUESTION 2.2.1 is not rejected? (2)

2.2.3 Which group of plants in this investigation would represent the control? (1)

2.2.4 Why did he use the same number and types of ferns? (2)
(7)

2.3 Study the diagrams below of organisms and answer the questions that follow:



Organisms

2.3.1 Give the letter(s) and the name(s) of the following:

(a) TWO organisms which are herbivores (2)

(b) ONE organism which is an omnivore (1)

(c) TWO organisms which are predators (2)

(d) ONE organism which is a producer (1)

2.3.2 Assume that all the above organisms are members of a community in a specific ecosystem. Draw a food chain of FOUR organisms that may occur in this specific ecosystem. (5)

2.3.3 What will happen to this community if the zebras were removed? (2)
(13)

TOTAL QUESTION 2: 30

QUESTION 3

3.1 Read the following case study on the Blue Crane that is critically endangered species and answer the questions that follow:

The Blue Crane lives in dry mountain grasslands. They make their nests on the ground. They eat grass seeds, shoots and animals such as insects and reptiles, frogs and fish found in or near grasslands. In the winter, they move from the mountains to the grasslands at lower altitudes where it is warmer. Grasslands are important agricultural land. They are often replaced by crops, pastures or plantations of trees. Grasslands are also popular areas for the development of small farms. The Blue Crane can no longer live and breed in the areas where people's activities have removed its habitat.

3.1.1 What is the most important part of the Blue Crane habitat? (1)

3.1.2 Explain your answer in QUESTION 3.1.1. (2)

3.1.3 List THREE ways in which the Blue Crane habitat is being lost or reduced. (3)

3.1.4 Why is the Blue Crane listed as a critically endangered species? (2)

3.1.5 Explain how habitat loss and the reduction in the number of the Blue Cranes can change the energy flow and energy relationships in the ecosystem. (3)

3.1.6 How can the Blue Crane be saved from extinction? (3)
(14)

3.2 Give TWO reasons why we should conserve biodiversity in South Africa. **(4)**

3.3 In a zoo animals are kept in captivity and attempts are made to ensure that the conditions are suited to their needs.

Explain the extent to which the existence of zoos influence people's awareness of the need for conservation. **(3)**

3.4 Knowledge of cultural practices tells us that the stems and leaves of various plants have been and are still used throughout South Africa. Study the table below which summarise the uses of some of these plant resources.

Province	Culture	Common name of plants that are used	Uses
KwaZulu-Natal	Zulu	*incema* *Induli* *ikhwane*	Traditional sleeping mats, woven crafts, mats
Limpopo and North West	Tswana	*umhlanga*	Reed screen around traditional dwellings

In the Limpopo Province some people build traditional dwellings with reed screens. Nowadays the reed screens are mostly used in game reserve camps for walls around bomas, swimming pools, huts and houses.

In KwaZulu-Natal *incema* is in great demand for weaving mats and other craftwork products such as baskets. Bundles of *incema* stems and leaves and/or woven mats are traditional gifts at weddings.

3.4.1 What is *indigenous knowledge*? (2)

3.4.2 Name THREE uses of *incema* in the past. (3)

3.4.3 Name TWO uses of *umhlanga* nowadays. (2)

3.4.4 How should people use plants like *incema* and *umhlanga* wisely? (2)
(9)

TOTAL QUESTION 3: 30

TOTAL SECTION B: 60

SECTION C

QUESTION 4

4.1 The table below shows the results of an investigation to determine the effect of temperature on the growth of tomatoes. The yield of each plant (the number of kilograms of tomatoes each plant produced) was measured at different temperatures.

Study the results in the table below and answer the questions that follow:

Temperature (ºC)	Yield per plant (kg)
10	0,5
15	1,5
20	2,5
25	3,5
30	2,5
35	1,0

4.1.1 Draw the line graph to show the effect of temperature on the yield of the tomato plants. (11)

4.1.2 Explain the relationship between temperature and the yield of tomatoes. (4)

4.1.3 During which season will tomatoes grow the best? (1)

4.1.4 Temperature is an abiotic factor. List FOUR other abiotic factors that will influence the yield of the tomatoes. (4)

4.1.5 What role do tomatoes play in the carbon cycle? (2)

4.1.6 Calculate the difference in yield between 10 ºC and 25 ºC. Show ALL the calculations. (3)
(25)

4.2 Environmental scientists use the term *ecological footprint* to describe the negative impact human actions have on the environment.

Legislation and anti-littering campaigns are the most important preventative measures. If soil pollution is not controlled, our surroundings will look like an endless rubbish dump. This should be clear from the following data, which indicate how long different items take to decompose:

Orange peel	-	2 to 5 months
Plastic bags	-	10 to 20 years
Nylon substances	-	30 to 40 years
Aluminium cans	-	80 to 100 years

With the above-mentioned information in mind, write an essay to express your view on this issue. Include at least THREE examples of ways in which you and your school have a negative impact on the environment, as well as in which you and your school could reduce this negative impact on the environment.

NOTE: NO marks will be awarded for answers in the form of flow charts or diagrams. **(15)**

TOTAL QUESTION 4: 40

TOTAL SECTION C: 40

GRAND TOTAL: 150