Education
KwaZulu-Natal Department of Education
REPUBLIC OF SOUTH AFRICA

LIFE SCIENCES

COMMON TEST

SEPTEMBER 2016

NATIONAL SENIOR CERTIFICATE

GRADE 10

MARKS: 60

TIME: 1 hour

N.B. This question paper consists of 7 pages.

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 answers 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. Present your answers according to the instructions of each question.
6. ALL drawings must be done in pencil and labelled in blue or black ink.
7. Draw diagrams, flow charts or tables only when asked to do so.
8. The diagrams in this question paper are NOT necessarily drawn to scale.
9. Do NOT use graph paper.
10. You must use a non-programmable calculator, protractor and compass, where necessary.
11. Write neatly and legibly.

SECTION A

QUESTION 1

1.1 Various options are given as possible answers to the following questions. Choose the answer and write only the letter (A to D) next to the question number (1.1.1 to 1.1.5) in the ANSWER BOOK, for example 1.1.6 D.

1.1.1 Which of the following is a biotic component?

A Soil
B Animals
C Water
D Temperature

1.1.2 Study the events listed below.

(i) Carbon becomes part of glucose and then other organic compounds
(ii) Animals feed on plants to obtain organic compounds
(iii) Inorganic compounds release carbon dioxide into the atmosphere
(iv) Animals release CO_2 during cellular respiration

Which ONE of the following combinations of events occurs during the carbon cycle?

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

1.1.3 The table below shows a part of an ecological study of the biomass of organisms in a community.

ORGANISM	BIOMASS (kg)
W	120
X	90
Y	2000
Z	21

Which one of the following would be a probable food chain in a balanced ecosystem?

A W → X → Y → Z
B Y → W → X → Z
C Y → X → W → Z
D Z → X → W → Y

1.1.4 Study the characteristics listed below.

(i) Heterotrophic mode of nutrition
(ii) Cells with cell wall
(iii) Able to locomote
(iv) The presence of nerve cells

Which ONE of the following combinations of characteristics applies to *Animalia*?

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

1.1.5 Which one of the following is the correct order for classifying an organism?

A Kingdom, phylum, class, genus, species
B Kingdom, class, genus, species, phylum
C Phylum, species, class, genus, kingdom
D Class, phylum, genus, species, kingdom

(5 x 2) **(10)**

TOTAL SECTION A: 10

SECTION B

QUESTION 2

2.1 The table below shows the abundance of different organisms in various regions in KZN.

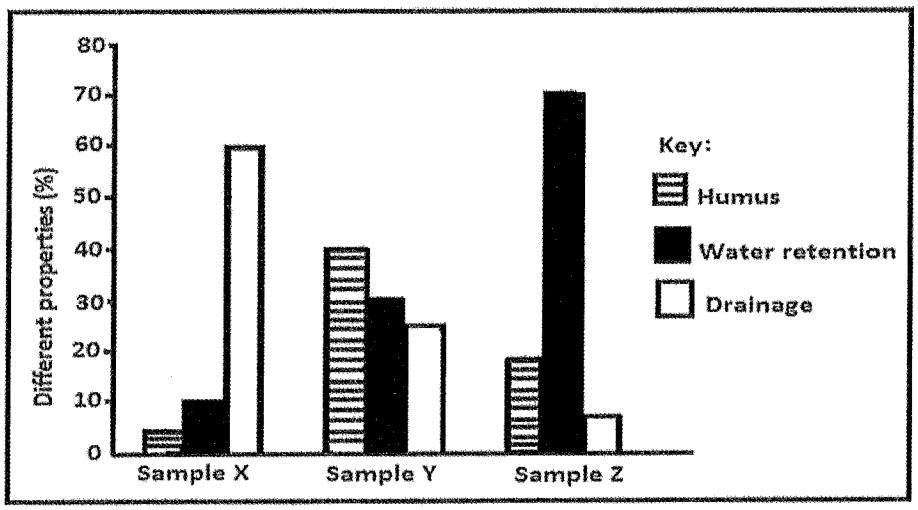
	Number of different organisms			
Regions	**Mammals**	**Reptiles**	**Plants**	**Birds**
Durban	140	65	4050	76
Bulwer	110	68	7852	84
Kokstad	90	54	5020	66
Nkandla	82	88	5162	40

2.1.1 State TWO kingdoms that are not represented in the table above. (2)

2.1.2 What percentage of the mammals are found in the Nkandla region. Show all working. (3)
(5)

2.2 A farmer collected three soil samples, (**X**, **Y** and **Z**) from different places in a farm. Each sample was analysed for the following properties: humus content, water retention and drainage rate of water.

The graph below shows the results obtained.



2.2.1 Provide a suitable caption for the above graph. (2)

2.2.2 State TWO ways of ensuring reliable results. (2)

2.2.3 State ONE reason why plants will dry up the fastest when grown in sample **X**. (1)

2.2.4 Tabulate TWO differences between the characteristics of sample **Y** and sample **Z** that makes sample **Y** better for plant growth. (5)
(10)
[15]

QUESTION 3

3.1 The table below shows the results of a study that investigated the effect of different temperatures and levels of light on the growth of tomatoes. The amount of tomatoes produced by each plant is called the yield. In this example the yield is measured in kilograms of tomatoes. The yield of each plant was measured at different temperatures and light levels.

Day Temperature (°C)	Yield per plant (kg)	
	Low light levels	High light levels
5	0,5	0,5
10	1,2	1,4
15	3,2	5,0
20	3,4	8,5
25	3,5	7,8
30	2,5	6,2

3.1.1 What information can you deduce about the conditions that give the highest yield of tomatoes? (2)

3.1.2 Why do you think there was hardly any change in yield between 15°C and 25°C when the plants were grown at low light levels? (2)

3.1.3 Light and temperature are abiotic factors that influence the growth of tomatoes. State TWO other abiotic factors that could influence the growth of tomato plants. (2)

3.1.4 Explain why plants growing on north facing slopes in South Africa generally have leaves with thick cuticles. (2)

(8)

3.2 Read the passage below and answer the questions set.

> The floristic kingdom is unique with a thick cuticle. It is found in the south west coast of the Northern Cape Province. This plant is able to withstand a winter rainfall and extremely dry summers.
>
> The south-west coast of the Northern Cape Province consists of sandy soil. This area needs to be protected against human impact in order to conserve this endemic plant species. This area may benefit local communities, tourists and environment.

3.2.1 What is meant by *endemic*? (2)

3.2.2 State which TWO parties can benefit by conserving the floristic kingdom. (2)

3.2.3 What plant and environmental features allow you to deduce that the floristic kingdom are suited as xerophytes? (3)
(7)

[15]

TOTAL SECTION B: 30

SECTION C

QUESTION 4

Below is a food chain that exists in a pond ecosystem.

Pondweed → tadpole → eel → bird

Describe the water cycle showing how it maintains the level of water in the pond and explain the effect on the food chain if pesticides from a nearby farm wash into the pond during heavy rains.

Content: (17)
Synthesis: (3)
(20)

NOTE: NO marks will be awarded for answers in the form of flow charts, tables or diagrams.

TOTAL SECTION C: 20
GRAND TOTAL: 60

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LIFE SCIENCES

MEMORANDUM

COMMON TEST

SEPTEMBER 2016

NATIONAL SENIOR CERTIFICATE

GRADE 10

N.B. This memorandum consists of 4 pages.

SECTION A

QUESTION 1

1.1.1 B✓✓
1.1.2 D✓✓
1.1.3 B✓✓
1.1.4 C✓✓
1.1.5 A✓✓

(5 x 2) **(10)**

TOTAL SECTION A **10**

SECTION B

QUESTION 2

2.1

2.1.1 - Monera✓
- Protista✓
- Fungi✓
(Mark first TWO only) Any (2)

2.1.2 140 + 110 + 90 + 82 = 422✓

$\frac{82}{422}$ x 100%✓

19.4%✓ (3)

(5)

2.2

2.2.1 Percentage of different properties of soil samples✓✓ (2)

2.2.2 - Take many readings for each soil sample and work out the average✓
- Repeat the investigation✓ Any (2)

2.2.3 Has low water retention✓/high drainage (1)

2.2.4

Soil Y	Soil Z
High humus✓	Low humus✓
Good drainage✓	Poor drainage✓

Suitable amt of the retained good H2O retention

excessive amt of H2O retained retention of H2O too much

2X2 (4) + 1 for table (5) (10)

[15]

QUESTION 3

3.1

3.1.1 High light✓ and a temperature of 20°C✓ (2)

3.1.2 - Light was a limiting factor✓
- decreasing the rate of photosynthesis✓ (2)

3.1.3 - Soil✓ Soil pH
- Water✓
- Wind✓ Climatic conditions
- Altitude✓
- Aspect✓/slope gases

(Mark first TWO only) Any (2)

3.1.4 - High amount of heat✓
- Less water available in soil✓ / dry soil
- Cuticles reduce water loss/conserve water✓ Any (2)

(8)

3.2

3.2.1 Organisms that occur in a particular area✓ and nowhere else✓/only (2)

3.2.2 - Local communities✓
- Tourists✓

(Mark first TWO only)

(2)

3.2.3 - Adapted to live in dry areas✓
- Has thick cuticle✓
- Can live in sandy soil✓ (3)

dry dry summers / drier soil (7)

SECTION C

QUESTION 4

Water cycle → don't have to say increased.

- Increased heat energy from the sun✓
- causes evaporation of water✓ (not water vapour
- from ponds to the atmosphere✓ not air
- Plant roots absorb water from soil✓
- Water from plants is lost by transpiration✓
- through their leaves✓
- Animals drink water✓ from ponds
- They also lose water vapour through sweating✓
- Air becomes saturated with water vapour✓
- Air rises and cools✓ vapour
- Water vapour condenses✓
- It forms clouds✓
- Clouds release water when it rains✓/precipitation
- Rain in the ground runs off into the ponds again✓ Any (9)

6/9

Effects of pesticides on food chain

- Pesticides pollute water✓/affect negatively / biotic components
- It poisons aquatic animals✓
- Tadpoles may die✓
- Leading to death of eels✓
- Due to shortage of food✓
- The eel population decreases✓
- Birds may also die✓
- due to increased competition for the limited eels✓/food
- Some birds migrate✓ to look for food
- Bird population decreases✓
- Pondweeds grow excessively✓
- since they have no consumers✓
- Disturbance of food chain occurs✓ ↓ not entire ecosystem Any (8)

5/8

Content (17)
Synthesis (3)
[20]

ASSESSING THE PRESENTATION OF THE ESSAY

RELEVANCE	LOGICAL SEQUENCE	COMPREHENSIVE
All information provided is relevant to the topic	Ideas arranged in a logical/ cause-effect sequence	Answered all aspects required by the essay in sufficient detail
All information is relevant to water cycle and effect of pesticides	Correct sequence of events in water cycle and cause-effect of pesticides	At least (6) points on water cycle; (5) points on the effect of pesticides on food chain.
1 mark	1 mark	1 mark

TOTAL SECTION C: 20
GRAND TOTAL: 60