



education

Department:
Education
PROVINCE OF KWAZULU-NATAL

**NATIONAL
SENIOR CERTIFICATE**

GRADE 11

**LIFE SCIENCES
COMMON TEST
SEPTEMBER 2018**

MARKS: 60

TIME: 1 hour

This question paper consists of 7 pages including this page.

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. Make ALL drawings in pencil and label them in blue or black ink.
7. Draw diagrams, tables or flow charts 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 a compass, where necessary.
11. Write neatly and legibly.

SECTION A**QUESTION 1**

Various options are provided as possible answers to the following questions. Choose the correct answer and write only the letter (A to D) next to the question number (1.1 to 1.5) in your ANSWER BOOK, for example 1.6 D.

- 1.1 Which ONE of the following substances is excreted by the skin, lungs and kidneys?
- A Urea
 - B Uric acid
 - C Water
 - D Carbon dioxide
- 1.2 What is the pH of urine likely to be if there is an excess of bicarbonate ions in the blood?
- A 5
 - B 6
 - C 7
 - D 8
- 1.3 A disadvantage of monoculture is that it decreases ...
- A biodiversity.
 - B crop yield.
 - C pesticide use.
 - D herbicide use.
- 1.4 Study the characteristics below.
- (i) Absence of natural predators in the habitat
 - (ii) Usually outcompeted by the natural vegetation in the area
 - (iii) Can be regulated through biological control
 - (iv) Usually indigenous
- Which ONE of the following combinations of characteristics apply to alien-invasive plants?
- A (ii) and (iv) only
 - B (i) and (iii) only
 - C (ii) and (iii) only
 - D (i) and (iv) only

1.5 A reduction in the use of chlorofluorocarbons (CFCs) may contribute to ...

- A a higher incidence of skin cancer.
- B a lower incidence of damage to the eyes.
- C a depletion of the ozone layer.
- D an increase in global warming.

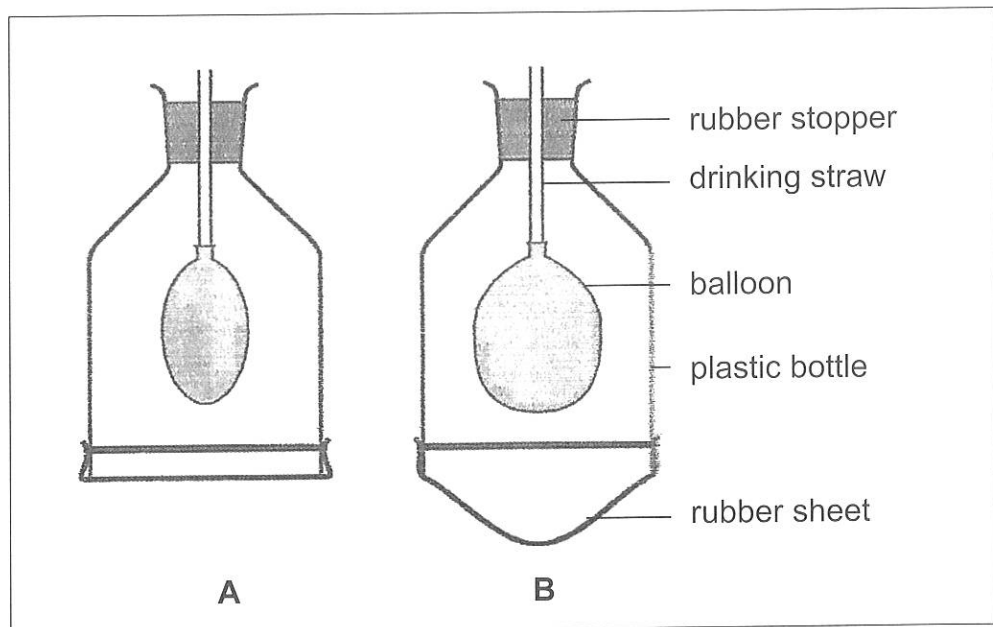
(5 x 2) (10)

TOTAL SECTION A: 10

SECTION B

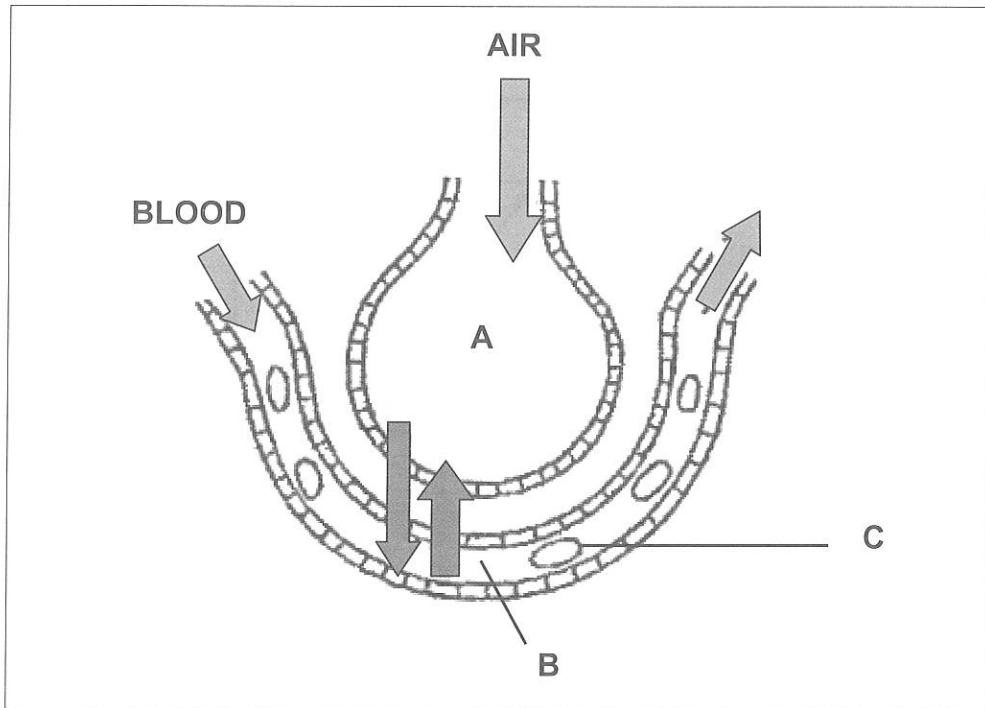
QUESTION 2

2.1 The diagram below represents a working model of the breathing system.



- 2.1.1 Name the part of the breathing system represented by the rubber sheet. (1)
 - 2.1.2 Give a visible reason why diagram **B** represents inhalation. (1)
 - 2.1.3 State how the action of this model differs from the similar mechanism in the human body. (2)
 - 2.1.4 Describe the process of exhalation that occurs in the human body. (4)
- (8)**

2.2 The following diagram represents an alveolus and a blood capillary in the human lung. The arrows indicate the direction in which gases are moving.



2.2.1 Will carbon dioxide move from **A** to **B** or from **B** to **A**? (1)

2.2.2 Explain ONE advantage of the fact that cell **C** passes through the capillary in a single row. (2)

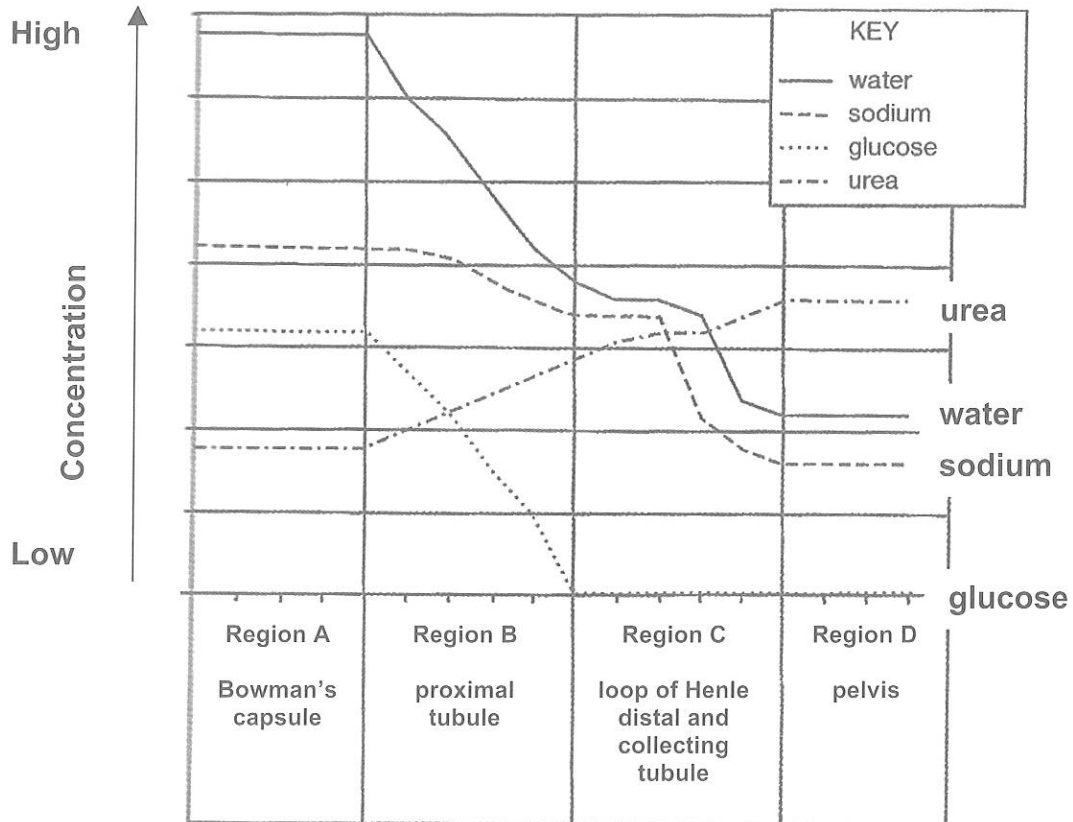
2.2.3 In the disease emphysema, the alveolus becomes less lobed.
Explain the effect that this could have on the process of gas exchange. (2)

2.2.4 Carbon dioxide is a greenhouse gas.
Explain ONE consequence of an increased concentration of carbon dioxide in the atmosphere. (2)
(7)

[15]

QUESTION 3

3.1 The following graph shows the concentration of certain substances as they pass through the nephron of a person's kidney.



- 3.1.1 Name the process that occurs in region:
- (a) **A** (1)
 - (b) **B** (1)
- 3.1.2 Name the metabolic waste product that occurs in higher concentration in urine than in blood. (1)
- 3.1.3 Give a reason for the increased concentration of the metabolic waste product named in QUESTION 3.1.2. (1)
- 3.1.4 Explain ONE way in which the Bowman's capsule is adapted for its function. (2)
- 3.1.5 Using information from the graph, explain whether the person was suffering from:
- (a) Diabetes (2)
 - (b) Dehydration (2)
- (10)**

- 3.2 The table below shows the percentage of water consumed by different sectors in South Africa.

SECTOR	AMOUNT OF WATER CONSUMED (%)
Domestic	29
Agricultural	59
Industry and mining	8
Commercial afforestation	4

- 3.2.1 Which ONE of the sectors listed above contributes most to eutrophication? (1)
- 3.2.2 State TWO effects of eutrophication. (2)
- 3.2.3 During periods of drought, consumers may experience water restrictions.
Explain why these restrictions are likely to be imposed upon the domestic sector rather than the other sectors listed. (2)
(5)
[15]

TOTAL SECTION B: 30

SECTION C

QUESTION 4

Describe the various factors that threaten food security.

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
COMMON TEST
MEMORANDUM - SEPTEMBER 2018**

**NATIONAL
SENIOR CERTIFICATE**

GRADE 11

MARKS: 60

This memorandum consists of 6 pages.

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Please turn over

PRINCIPLES RELATED TO MARKING LIFE SCIENCES

- If more information than marks allocated is given**
Stop marking when maximum marks is reached and put a wavy line and 'max' in the right-hand margin.
- If, for example, three reasons are required and five are given**
Mark the first three irrespective of whether all or some are correct/incorrect.
- If whole process is given when only a part of it is required**
Read all and credit the relevant part.
- If comparisons are asked for, but descriptions are given**
Accept if the differences/similarities are clear.
- If tabulation is required, but paragraphs are given**
Candidates will lose marks for not tabulating.
- If diagrams are given with annotations when descriptions are required**
Candidates will lose marks.
- If flow charts are given instead of descriptions**
Candidates will lose marks.
- If sequence is muddled and links do not make sense**
Where sequence and links are correct, credit. Where sequence and links are incorrect, do not credit. If sequence and links become correct again, resume credit.
- Non-recognised abbreviations**
Accept if first defined in answer. If not defined, do not credit the unrecognised abbreviation, but credit the rest of the answer if correct.
- Wrong numbering**
If answer fits into the correct sequence of questions, but the wrong number is given, it is acceptable.
- If language used changes the intended meaning**
Do not accept.
- Spelling errors**
If recognisable, accept the answer, provided it does not mean something else in Life Sciences or if it is out of context.
- If common names are given in terminology**
Accept, provided it was accepted at the national memo discussion meeting.
- If only the letter is asked for, but only the name is given (and vice versa)**
Do not credit.
- If units are not given in measurements**
Candidates will lose marks. Memorandum will allocate marks for units separately.
- Be sensitive to the sense of an answer, which may be stated in a different way.**
- Caption**
All illustrations (diagrams, graphs, tables, etc.) must have a caption.

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SECTION A

QUESTION 1

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

(5 x 2) (10)

TOTAL SECTION A: 10

SECTION B

QUESTION 2

- 2.1 2.1.1

Diaphragm✓

(1)

- 2.1.2

Inflated balloon ✓

Lowered rubber sheet ✓/increase in volume of bell jar
 OR

(1)

- 2.1.3
- The movement of the rib-cage✓/action of intercostal muscles cannot be demonstrated✓

(2)

- 2.1.4

- Diaphragm relaxes✓
- External intercostal muscles relax✓
- The volume of the thoracic cavity decreases✓
- The pressure on the lungs/interpleural pressure increases✓
- Air leaves the lungs✓ and enters the atmosphere

Any 4

(4)

- 2.2 2.2.1

B to A✓

(1)

- 2.2.2

- Every cell is brought close to the alveolus✓
- to increase the amount of gases exchanged✓

(2)

- 2.2.3

- The surface area of the alveolus will decrease✓
- thus decreasing the amount of gases exchanged✓

(2)

- 2.2.4

- Leads to enhanced greenhouse effect✓
- causing global warming✓/increase in average temperature of the Earth

(2)

(7)

[15]

QUESTION 3

- 3.1 3.1.1

- (a) Glomerular filtration✓//Ultrafiltration/Filtration
- (b) Tubular reabsorption✓

(1)

- 3.1.2

Urea✓

(1)

- 3.1.3

Water is reabsorbed from the renal tubule✓

OR
 Urea is excreted by epithelial cells of distal convoluted tubule into filtrate✓

(1)

- 3.1.4

- Inner wall is a single layer of podocytes with slit pores✓
- that allow only very small substances from blood to pass through✓

OR

- Bowman's capsule is cup-shaped✓
- to increase surface area for filtration✓

Mark first ONE only

Any 1 x 2 (2)

- 3.1.5

- (a) No✓ - All glucose is reabsorbed at the proximal convoluted tubule✓/no glucose present in urine/pelvis

(2)

- (b) Yes✓ - A lot of water is reabsorbed✓/very little water is present in urine/pelvis

(2)

(10)

- 3.2 3.2.1

Agricultural✓
 Mark first ONE only

(1)

- 3.2.2

- Rapid algal growth✓
- Increased bacterial action/decomposition✓
- Depletion of oxygen in the water✓
- Death of plants & animals✓

Mark first TWO only

Any 2 (2)

- 3.2.3

- Water restrictions imposed on other sectors will negatively impact the economy✓/food security of the country
- Water restrictions on the domestic sector will affect the lifestyle of the individual✓ and not the country

(2)

(5)

[15]

SECTION C**QUESTION 4****Human exponential population growth**✓

- may result in domestic consumption of food being more than its production✓

Droughts and floods✓/**Climate change**

- Crop failure results✓
 - Since crops are damaged by floods✓
 - or crops receive insufficient water✓ during periods of drought
- Monoculture**✓
- Leads to soil erosion✓
 - leaching/depletion of nutrients from soil✓
 - pollution of rivers✓
 - due to over-fertilising the soil✓
 - Lack of genetic variety makes crops prone to outbreaks of disease✓
 - and infestation by pests✓

Pest control✓

- Over-use of pesticides✓
- may cause accumulation of pesticide in food chains✓
- killing natural predators✓ that control pests
- This could cause crop failure✓/lower yields of crops
- Costs associated with the use of pesticides causes an increase in food price✓

Loss of topsoil✓/**Erosion**

- Leads to the loss of nutrients✓ in soil
- which reduces crop yield✓

Need for fertilisers✓

- Over-use of fertilisers✓
- Can affect aquatic life through eutrophication✓
- Also costly, therefore causes increase in food prices✓

Alien plants and the reduction of agricultural land✓

- Alien plants grow invasively✓,
- and use very large amounts of water✓
- reducing water availability for crops✓/outcompeting the crops

Loss of wild varieties✓ **impact on gene pools**

- Lack of variety in the gene pool✓ for crops can threaten food security
- if in the future crops are threatened by new diseases✓/a change in the environmental conditions

Genetically engineered foods✓

- These crops are grown in monoculture✓/reducing genetic diversity
- which may threaten the survival of the crop if the environment changes✓
- They are costly✓ to produce
- making food less accessible to the poor✓

Wastage of food also threatens food security✓

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
All information relates to factors threatening food security.	All factors threatening food security are arranged in a logical sequence	Factors threatening food security discussed comprehensively
No irrelevant information		Minimum mark: 11/20
1 mark	1 mark	1 mark

TOTAL SECTION C: 20
GRAND TOTAL: 60

