



Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE 11
LIFE SCIENCES
CONTROLLED TEST 3
14 SEPTEMBER 2023

MARKS: 50

TIME: 1 hour

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 your 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. Present your answers according to the instructions of each question.
6. Do ALL drawings in pencil and label them in blue or black ink.
7. Draw diagrams, tables or 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.
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 – D) next to the question number (1.1.1 – 1.1.2) in the ANSWER BOOK, for example 1.1.3 D.

- 1.1 1.1.1 In which ONE of the following structures is cilia found?

- A Larynx
B Alveoli
C Trachea
D Capillary blood vessels

- 1.1.2 Glucose is present in someone's urine who suffers from...

- A kidney stones.
B diabetes mellitus.
C bladder infection.
D injury to the lower back.

(2 x 2) **(4)**

- 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 – 1.2.3) in the ANSWER BOOK.

1.2.1 The inherent ability of a population to increase by birth

1.2.2 A protective membrane surrounding the lungs

1.2.3 The process of moving air out of the body/lungs. (3 x 1)

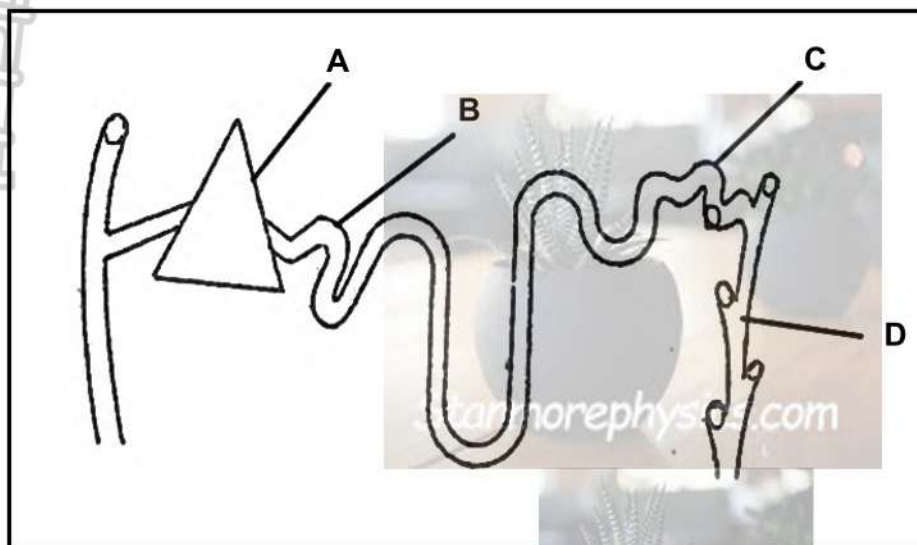
(3)

- 1.3 Indicate whether each of the statements in COLUMN I applies to **A ONLY**, **B ONLY**, **BOTH A AND B** or **NONE** of the items in COLUMN II. Write **A only**, **B only**, **both A and B** or **none** next to the question number (1.3.1 – 1.3.2) in the ANSWER BOOK.

	COLUMN I	COLUMN II
1.3.1	Hormone involved in the reabsorption of water	A: ADH B: Glucagon
1.3.2	Permanent movement of organisms out of a specific area	A: Emigration B: Migration

(2 x 2) **(4)**

- 1.4 Study the diagrammatic representation of the nephron of the human kidney below. The triangle labelled A represents a part of the nephron that has been left out of the diagrammatic representation.



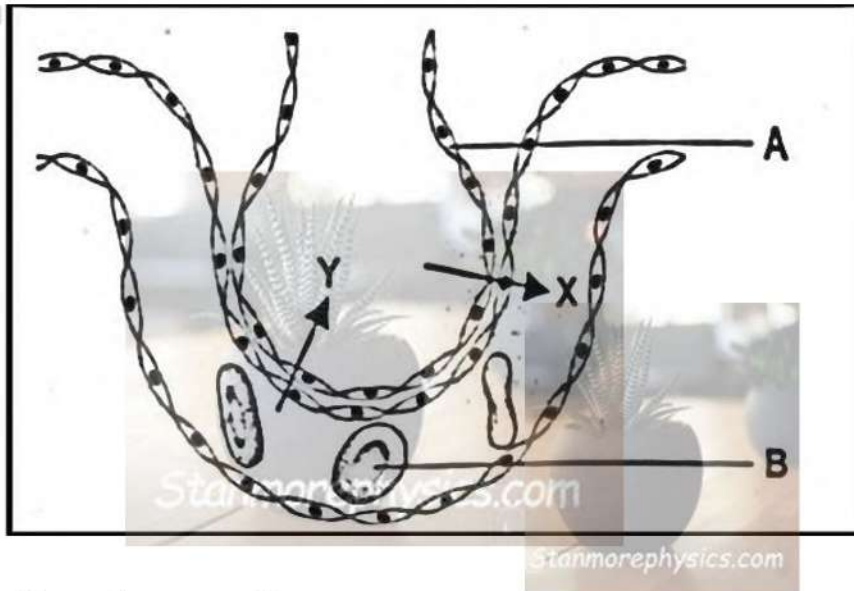
- 1.4.1 Identify the parts labelled **B** and **D**. (2)
1.4.2 State ONE function of part **C**. (1)
1.4.3 Explain TWO ways in which the part **A** is structurally suited for its function. (4)
(7)

TOTAL SECTION A : 18

SECTION B

QUESTION 2

2.1 The diagram represents a section of the internal structure of a part of the human lung.



2.1.1 Name the gas at **Y** (1)

2.1.2 State ONE form in which gas **X** is transported in the body. (1)

2.1.3 In normal and healthy lungs, an effective oxygen supply is maintained between the alveoli and the lung capillaries.

Describe and explain how this is maintained (2)

2.1.4 Explain the role of the normal shape of **B**. (2)

(6)

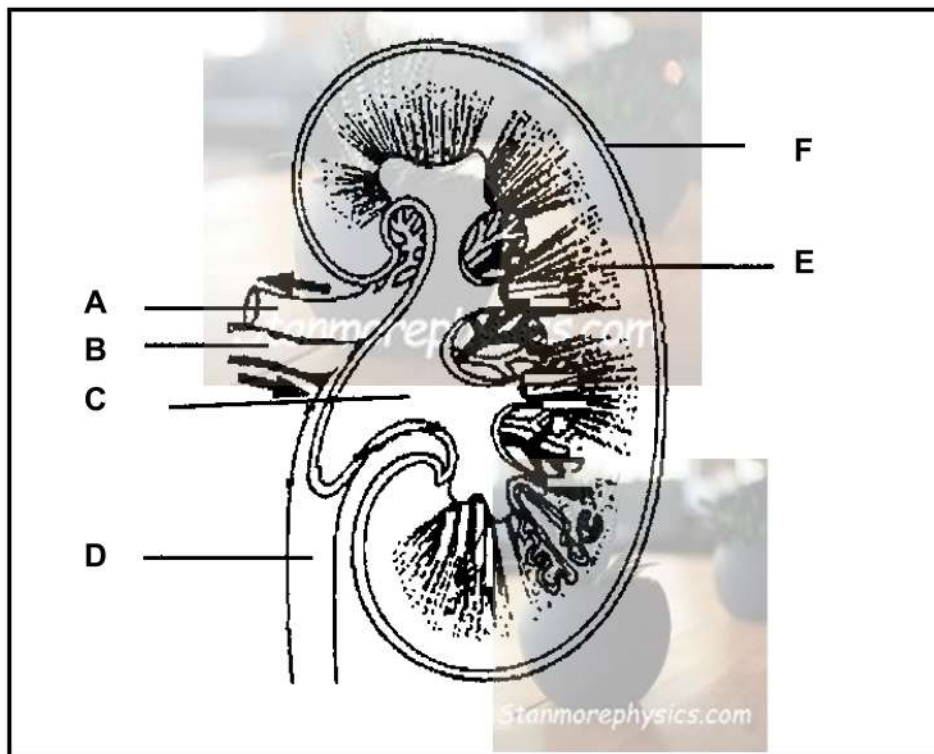
2.2 An investigation was conducted to determine the effect of smoking on the prevalence of diseases. Study the table below and answer the questions that follow.

		Mortality rate per 100 000		
Diseases	Active - smoker	Passive - smoker	Non – smoker	
Lung cancer	200	190	11	
Cancer of the mouth or larynx	30	20	6	
Other cancers	195	80	105	
Respiratory diseases	60	56	12	
Heart diseases	220	138	80	
Other medical conditions	70	40	35	
Suicide, homicide, accidents	70	75	20	

- 2.2.1 State the dependent variable for this investigation. (1)
- 2.2.2 State TWO ways which could have been followed to ensure that results are valid. (2)
- 2.2.3 Draw a bar graph representing the above information for active smokers (6)
- (9)
- (15)

QUESTION 3

3.1 The diagram below shows a section through a kidney.



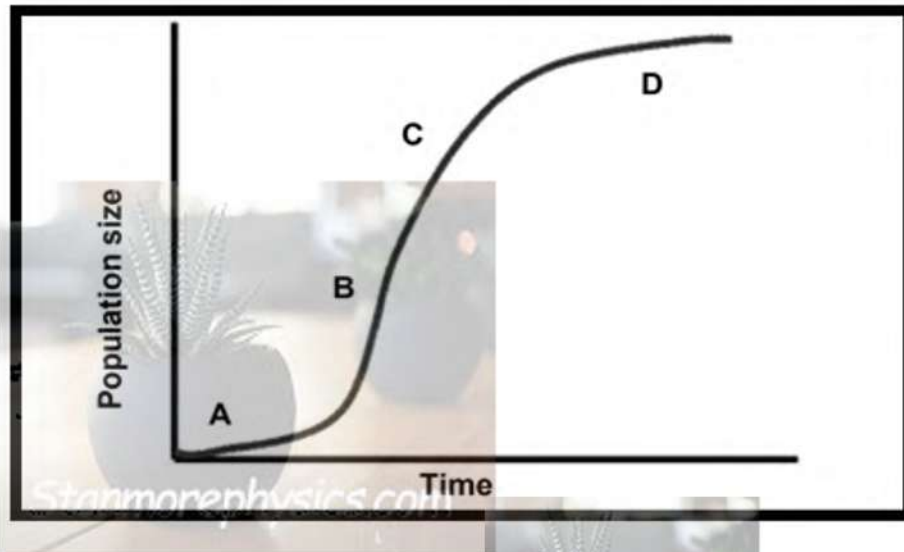
3.1.1 Name the functional unit of the kidney. (1)

3.1.2 Give the name of the part that is cone shaped and consisting of many ducts collecting urine (1)

3.1.3 An athlete fainted after running a long distance without taking water on a very hot day. During the tests which were conducted, the doctor discovered that his urine had less water/smaller volume of water.

Describe fully the process which led to less water in his urine. (6)
(8)

3.2 The graph below shows the population growth of a population of butterflies.



- 3.2.1 What type of growth curve is shown in the graph? (1)
- 3.2.2 Name phase labelled **B**. (1)
- 3.2.3 Explain the shape of the graph at **C**. (3)
- (5)

3.3 In 2007, a fire broke out in a part of the Umngazi game reserve reducing the carrying capacity for impala in the reserve to 140. To compare the population size to the carrying capacity, 15 impala were captured, marked and released. One month later 40 impala were recaptured and of these 5 were found to be marked.

- 3.3.1 Calculate the size of the Impala population, using the Lincoln – Petersen index ($N = C \times M / R$. Show ALL working) (3)
- 3.3.2 List ONE precaution that must be followed when using the method described in QUESTION 3.3.1 to estimate population size. (1)
- (4)
- (17)

TOTAL SECTION B: 32

GRAND TOTAL: 50



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GRADE 11

LIFE SCIENCES
CONTROLLED TEST 3
MARKING GUIDELINE
2023

Stanmorephysics.com

MARKS: 50

This marking guideline consists of 6 pages.

PRINCIPLES RELATED TO MARKING LIFE SCIENCES

1. **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.
2. **If, for example, three reasons are required and five are given**
Mark the first three irrespective of whether all or some are correct/incorrect.
3. **If whole process is given when only a part of it is required**
Read all and credit the relevant part.
4. **If comparisons are asked for but descriptions are given**
Accept if the differences/similarities are clear.
5. **If tabulation is required, but paragraphs are given**
Candidates will lose marks for not tabulating.
6. **If diagrams are given with annotations when descriptions are required**
Candidates will lose marks.
7. **If flow charts are given instead of descriptions**
Candidates will lose marks.
8. **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.
9. **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.
10. **Wrong numbering**
If answer fits into the correct sequence of questions but the wrong number is given, it is acceptable.
11. **If language used changes the intended meaning**
Do not accept.
12. **Spelling errors**
If recognizable, accept the answer, provided it does not mean something else in Life Sciences or if it is out of context.
13. **If common names are given in terminology**
Accept, provided it was accepted at the memo discussion meeting.
14. **If only the letter is asked for but only the name is given (and vice versa)**
Do not credit.

SECTION A

QUESTION 1

1.1

1.1.1 C✓✓

1.1.2 B✓✓

2 x 2 (4)

1.2

1.2.1 Natality✓

1.2.2 Pleura✓/ pleural membrane

1.2.3 Exhalation ✓

2 x 1 (3)

1.3

1.3.1 A only✓✓

1.3.2 A only✓✓

2 x 2 (4)

1.4

1.4.1. B- Proximal Convoluted Tubule✓

(1)

D- Collecting tubule✓/ duct

(1)

1.4.2 - Tubular reabsorption✓

- Tubular excretion✓

- Osmoregulation✓

Mark the first ONE only

Any (1)

1.4.3 - It consist of a wide network of capillaries✓ (glomerulus)
to increase surface area for filtration ✓

- It is also made up of a single layer of endothelium✓
for easy diffusion of filtrate✓

- It consists of a single layer of squamous epithelium with podocytes✓
to allow the filtrate to pass through and enter the renal tube ✓

-Afferent arteriole is wider than efferent arteriole, causing high pressure in the
glomerulus.

(Mark the first TWO only)

Any (2 x 2) (4)

(8)

TOTAL SECTION A: (18)

SECTION B

QUESTION 2

2.1.1 Carbon dioxide✓ / CO₂ (1)

2.1.2 - Oxyhaemoglobin✓
- Dissolved in the plasma
(Mark the first ONE only) Any (1)

2.1.3

- Ventilation✓/breathing brings in air with a higher oxygen level✓/removes air with a low oxygen level
- OR
- Circulation✓/transport/moving of blood with a high oxygen level is removed from the lungs✓/blood with a low oxygen level is brought into the lungs

Any (2)

2.1.4 B is disc-shaped✓
to increase the surface area for gaseous exchange✓ (2)
(6)

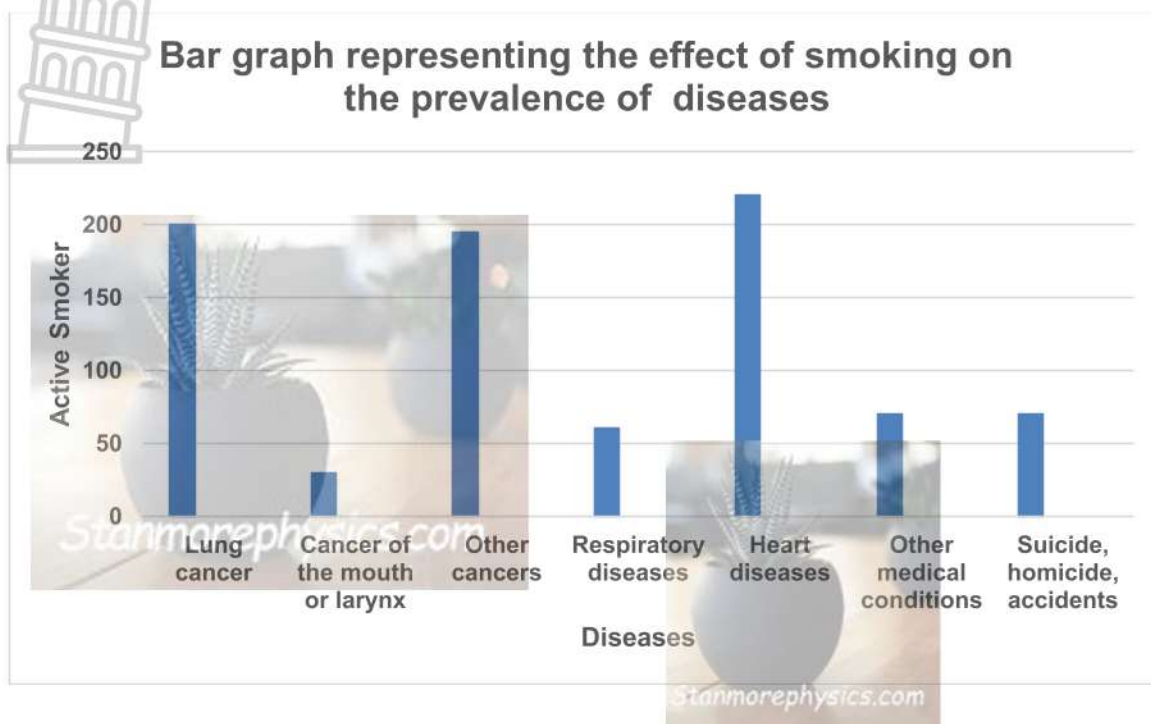
2.2.1 Prevalence of diseases ✓ (1)

2.2.2

- Participants of the same age✓
- Same substance smoked by all smoking participants✓
- Same environment✓
- Same period of investigation✓
- Same technique followed for diagnosis✓
- Same health facility for diagnosis✓
- Same gender✓

(Mark the first TWO only) Any (2)

2.2.3

**Rubric for mark allocation for the graph**

Criteria	Mark allocation
Bar graph is drawn (T)	1 mark
Title/caption of graph (C)	1 mark
Correct label for X-axis and Y-axis (L)	1 mark
Correct scale for X- axis (equal width of the bars and spaces between the bars) and Y-axis (S)	1 mark
Drawing of the bars (P)	1 to 3 bars plotted correctly – 1 mark All 4 bars plotted correctly – 2 marks

(9)

(15)

QUESTION 3

3.1.1 Nephron✓ (1)

3.1.2 (renal)pyramids✓ (1)

3.1.3 Osmoregulation *✓

- Spending a long period in the sun without drinking water led to the shortage of water in the blood✓
 - The receptors in the hypothalamus were stimulated✓
 - to secrete more ADH✓
 - ADH was transported to the kidneys by the blood
 - to increase the permeability✓ of the
 - collecting ducts i✓n the kidneys
 - More water was reabsorbed ✓
- back into the bloodstream and less water was excreted in the urine.

*1 compulsory + 5 (6)
(8)

3.2

3.2.1 Logistic/ S-shaped growth Curve✓ (1)

3.2.2 Logistic phase✓/ Accelerating/ Geometric Growth phase (1)

3.2.3

- Population growth slows down✓
 - because of the environmental resistance✓
 - and the population size is approaching the optimum/maximum size✓ which can be supported by the habitat
- (3)
(5)

3.3.1 $(15 \times 40) \checkmark \div 5 \checkmark = 120 \checkmark$ (3)

3.3.2

- The mark must not harm/affect the organism in any way✓
 - The mark must last for the duration of the investigation✓
 - Investigation must be carried out on/in a closed population✓
 - Enough time must be given for the marked organisms to mix with the rest of the population✓
 - Several samples can be taken and then an average calculated✓
 - The animals must be randomly captured ✓
- Any (1)
(Mark the first ONE only)

(4)
(17)



TOTAL SECTION B: 32
GRAND TOTAL: 50

