



Education

**KwaZulu-Natal Department of Education
REPUBLIC OF SOUTH AFRICA**

LIFE SCIENCES

COMMON TEST

SEPTEMBER 2017

**NATIONAL
SENIOR CERTIFICATE**

GRADE 11

MARKS: 60

TIME: 1 hour

This question paper consists of 8 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 a compass where necessary.
11. Write neatly and legibly.

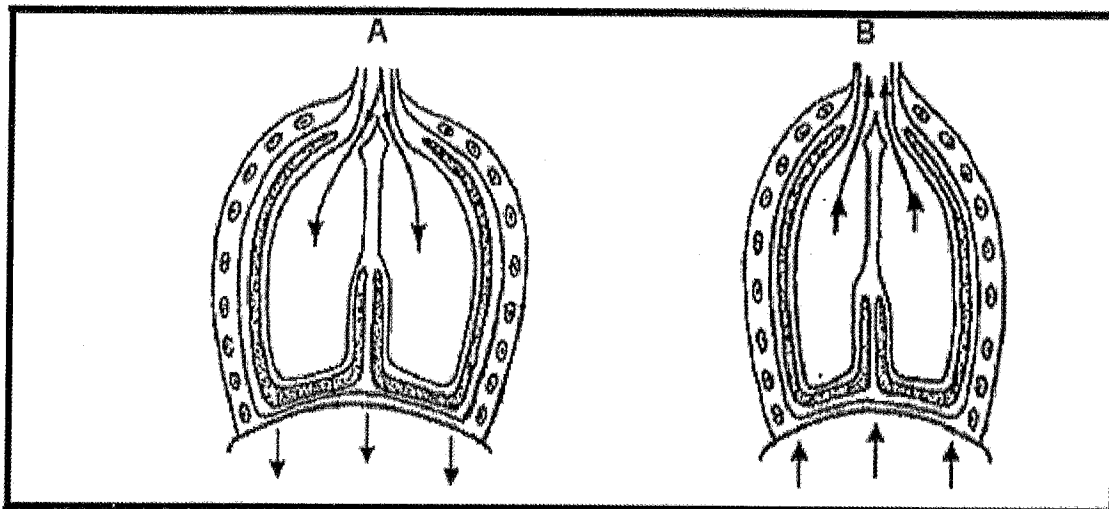
SECTION A**QUESTION 1**

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 The blood vessel that carries deoxygenated blood from the heart to the lungs is the ...

- A pulmonary vein.
- B pulmonary artery.
- C renal vein.
- D renal artery.

QUESTIONS 1.1.2 AND 1.1.3 ARE BASED ON THE DIAGRAM BELOW.



The diagram above represents the sectional front views of the chest region of a human during breathing movements.

1.1.2 Which breathing movement is represented by diagram A?

- A Inhalation
- B Exhalation
- C Respiration
- D Gaseous exchange

1.1.3 Below is a list of changes that occur during breathing.

- (i) The rib cage is lowered and the length of the thoracic cavity is decreased.
- (ii) The total volume of the thoracic cavity decreases and pressure on the lungs increases.
- (iii) Air is forced out of the lungs.
- (iv) The external intercostal muscles and diaphragm relax.

Which ONE of the following represents the changes in the correct order that take place in the process represented by diagram B?

- A (i) → (ii) → (iii) → (iv)
- B (iv) → (ii) → (i) → (iii)
- C (ii) → (iv) → (iii) → (i)
- D (iv) → (i) → (ii) → (iii)

1.1.4 A muscular sac which stores urine temporarily is the ...

- A kidney.
- B ureter.
- C bladder.
- D urethra.

1.1.5 Which ONE of the following would be the result of a person drinking a large volume of water?

	Amount of ADH secreted	Reabsorption of water from kidney tubule	Volume of urine produced
A	Decreases	Decreases	Increases
B	Decreases	Increases	Decreases
C	Increases	Decreases	Increases
D	Increases	Increases	Decreases

(5 x 2)

(10)

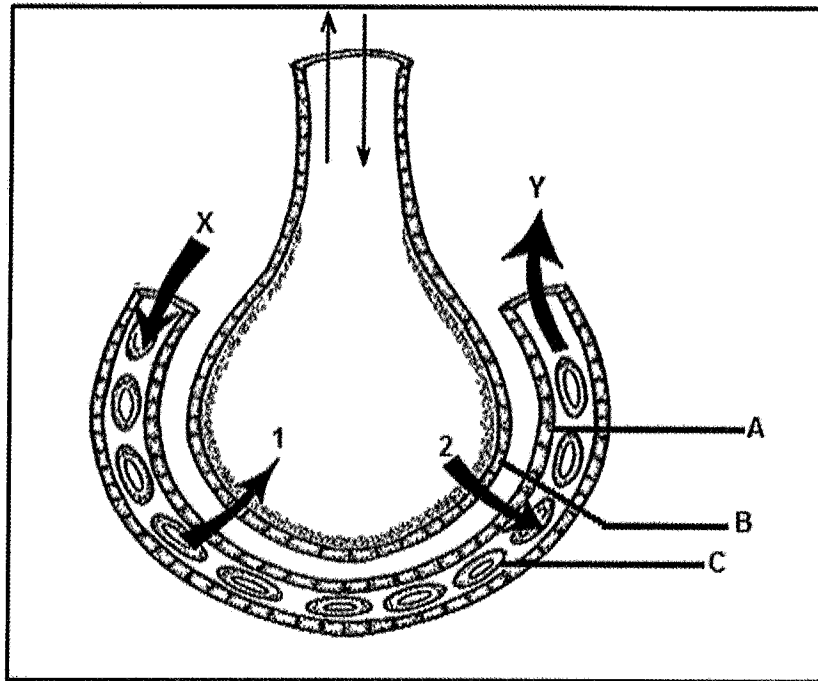
TOTAL SECTION A:

10

SECTION B

QUESTION 2

2.1 Study the diagram representing a section through an alveolus and the surrounding blood capillary in the human body.



2.1.1 Identify:

- (a) Epithelial tissue B (1)
- (b) Part C (1)

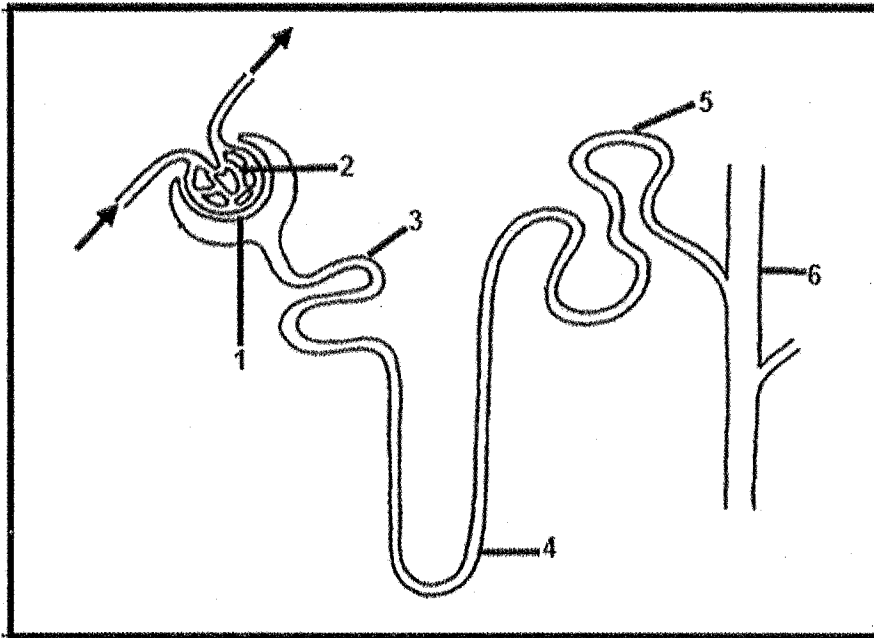
2.1.2 Explain why point Y has a higher concentration of oxygen than point X. (2)

2.1.3 Identify the gas represented by 1. (1)

2.1.4 State TWO forms in which the gas mentioned in Question 2.1.3 is transported in the blood. (2)

(7)

2.2 The diagram below represents the structure of the nephron.



The table below shows the concentration of some of the substances found in the nephron of a human being.

Part of the nephron	Urea g/100 cm ³	Glucose g/100 cm ³	Proteins g/100 cm ³	Salts g/100 cm ³
2	0,03	0,10	8,00	0,72
3	0,03	0,10	0,00	0,72
6	2,00	0,00	0,00	1,50

- 2.2.1 Name the specialized cells found at part 1. (1)
- 2.2.2 Which substance:
- (a) Did not pass from part 2 to part 3 (1)
- (b) Was completely reabsorbed from part 3 (1)
- 2.2.3 Calculate the difference in the salt concentration between part 3 and part 6. Show all working. (3)
- 2.2.4 Explain why the concentration of urea is greater in part 6 than in part 3. (2)
- (8)**
[15]

QUESTION 3

- 3.1 The table below shows the percentage of carbon dioxide (CO₂) emitted by different sectors in a certain city in South Africa.

SECTOR	CO ₂ EMISSION (%)
Transport	25
Residential	27
Industrial	15
Commercial	28
Other	5

- 3.1.1 Identify the dependent variable in this investigation. (1)
- 3.1.2 Which sector emits the most carbon dioxide? (1)
- 3.1.3 Draw a pie chart to represent the data shown in the table above. Show all the working. (6)
- 3.1.4 Describe how an increase in the CO₂ concentration can lead to global warming. (3)
- (11)**

- 3.2 Read the passage below and answer the questions.

The fynbos vegetation is unique to South Africa. Approximately 68% of the plants are endemic. This vegetation grows in the south-western parts of the Western Cape Province.

The vegetation of this biome grows in nutrient poor soil. They survive long dry summer conditions and frequent fires.

Flora of the Cape is threatened by alien vegetation and habitat destruction by humans. Already many species are extinct from this biome. Hence, its conservation is a national conservation priority.

- 3.2.1 State ONE environmental condition mentioned in the passage under which fynbos grows. (1)
- 3.2.2 State how fynbos vegetation is threatened by alien vegetation. (1)
- 3.2.3 Suggest TWO reasons why humans need to conserve nature. (2)
- (4)**
[15]

TOTAL SECTION B: 30

SECTION C**QUESTION 4**

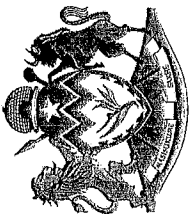
Describe how poor farming practices may impact negatively on the availability of water, quality of water, and food security.

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

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

TOTAL SECTION C: 20

GRAND TOTAL: 60



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LIFE SCIENCES
MARKING GUIDELINE
COMMON TEST
SEPTEMBER 2017

NATIONAL SENIOR CERTIFICATE

GRADE 11

This marking guideline consists of 5 pages.

SECTION A

QUESTION 1

- 1.1
- 1.1.1 B✓✓
 - 1.1.2 A✓✓
 - 1.1.3 D✓✓
 - 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 (a) Squamous✓ epithelial tissue (1)
 - (b) Red blood corpuscle✓/red blood cell/erythrocyte (1)
 - 2.1.2 - Oxygen has diffused✓ (2)
 - from the alveolus into the blood✓
 - 2.1.3 Carbon dioxide✓/CO₂ (1)
 - 2.1.4 - Bicarbonate ions✓
 - Carbaemoglobin✓/carbaminohaemoglobin
 - Solution in blood plasma✓
 - (Mark first TWO only)**
- Any (2)
 (7)
- 2.2
- 2.2.1 Podocytes✓ (1)
 - 2.2.2 (a) Protein✓ (1)
 - (b) Glucose✓ (1)
 - 2.2.3 1,50 – 0,72✓ (3)
 - = 0,78✓ g/100 cm³✓
 - 2.2.4 - Large amount of water✓
 - is reabsorbed from the tubule into the medulla✓
- OR**
- Some urea is added✓ (2)
 - into the distal convoluted tubule✓/part 5 (8)
- [15]**

QUESTION 3

3.1

3.1.1 CO₂ Emission ✓

(1)

3.1.2 Commercial sector ✓

(1)

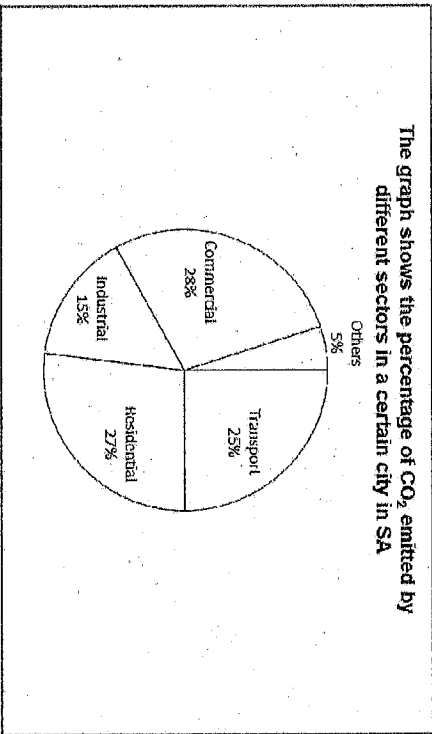
3.1.3 Transport: $25 \div 100 \times 360^\circ = 90^\circ$

Residential: $27 \div 100 \times 360^\circ = 97,2^\circ/97^\circ$

Industrial: $15 \div 100 \times 360^\circ = 54^\circ$

Commercial: $28 \div 100 \times 360^\circ = 100,8^\circ/101^\circ$

Other: $5 \div 100 \times 360^\circ = 18^\circ$



Criteria	Mark allocation
Correct type of graph (T)	1
Title of graph	1
Calculations/ working to determine the correct proportions (C)	1: 1 to 4 calculations correct 2: All 5 calculations correct
Proportions accurate for each sector/slice labeled/key provided (P)	1: 1 - 3 sectors drawn correctly 2: All 5 sectors drawn correctly

(6)

3.1.4 - Increased CO₂ will trap more heat ✓

- therefore preventing the escape of heat from the Earth 's surface ✓

- leading to an enhanced greenhouse effect ✓

- raising the temperature on Earth 's surface ✓

Any (3)

(11)

3.2

3.2.1 - Nutrient poor soil ✓

- Dry summer conditions ✓

- Frequent fires ✓

(Mark first ONE only)

Any (1)

3.2.2 Alien vegetation take up space ✓/use up resources such as water and nutrients

(1)

3.2.3 - To prevent extinction of species ✓

- To preserve natural resources ✓

- Economic benefit for humans ✓

- Ecotourism ✓

- Medicinal plants/animals ✓

(Mark first TWO only)

Any (2)

(4)

TOTAL SECTION B: 30 [15]

SECTION C

QUESTION 4

Poor farming practices and availability of water

- Open drain irrigation ✓
- leads to loss of water by evaporation ✓
- Contamination of water sources by fertilizer and pesticides ✓
- decreases the amount of clean water available ✓
- thus increasing the costs ✓ Involved in purification
- Overgrazing ✓
- leads to soil erosion ✓
- Water runs off rapidly instead of soaking into the ground ✓
- Ploughing of marginal lands unsuitable for cultivation ✓
- and ploughing on the contour ✓
- allows the cattle to form paths which soon form gullies ✓
- resulting in soil erosion ✓
- This results in loss of available water ✓
- due to excessive run-off ✓
- Sediments build-up in streams, dams ✓
- which reduce the capacity in storage dams ✓

Max (7)

Poor farming practices and quality of water

- To ensure high crop yields ✓,
- farmers use large quantities of herbicides, pesticides and fertilizers
- which pollutes the water ✓ /leads to eutrophication.
- Added nutrients lead to an increase in algal growth ✓/algal bloom
- These algae over-use and deplete the oxygen in the water ✓

Max (4)

Poor farming practices and food security

- Poor farming practices cause environmental degradation✓/loss of topsoil/loss of nutrients
- thus reducing crop yields✓ over time
- Monoculture depletes nutrients and water supplies✓
- impacting negatively on the quality of topsoil✓
- Also leads to increased pest population✓
- causing large-scale damage to crops✓
- which reduces food supply to humans✓
- The use of pest control✓
- results in pesticides accumulating in the food chains✓,
- harming consumers ✓ that help control pest populations
- The use of fertilizers replace nutrients lost in the soil✓
- but can be expensive, contributing to high cost of food✓
- thus reducing access to poor consumers✓

Max (6)

Content (17)
Synthesis (3)

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
Only provided information relevant to:	All information for:	Learner obtains at least the following
<ul style="list-style-type: none"> • Poor farming and quality of water • Poor farming and availability of water • Poor farming and food security There is no irrelevant information.	<ul style="list-style-type: none"> • Poor farming and quality of water • Poor farming and availability of water • Poor farming and food security is presented in a logical sequence.	<ul style="list-style-type: none"> • Poor farming and quality of water 5/7 • Poor farming and availability of water 2/4 • Poor farming and food security 4/6
1 mark	1 mark	1 mark

TOTAL SECTION C: 20
GRAND TOTAL: 60

