Basic Education

KwaZulu-Natal Department of Education
REPUBLIC OF SOUTH AFRICA

LIFE SCIENCES

COMMON TEST

SEPTEMBER 2015

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 tablesonly 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 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 (1.1.1 to 1.1.5) in your ANSWER BOOK, for example 1.1.6 D.

1.1.1 Blood from the pulmonary vein enters the heart at the ...

A left ventricle.
B left atrium.
C right ventricle.
D right atrium.

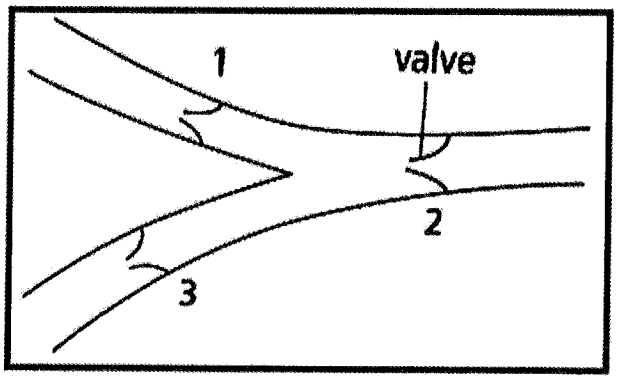
1.1.2 The following are different stages of the cardiac cycle.

(i) Atrial systole
(ii) Ventricular systole
(iii) General diastole

Which ONE of the following are stages of the cardiac cycle during which the tricuspid and bicuspid valves are closed?

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

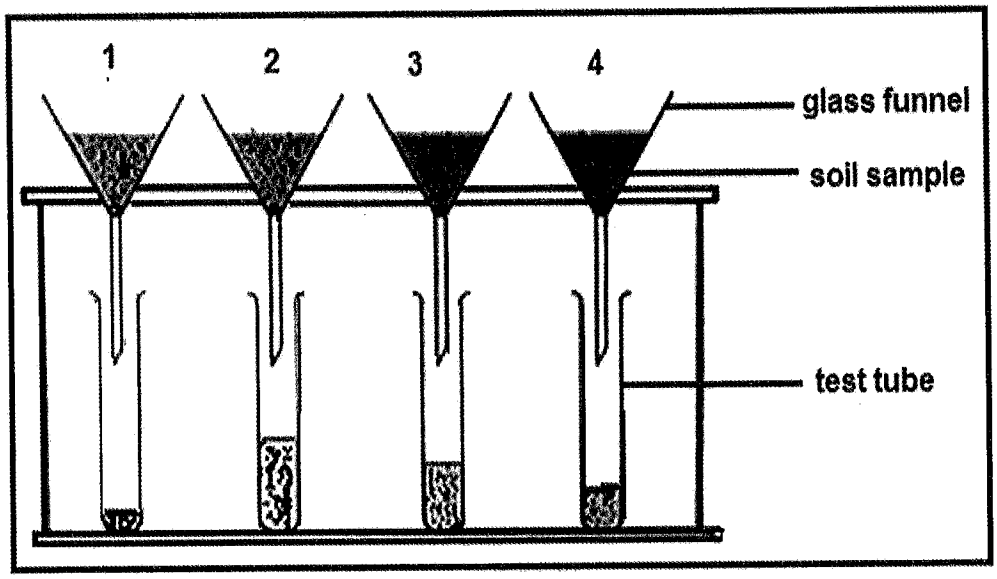
1.1.3 The diagram shows a longitudinal section of a vein.



The direction of blood flow will be from ...

A 1 to 2 and 2 to 3.
B 3 to 2 and 2 to 1.
C 2 to 1 and 2 to 3.
D 1 to 2 and 3 to 2.

QUESTIONS 1.1.4 AND 1.1.5 ARE BASED ON THE DIAGRAM BELOW.



Equal volumes of water are poured onto equal volumes of different soil samples supported in glass funnels with glass wool.

1.1.4 The aim of this investigation is to determine which of the following in the different soil samples?

A Water holding capacity
B Air content
C Humus content
D pH

1.1.5 Which funnel contains the soil sample with the greatest amount of clay?

A 1
B 2
C 3
D 4

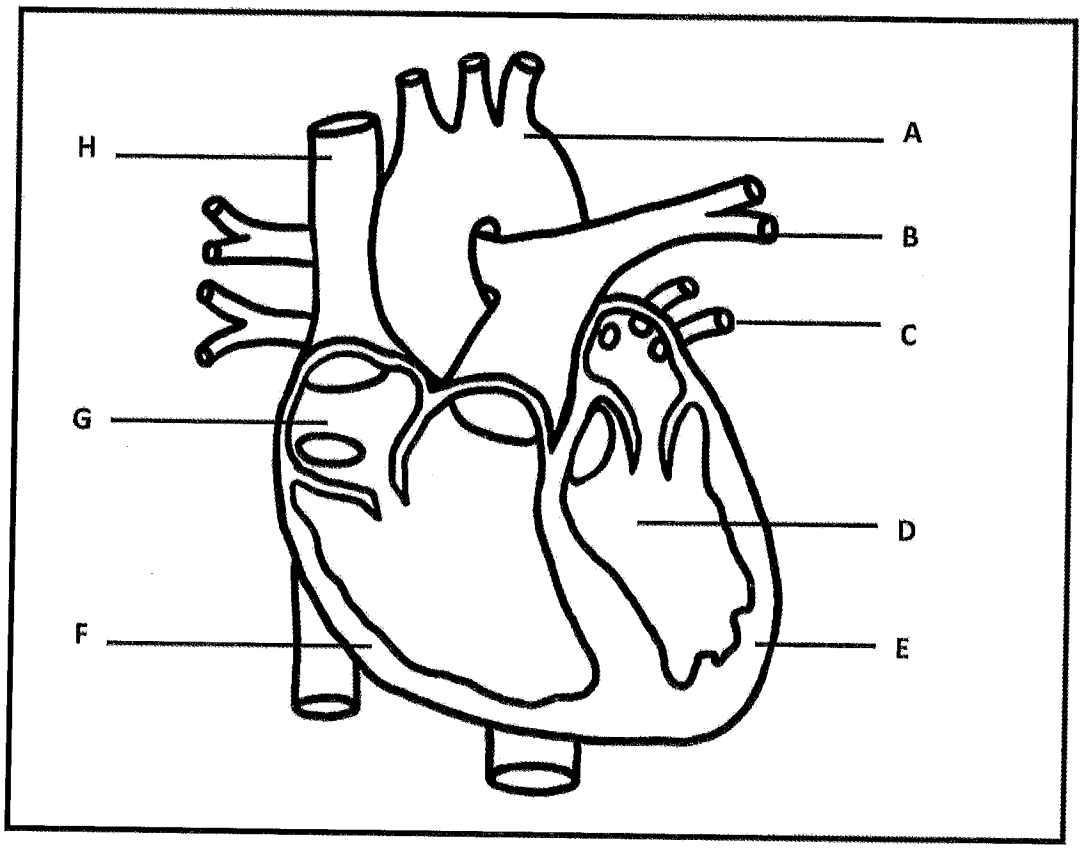
(5 x 2) **[10]**

TOTAL SECTION A: 10

SECTION B

QUESTION 2

2.1 Study the diagram of the human heart below.



2.1.1 Identify the heart chambers labelled **G** and **D.** (2)

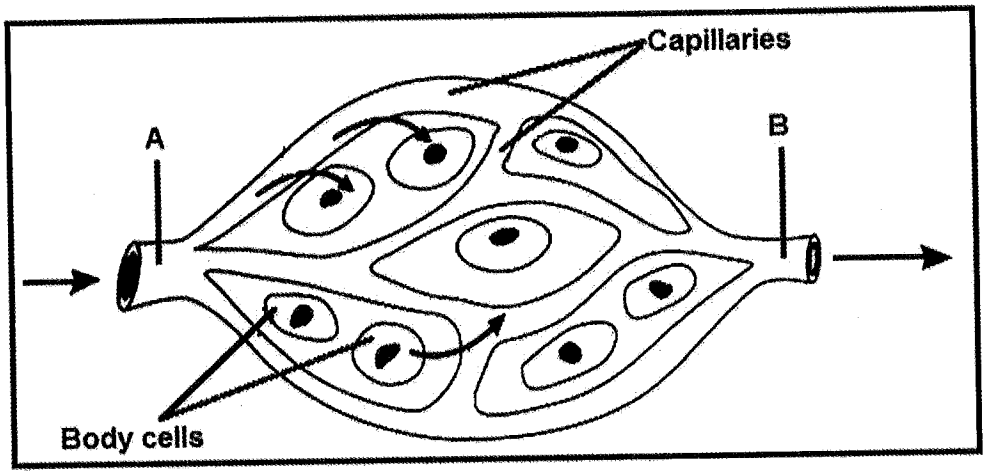
2.1.2 Write down the LETTER only of an artery that carries:

(a) Oxygenated blood (1)
(b) Deoxygenated blood (1)

2.1.3 Explain why the walls labelled **E** and **F** differ in thickness. (2)

2.1.4 Explain what will happen if the coronary arteries, that go to the muscles of the heart, become blocked due to a high cholesterol level in the bloodstream. (3)
(9)

2.2 Study the diagram of a capillary network below.



2.2.1 Identify the type of blood vessel labelled **B**. (1)

2.2.2 Tabulate TWO structural differences between the blood vessels labelled **A** and **B**. (5)

(6)
[15]

QUESTION 3

3.1 Study the food chain below and answer the questions that follow.

pondweed → tadpole → eel → bird

3.1.1 If the above food chain represented above was the only one to exist in the ecosystem as a result of limited biodiversity, explain what would happen if all the tadpoles died. (4)

3.1.2 Explain how the results would have been different if the biodiversity of the ecosystem was greater. (3)

3.1.3 If pesticides that were used in a nearby field had to enter the pond, explain why the pesticide concentration will be the higher in the birds compared to the eel. (2)

(9)

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 Identify the biome in the extract above. (1)

3.2.2 What is threatening the flora of the Cape? (1)

3.2.3 Suggest TWO reasons why humans need to conserve nature. (2)

3.2.4 Why is South Africa's fynbos vegetation unique? (1)

3.2.5 Give ONE reason for the habitat destruction by humans. (1)

(6)

[15]

TOTAL SECTION B: 30

SECTION C

QUESTION 4

Describe how carbon, nitrogen and oxygen are recycled in ecosystems such that they are maintained at acceptable levels.

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

Basic Education

KwaZulu-Natal Department of Education
REPUBLIC OF SOUTH AFRICA

LIFE SCIENCES

MEMORANDUM

COMMON TEST

SEPTEMBER 2015

NATIONAL
SENIOR CERTIFICATE

GRADE 10

N.B. This memorandum consists of 4 pages including this page.

SECTION A

QUESTION 1

1.1

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

(5 x 2) **[10]**

TOTAL SECTION A: 10

SECTION B

QUESTION 2

2.1

2.1.1 G – Right atrium✓
D – Left ventricle✓ (2)

2.1.2 (a) A✓ (1)
(b) B✓ (1)

2.1.3
- Wall E is thicker than F✓
- because the left ventricle has to pump blood to all body regions✓
- while the right ventricle only has to pump blood to the nearby lungs.✓

(Any 2) (2)

2.1.4 - Cardiac muscles will not receive oxygen and nutrients✓
- Muscle cells may die✓/ stop contraction
- May lead to heart attack✓ (3)
(9)

2.2

2.2.1 Venule✓/vein (1)

2.2.2

A	B
Has thick muscular walls✓	Has thin muscular walls✓
Has no valves✓	Has valves✓
Lumen is small in diameter✓	Lumen is large in diameter✓

(Mark first TWO only) 1 mark for table + (2 x 2) (5)
(6)
[15]

QUESTION 3

3.1

3.1.1
- The eel population would decrease✓
- causing the bird population to decrease✓
- due to shortage of food✓
- The pondweed population will increase✓
- since it will not be fed upon by the tadpoles✓ (Any 4) (4)

3.1.2
- The eels and the birds may have survived✓
- as there would have been alternative sources of food✓
- The pondweed population would not increase✓
- as there would be other organisms to feed on them✓ (Any 3) (3)

3.1.3
- A single bird feeds on many eels✓
- and thus the pesticide will accumulate✓ (2)
(9)

3.2

3.2.1 Fynbos✓ (1)

3.2.2 - Alien vegetation✓
- Habitat destruction✓ (1)

3.2.3 - To prevent extinction of species✓
- To preserve natural resources✓
- Economic benefit for humans✓/ attraction of tourists (Any 2) (2)
(Mark first TWO only)

3.2.4 Found in South Africa only✓/68 % of plants are endemic (1)

3.2.5 - Urban expansion✓
- Agricultural use of land✓
- Harvesting natural resources for industrial use✓
- Building houses✓ (Any1) (1)
(Mark first ONE only) **(6)**

[15]

TOTAL SECTION B: 30

SECTION C

QUESTION 4

The Carbon Cycle
- CO_2 produced during respiration✓ is released into the atmosphere
- which is used by plants for photosynthesis✓
- used to produce organic compounds✓
- Excess organic compounds are stored✓ in the plant bodies
- When animals consume other plants and animals✓
- they get their carbon✓ in this way
- They store carbon in their bodies✓ as proteins, fats and carbohydrates
- When plants and animals die, decomposers✓ break down their bodies
- to release the CO_2✓ stored in them back into the atmosphere (Any 6)

The Oxygen Cycle
- All living organisms undergo respiration✓
- during which oxygen is used to breakdown glucose✓
- Energy is produced and CO_2✓released into the atmosphere
- During photosynthesis, oxygen is released back into the atmosphere✓ (Any 3)

The Nitrogen Cycle
- Nitrogen-fixing bacteria and lightning ✓
- convert N_2 into nitrates✓
- Nitrates absorbed by plants are used to make plant proteins✓
- which are then consumed by animals and converted into animal proteins✓.
- Animals release waste products such as urine and faeces✓ from their bodies
- when decomposers break down wastes and dead bodies of organisms✓
- nitrogen is released into the soil as ammonia✓
- Nitrite bacteria convert ammonia into nitrites✓
- Nitrate bacteria✓ convert nitrites into nitrates
- Nitrates are absorbed by plants again✓
- Denitrifying bacteria✓ in the soil convert nitrates into nitrogen gas
- which is released back into the atmosphere✓ (Any 8)

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 information relevant to the cycles (carbon, oxygen and nitrogen) is provided. There is no irrelevant information.	All information for each cycle is presented in a logical sequence.	Learner obtains at least **4/6** in C cycle, **2/3** in the O_2 cycle & **5/8** in the N cycle
1 mark	1 mark	1 mark

TOTAL SECTION C: 20
GRAND TOTAL: 60