Basic Education

KwaZulu-Natal Department of Education
REPUBLIC OF SOUTH AFRICA

LIFE SCIENCES

COMMON TEST

MARCH 2016

NATIONAL SENIOR CERTIFICATE

GRADE 11

MARKS: 60

TIME: 1 hour

N.B. This question paper consists of 9 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 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. ALL drawings should be done in pencil and labelled in blue or black ink.
8. Draw diagrams, flow charts or tables only when asked to do so.
9. The diagrams in this question paper are NOT necessarily drawn to scale.
10. Do NOT use graph paper.
11. You must use a non-programmable calculator, protractor and a compass where necessary.
12. Write neatly and legibly.

SECTION A

QUESTION 1

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

1.1.1 Platyhelminthes are called acoelomate because they ...

A only have one external opening.
B are bilaterally symmetrical.
C possess a body cavity.
D have no cavity in the mesoderm between the ectoderm and the endoderm.

1.1.2 All viruses are ...

A cells with cytoplasm and organelles.
B unicellular and pathogenic.
C cellular in structure.
D acellular and non-living.

1.1.3 Which ONE of the following describes bacteria?

A Unicellular plants that are parasitic
B Unicellular, prokaryotic organisms that multiply rapidly
C Microscopic plants with a saprophytic mode of nutrition
D Unicellular, prokaryotic organisms that are parasitic

1.1.4 Vaccinations can control the spread of ...

A genetic disorders.
B infectious diseases.
C nutritional deficiencies.
D viral diseases only.

1.1.5 Study the plant groups listed below:

(i) Bryophytes
(ii) Pteridophytes
(iii) Gymnosperms
(iv) Angiosperms

In which of the following do male gametes depend on water or moisture to swim toward the ovum?

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

(5 x 2) = (10)

Total Section A= (10)

SECTION B

QUESTION 2

2.1 Grade 11 learners investigated the effect of three different antibiotics (AB1, AB2 and AB3) on the growth of three different strains of disease-causing bacteria (X, Y and Z). The following procedure was followed.

- Nine identical agar plates (petri dishes with the nutrient agar) were prepared.
- Bacteria X was cultured on the first three agar plates, bacteria Y on the next three agar plates and bacteria Z on the last three agar plates.
- The same amount of AB1 was placed in the centre of each of three agar plates, one with bacteria X, one with bacteria Y and one with bacteria Z.
- This step was repeated using AB2 and then AB3.
- The nine petri dishes were incubated at the same temperature and at the same time.
- Bacterial growth was examined for each agar plate and the diameter of the area where no bacteria grew was measured.

The following results were obtained from the investigation.

	Diameter (mm) of area where no bacteria grew		
	AB1	**AB2**	**AB3**
Bacteria X	8	14	3
Bacteria Y	9	11	5
Bacteria Z	6	5	4

2.1.1 Identify the following in the investigation:

(a) The independent variable (1)

(b) The dependent variable (1)

2.1.2 State the aim for this investigation. (2)

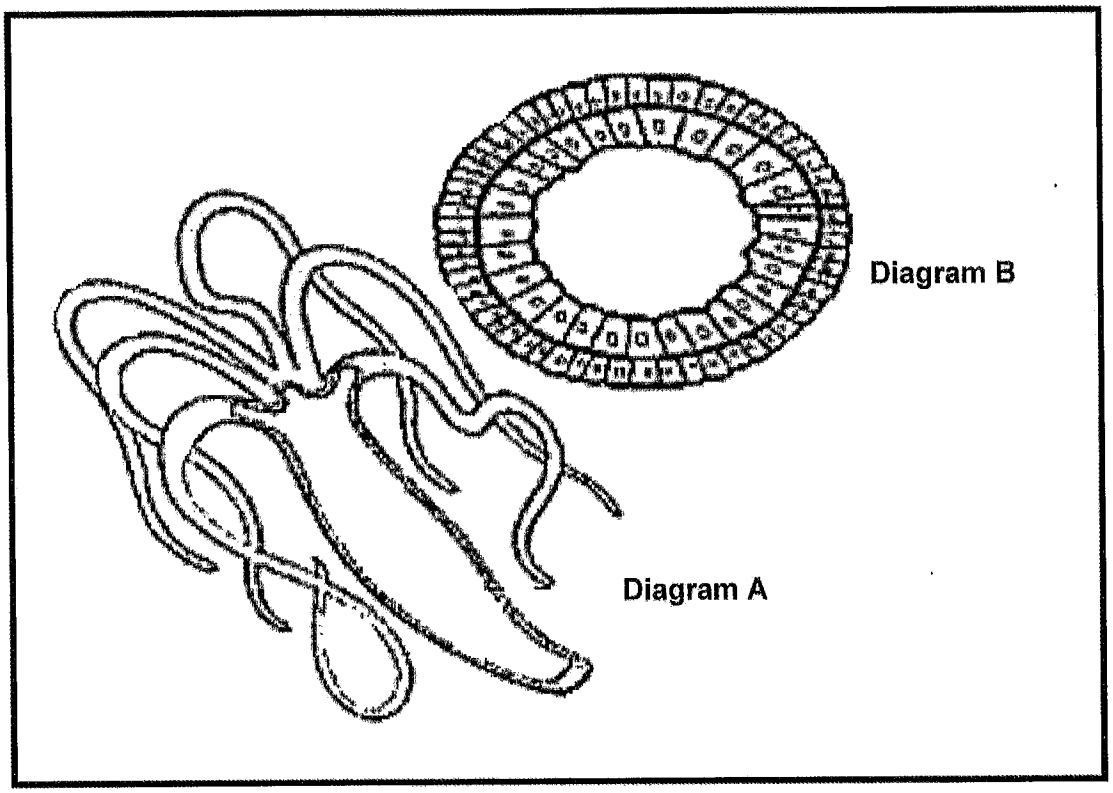
2.1.3 Which antibiotic was the most effective in decreasing bacterial growth? (1)

2.1.4 Which TWO variables did the learners keep constant to ensure the validity of their investigation? (2)

2.1.5 State TWO ways in which learners could improve the reliability of this investigation. (2)

(9)

2.2 Diagram **A** shows a complete animal while diagram **B** shows cross section through the body of the same animal.



2.2.1 Identify the phylum to which this organism belongs. (1)

2.2.2 What type of gut does this organism have? (1)

2.2.3 Explain ONE disadvantage of the type of gut named in Question 2.2.2. (2)

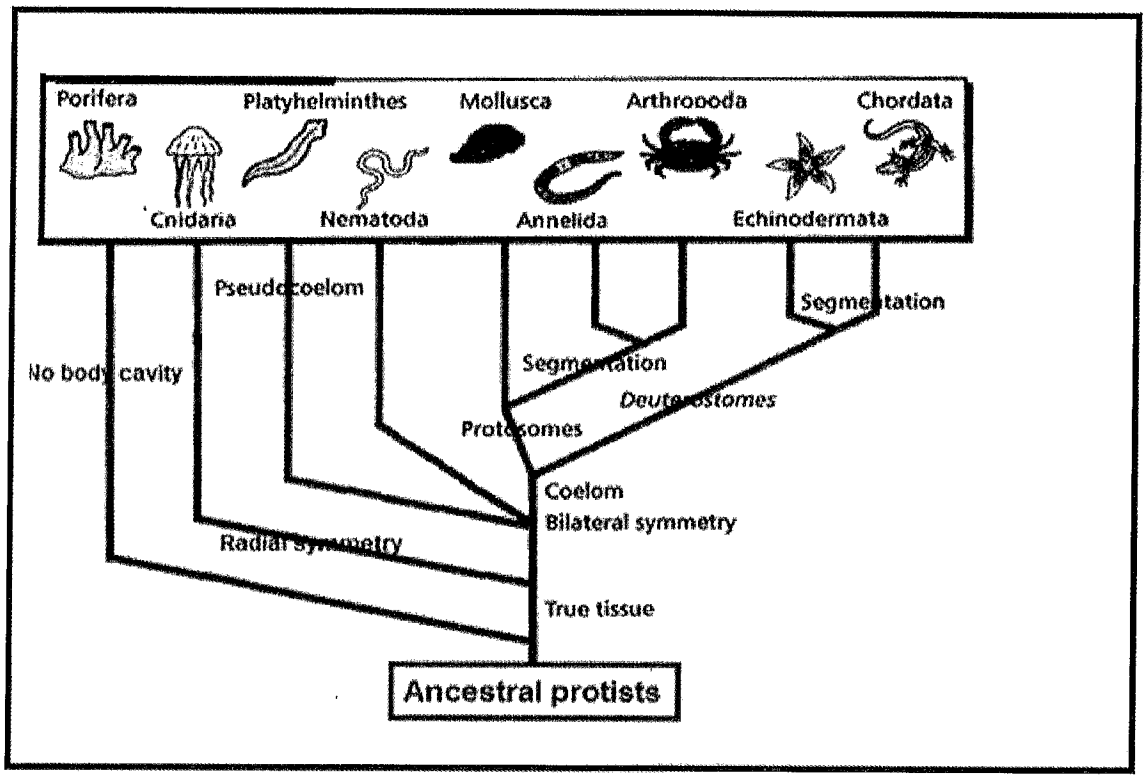
2.2.4 Explain ONE importance of the development of a coelom. (2)

(6)

[15]

QUESTION 3

3.1 The diagram below represents a phylogenetic tree of different groups of animals. Study the diagram and answer questions that follow.



3.1.1 From the above phylogenetic tree, which group represents the ancestor of the animal kingdom? (1)

3.1.2 How many animal phyla are shown on this tree? (1)

3.1.3 The first major split in the animal kingdom was into radial and bilateral symmetry.

(a) Which phylum did not form a part of this split? (1)

(b) Which phylum has radial symmetry? (1)

3.1.4 The second split in the animal kingdom was based on the presence and absence of a true coelom.

(a) Name the phylum that does not have a true coelom. (1)

(b) State ONE way in which the coelom of annelids and arthropods are different from each other. (2)

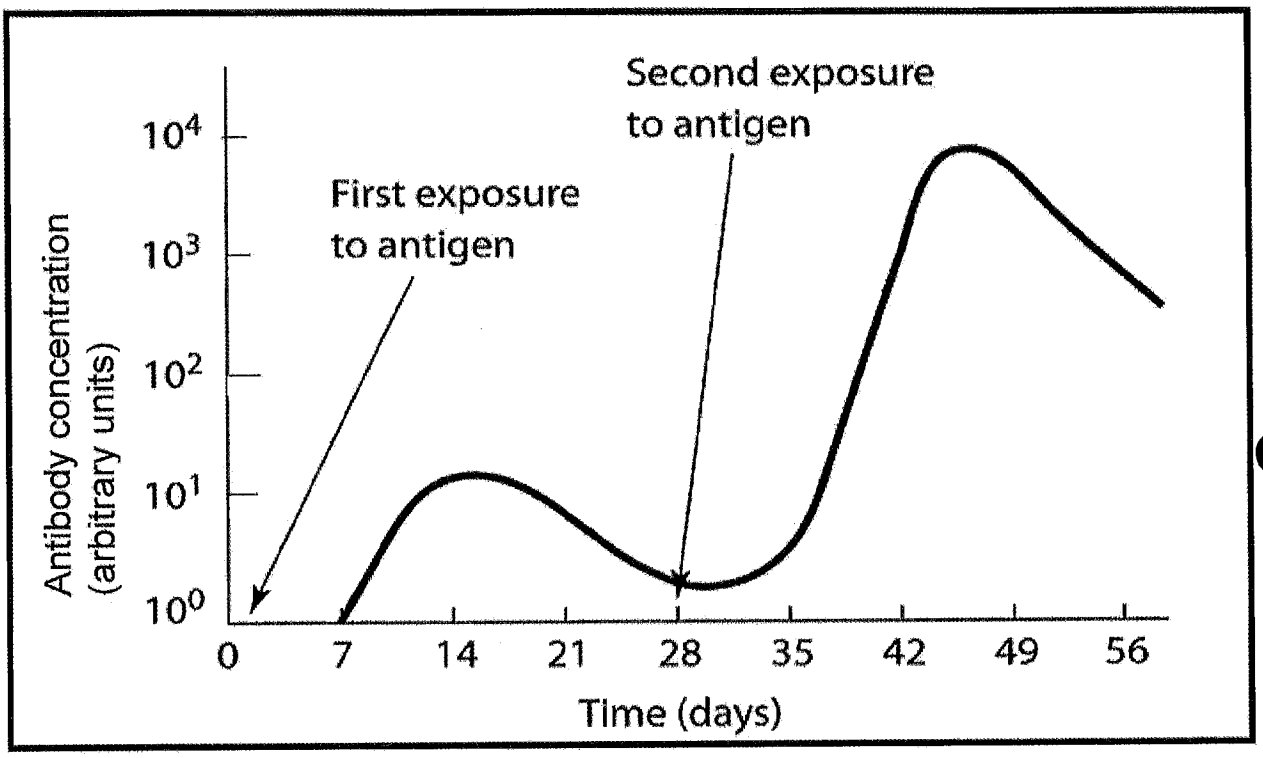
3.1.5 From the diagram, identify ONE phylum you have studied which:

(a) Is diploblastic (1)

(b) Has a coelom and is bilateral symmetrical (1)

[9]

3.2 The graph below shows changes in the concentration of antibodies during two exposures to an antigen (a substance that stimulates the production of an antibody when introduced into the body) over time.



3.2.1 Which type of immunity (**passive or active**) is represented by the graph? (1)

3.2.2 Name the substance produced by the body that destroys harmful bacteria. (1)

3.2.3 Describe ONE difference in the response to the first exposure and the second exposure to the antigen. (2)

3.2.4 After how many weeks did the antibody concentration reach 10^4 arbitrary units? (2)

(6)
[15]

Total Section B= 30

SECTION C

QUESTION 4

4.1 A trend in the evolution of plants has been an increase in the size of plants and a decreasing dependence on water for reproduction.

Explain the above trend through a comparison of the bryophytes and the angiosperms.

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

Content : (17)
Synthesis: (03)
(20)

TOTAL MARKS: [60]

Basic Education

KwaZulu-Natal Department of Basic Education

REPUBLIC OF SOUTH AFRICA

LIFE SCIENCES

GRADE 11

MEMORANDUM

MARCH 2016

NATIONAL SENIOR CERTIFICATE

GRADE 11

MARKS : 60

This memorandum consists of 6 pages.

SECTION A

QUESTION 1

1.1

1.1.1 D ✓✓

1.1.2 D ✓✓

1.1.3 B ✓✓

1.1.4 B✓✓

1.1.5 A✓✓

(5 x 2) = (10)

TOTAL SECTION A: [10]

SECTION B

QUESTION 2

2.1

2.1.1

(a) Type of antibiotic✓ (1)

(b) Bacterial growth/diameter of area where no bacteria grew✓ (1)

2.1.2 To investigate/determine the effectiveness of three different antibiotics✓ on three different strains of disease-causing bacteria✓ (2)

2.1.3 Antibiotic 2 / AB2✓ (1)

2.1.4

- Identical agar plates were used✓
- Equal amounts of each antibiotic used in the agar plates✓
- The plates were incubated at the same temperature✓
- The plates were incubated at the same time✓ Any (2)

(Mark first TWO only)

2.1.5

- Increase the sample size ✓
- Repeat the investigation✓ (2)

(Mark first TWO only)

(9)

2.2

2.2.1 Cnidaria✓ (1)

2.2.2 Blind gut ✓ (1)

2.2.3 It has only one opening✓
so ingestion and egestion cannot occur simultaneously✓
OR
Since food move circulates✓/does not move in one direction
the gut cannot become specialised✓ (2)

2.2.4
- It separates the gut from the body wall✓
- allowing for more extensive growth of organs and systems✓/allowing the gut to function independently of the rest of the body
OR
- Serves as a hydrostatic skeleton✓
- against which the muscles act✓
OR
- It contains coelomic fluid ✓
- which is spread over the body surface to prevent desiccation✓

(Mark first ONE only) Any (1x2) (2)

(6)

[15]

QUESTION 3

3.1.

3.1.1 Protista✓/ Ancestral protists (1)

3.1.2 9✓ (1)

3.1.3
(a) Porifera✓
(b) Cnidaria✓ (2)

3.1.4
(a) Platyhelminthes✓ (1)
(b) Coelom in arthropods is reduced and contains blood ✓
Coelom in annelids contains coelomic fluid✓ (2)

3.1.5
(a) Cnidaria ✓ (1)
(b) Annelida✓/Arthropoda/Chordata (1)

(9)

3.2

3.2.1 Active immunity✓ (1)

3.2.2 Antibodies✓ (1)

3.2.3 After the first exposure: It takes longer for the body to respond and produce antibodies✓
After the second exposure: The body response is quicker and more intense ✓ (2)

3.2.4 6 weeks✓✓ (2)

(6)

[15]

Total Section B= 30

SECTION C

QUESTION 4

Size of the plants.

- Bryophytes are small plants/few centimetres tall✓
- that do not have true strengthening tissue✓
- for keeping the plant upright✓
- and no conducting tissue✓
- to conduct water long distances✓
- In addition it does not contain true roots, stems and leaves✓
- and have no cuticle to reduce water loss✓ any 4/5

- Angiosperms may be very tall/grow up to a few metres✓
- since they have well-developed conducting tissue/xylem ✓
- which allows water to be pushed up to great heights✓
- They also have strengthening tissue✓
- to keep a tall plant upright✓
- They have well developed roots and stems✓
- and the leaves have cuticles to reduce water loss✓ any 4/5 (max 9)

Decreasing dependence on water for reproduction.

- Bryophytes depend on water for sexual reproduction✓
- The sperm cell need to swim in a film of water✓
- from the male sex organs ✓
- to reach the egg cell/ovum✓
- in the female sex organ✓
- These plants therefore always grow in a moist environment✓
- and the sex organs are found on the undersurface of the gametophyte✓ any 4

- In angiosperms water is not needed to carry sperm cells to the ovum✓
- During pollination✓
- wind/insects/birds carry the pollen grains to another plant✓

- A pollen tube containing the male gametes✓
- germinates towards the egg cell/ovum✓
- Angiosperms are therefore not restricted to moist habitats✓ any 4 (max 8)

ASSESSING THE PRESENTATION OF THE ESSAY

Criterion	Relevance (R)	Logical sequence (L)	Comprehensive (C)
Generally	All information is relevant to the topic	Ideas arranged in a logical/cause-effect sequence	All aspects required by the essay have been sufficiently addressed
In this essay in Q 4	Only information relevant to the description of size of the plants and decreasing dependence on water for reproduction is given for bryophytes and angiosperms.	The description of size of the plants and decreasing dependence on water for reproduction given for each of bryophytes and angiosperms is logical and sequential.	At least **6** correct points in the description of the size of plants and **5** points on their dependence on water for reproduction are given.
Mark	1	1	1

(17)

(3)

[20]

TOTAL MARKS: [60]

