Education

KwaZulu-Natal Department of Education
REPUBLIC OF SOUTH AFRICA

LIFE SCIENCES

COMMON TEST

MARCH 2018

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. 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

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 Which ONE of the following are branching filaments that make up the mycelium of a fungus? (2)

A Cilia
B Hyphae
C Proteins
D Flagella

1.1.2 Which ONE of the following organisms acts as a vector in the transmission of malaria? (2)

A *Plasmodium*
B *Anopheles*
C *Amoeba*
D *Mycobacterium*

1.1.3 Edward Jenner infected a boy with cowpox (which resembles a mild form of smallpox). When the boy recovered from the cowpox, Jenner infected him with smallpox. No disease developed. This was the discovery of the first successful ... (2)

A antibody.
B virus.
C vaccine.
D antibiotic.

1.1.4 Lichen is a combination of algae and fungi. The fungi absorb water and make it available to the algae for photosynthesis. Fungi are heterotrophic and obtain their nutrients from the algae.

Which ONE of the following represents the relationship described above? (2)

A Competition
B Parasitism
C Commensalism
D Mutualism

1.1.5 Seeds are better suited for survival than spores because they ... (2)

A can remain dormant for long periods.
B are dispersed by wind only.
C have a limited food supply.
D are smaller.

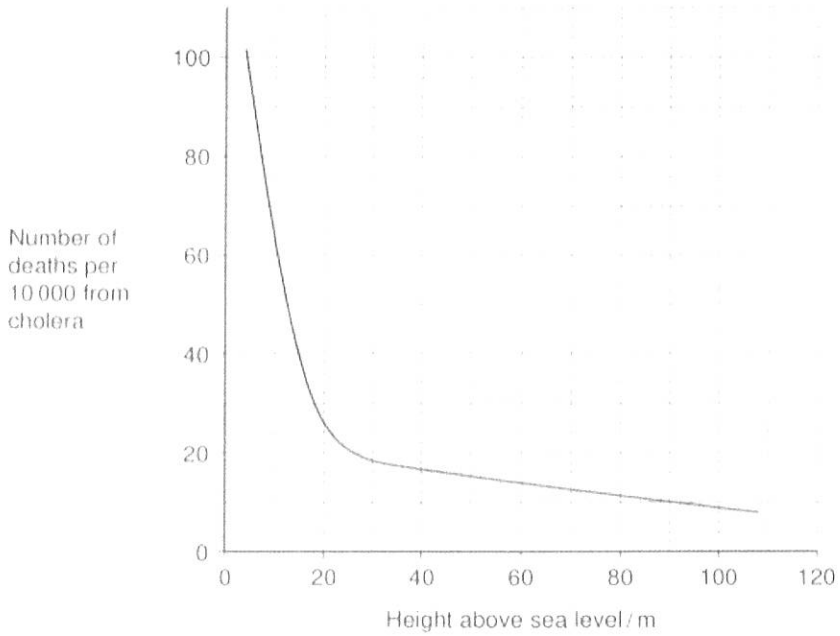
(5 x 2) **(10)**
TOTAL SECTION A: 10

SECTION B

QUESTION 2

2.1 Cholera is a disease caused by the bacterium *Vibrio cholerae*. An outbreak of cholera occurred in London in 1849. An investigation was conducted to determine the relationship between the number of deaths from cholera and the height above sea level at which people lived.

The results of the investigation, obtained from historical records, are shown in the graph below.



2.1.1 State a hypothesis for the investigation. (2)

2.1.2 The population size of London in 1849 was 2,5 million. Use information from the graph to determine the number of deaths from cholera at a height of 10m above sea level.

Show all working. (2)

2.1.3 Provide TWO possible explanations as to why antibiotics may sometimes prove ineffective in the control of cholera. (4)

2.1.4 The last major outbreak of cholera in South Africa occurred in 2004. Of the 738 people who were diagnosed with cholera, a total of four died from the disease.

Suggest TWO reasons for a decrease in the number of deaths from cholera over time. (2)
(10)

2.2 The uterus is a female organ in which offspring develop before birth. The lower end of the uterus is called the cervix.

Scientists investigated the link between cervical cancer and infection with some types of Human Papilloma Virus (HPV).

The table below shows the frequency of five different types of HPV in women who had cervical cancer.

Type of Human Papilloma Virus (HPV)	**Percentage of women with cervical cancer who have this type of HPV**
HPV6	2
HPV11	2
HPV16	66
HPV18	16
HPV31	8

2.2.1 A local newspaper published an article about cervical cancer with the headline "HPV6 is the main cause of cervical cancer".

Does the data in the table support this claim? Explain your answer. (2)

2.2.2 Scientists have developed vaccines against HPV. The vaccines contain HPV antigens.

What is an HPV antigen? (1)

2.2.3 Explain why antibiotics will be ineffective against HPV. (2)
(5)
[15]

QUESTION 3

3.1 Read the extract below and answer the questions that follow.

How a Seed Bank, almost lost in Syria's War, could help feed a Warming Planet

Ali Shehadeh is a plant conservationist from Syria. His goal is to safeguard those seeds that may be hardy enough to feed us in the future, when many parts of the world could become as hot, arid and inhospitable as it is in the Middle East.

As the War in Syria intensified Mr Shehadeh was forced to leave the Icarda Seed Bank in Syria and flee his country.

However, long before the War, in 2008, Icarda had begun to send seed samples to the Svalbard Global Seed Vault in Norway. This vault is built deep into the side of a mountain, situated above the Arctic Circle.

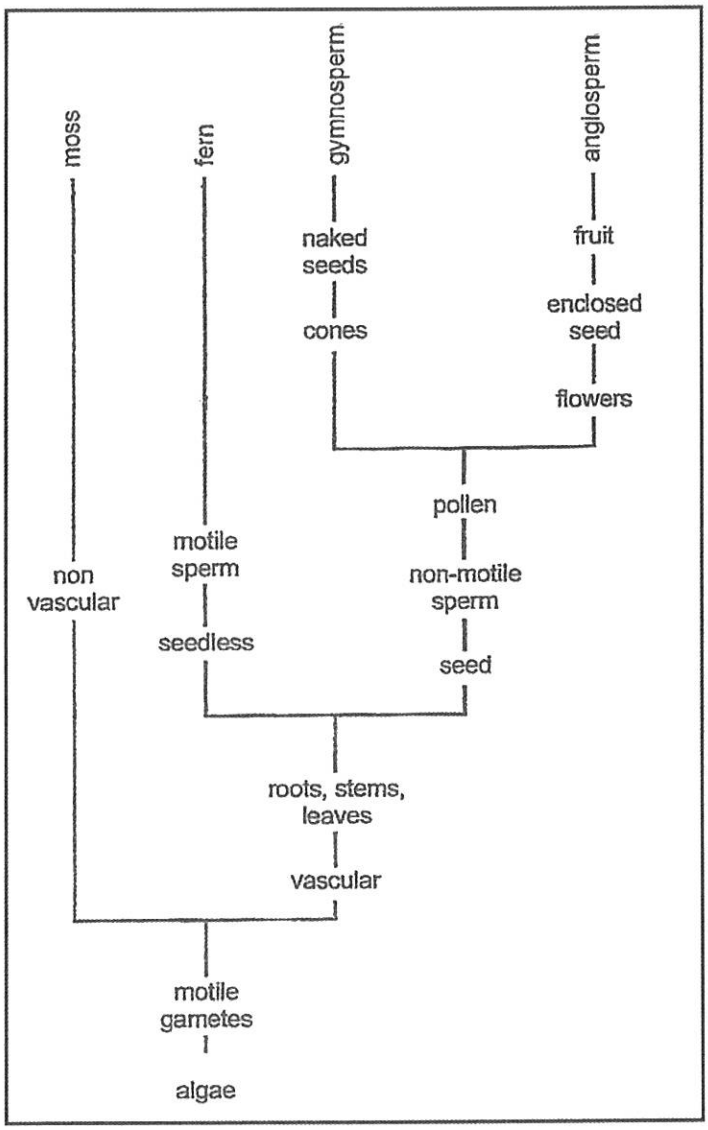
Mr Shehadeh hunts for the genetic traits that will be most useful in the future: resistance to pests and blistering winds and the ability to endure intensely hot summers. He tries to select for these traits and breeds them into the next generation of seeds.

3.1.1 State TWO benefits of seed banks indicated in the extract. (2)

3.1.2 Explain why seeds originating in the Middle East would be suitable for cultivating in all parts of the world in the future. (2)

3.1.3 State why the location of the Svalbard Global Seed Vault may be regarded as ideal for seed preservation. (1)
(5)

3.2 Study the phylogenetic tree below showing how four plant groups evolved.



3.2.1 Name the common ancestor of all the plant groups represented. (1)

3.2.2 List TWO characteristics of mosses shown on the phylogenetic tree. (2)

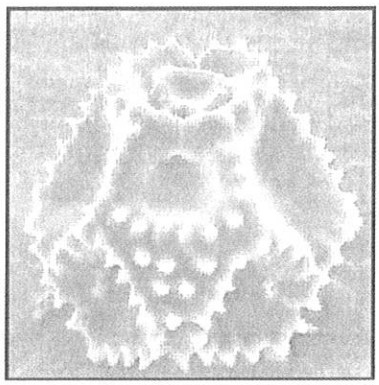
3.2.3 Ferns are dependent on water for fertilization.

Provide evidence from the phylogenetic tree to justify this statement. (1)

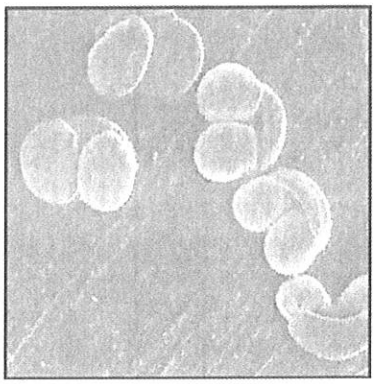
3.2.4 Angiosperms are the largest and most diverse group of plants.

Explain why the presence of flowers has made the angiosperms more successful over the gymnosperms. (2)
(6)

3.3 The electron micrographs below show pollen grains (**A** and **B**) from two different plants.



A



B

3.3.1 Define the term pollination. (2)

3.3.2 Explain an observable feature of pollen grain **A** that makes it suited for pollination by animals. (2)
(4)

[15]

TOTAL SECTION B: 30

SECTION C

QUESTION 4

Describe the body plans of the phyla Porifera and Platyhelminthes in relation to their respective modes of life.

Content: (17)
Synthesis: (3)

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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MARKING GUIDELINE - MARCH 2018

NATIONAL
SENIOR CERTIFICATE

GRADE 11

MARKS: 60

This memorandum 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 recognisable, 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 national memo discussion meeting.
14. **If only the letter is asked for, but only the name is given (and vice versa)**
    Do not credit.
15. **If units are not given in measurements**
    Candidates will lose marks. Memorandum will allocate marks for units separately.
16. **Be sensitive to the sense of an answer, which may be stated in a different way.**
17. **Caption**
    All illustrations (diagrams, graphs, tables, etc.) must have a caption.

SECTION A

QUESTION 1

1.1 1.1.1 B ✓✓
1.1.2 B ✓✓
1.1.3 C ✓✓
1.1.4 D ✓✓
1.1.5 A ✓✓ (5 x 2) **(10)**

TOTAL SECTION A: 10

SECTION B

QUESTION 2

2.1 2.1.1 As height above sea level/altitude increases the death rate from cholera increases✓✓

OR

As height above sea level/altitude increases the death rate from cholera decreases✓✓

OR

Height above sea level/altitude has no effect on the death rate from cholera✓✓ (2)

2.1.2 $\frac{60}{10\,000}$ x 2 500 000✓

= 15 000✓ (2)

2.1.3 - Course of antibiotics not completed✓
- resulting in production of more✓bacteria

- Mutations✓of bacteria may occur
- making them resistant✓to antibiotics

- Overuse✓of antibiotics
- kills antibiotic-sensitive bacteria✓, allowing antibiotic-resistant bacteria to grow and multiply Any 2 x 2 (4)
(Mark first TWO only)

2.1.4 - Introduction of antibiotics ✓
- Improved sanitation✓
- Improved hygiene✓ Any 2 (2)
(Mark first TWO only)

(10)

2.2 2.2.1 No✓ - A high percentage of women with cervical cancer have HPV16✓

OR

No✓ - A low percentage of women with cervical cancer have HPV6✓ (2)

2.2.2 Substance/molecule from HPV capable of producing an immune response✓/antibodies (1)

2.2.3 - Antibiotics are only effective in destroying living✓ organisms
- Viruses, like HPV, do not have the general characteristics of living organisms ✓ (2)
(5)
[15]

QUESTION 3

3.1 3.1.1 - Ensure food security✓
- Preservation of seeds that are resistant to pests✓
- Preservation of seeds that are resistant to harsh weather conditions✓/heat/drought/wind Any 2 (2)
(Mark first TWO only)

3.1.2 - These seeds are adapted for survival in hot, dry conditions✓ that may occur in all parts of the world in the future
- due to climate change/global warming✓ (2)

3.1.3 Cool✓ conditions (in Arctic/polar region)
Secure✓ location (deep inside mountain) Any 1 (1)
(Mark first ONE only) **(5)**

3.2 3.2.1 Algae✓ (1)

3.2.2 - Non-vascular✓
- Motile gametes✓ (2)

3.2.3 Motile sperm✓ (1)

3.2.4 - Flowers have a larger variety of pollinating agents✓
- increasing their chances✓ of pollination/fertilization/reproduction (2)
(6)

3.3 3.3.1 - Transfer of pollen✓
- from an anther to a stigma✓ (2)

3.3.2 - Rough/spiky edges✓
- to attach✓ to body covering of animal (2)
(4)
[15]

Total Section B: 30

SECTION C

QUESTION 4

Body Plan of Porifera

- Organisms are asymmetrical✓
- They have no cephalisation✓
- since they are sedentary✓/sessile
- Water circulates inside sac✓/spongocoel
- and is ejected through single opening✓/osculum
- Individual cells sense environment✓ and react to changes in the environment
- No tissues/organs present✓
- No coelom present✓
- No gut present✓/no mouth since
- they are filter-feeders✓
- No blood system present✓
- since all cells are in direct contact with the water✓
- so diffusion is sufficient✓
- for all cells to obtain nutrients✓/for gaseous exchange/for waste removal

Any 8 (8)

Body Plan of Platyhelminthes

- Bodies are flat✓
- and have no coelom✓/acoelomate
- enabling rapid diffusion of substances✓
- This enables endoparasitic organisms✓
- to obtain food efficiently✓
- They are triploblastic✓/have ectoderm, endoderm and mesoderm
- allowing greater complexity/differentiated tissue/organ specialisation✓
- which suits the lifestyle of a motile✓organism
- Some have a blind gut✓/one gut opening
- No blood system✓
- since the process of diffusion is sufficient✓to obtain substances needed
- Organisms have bilateral symmetry✓
- and dorsoventral differentiation✓
- They have cephalisation✓
- Cephalisation enables mobile organisms✓
- to detect food✓/sense danger
- and respond quickly when entering a new environment✓

Any 9 (9)

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 in sufficient detail
All information provided is relevant to: - The body plan of Porifera in relation to its mode of life - The body plan of Platyhelminthes in relation to its mode of life There is no irrelevant information.	All information regarding: - The body plan of Porifera in relation to its mode of life - The body plan of Platyhelminthes in relation to its mode of life Is arranged in a logical sequence	Required minimum mark for each aspect: - The body plan of Porifera in relation to its mode of life **(5/8)** - The body plan of Platyhelminthes in relation to its mode of life **(6/9)**
1 mark	1 mark	1 mark

TOTAL SECTION C: 20

GRAND TOTAL: 60