

Hillcrest High School

Grade 11

Life Science Exam

Paper 2

November 2013

Time: 2 ½ hours

Examiner: Mr Mahabeer

150 Marks



Instructions

1. Write your Life Science teachers name on all booklets.
 2. Number the answers exactly as the questions are numbered.
 3. Write neatly and legibly
 4. Do all drawings in pencil and label them in ink.
 5. Only draw diagrams and flow charts when requested to do so.
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SECTION A

Question 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(1.1.1-1.1.10) in your answer book, for e.g. 1.1.11 C

1.1.1. A bacterial cell

- A- Is a prokaryote
- B- Contains mitochondria, vacuoles, plastids
- C- Is a eukaryote
- D- Has the same type of nucleus as fungi

1.1.2. Drugs extracted from fungi are known as

- A- Antibodies
- B- Antibiotics
- C- Antigens
- D- Pathogens

1.1.3. The vegetative part of the fungus is called

- A- Sporangium
- B- Spores
- C- Mycelium
- D- Sporangiphore

1.1.4. The Sporophyte of a fern has

- A- No roots
- B- Rhizome
- C- No leaves
- D- Rhizoids

1.1.5. Needle-like leaves of gymnosperms

- A- Cannot transpire
- B- Do not synthesise organic food
- C- Protect the stem against changes in temperature
- D- Photosynthesise

1.1.6. Which of the following forms the outmost whorl of a flower?

- A- Petals
- B- Stamens
- C- Gynaecium
- D- Calyx

1.1.7. The coelom of an earthworm

- A- Separates the mesoderm from the ectoderm
- B- Contains fluid
- C- Digests food
- D- Possesses chaetae for locomotion

1.1.8. The temperature of homoeothermic animals is

- A- Constant in any weather
- B- High in warm weather
- C- Low in cold weather
- D- High in cold weather

1.1.9. The most abundant green house gas found in the atmosphere

- A- CFC's
- B- Carbon Dioxide
- C- Nitrous Oxide
- D- Methane

1.1.10. Which of the following is NOT an effect of global warming?

- A- Melting of polar ice caps
- B- Desertification
- C- Reduced biodiversity
- D- Increased food production

(Total20)

- 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 to 1.2.10) in the ANSWER BOOK.
- 1.2.1. Sorting and grouping things according to similarities and differences.
- 1.2.2. Organisms that do not have a definite nucleus or other membrane enclosed structures.
- 1.2.3. Organisms that are able to manufacture their own food.
- 1.2.4. Heterotrophic organisms that break down the material on which they feed, releasing their components for re-use.
- 1.2.5. Ongoing change to the Earth's weather pattern.
- 1.2.6. The measure of the total greenhouse gas by an individual, company or country.
- 1.2.7. The type of fertilization occurring in flowering plants.
- 1.2.8. The ability of a substance to be broken down into simpler substances by the natural process of decay.
- 1.2.9. Process of loss of top soil due to floods, rainfall, and deforestation, resulting in little or no plant growth.
- 1.2.10. The inborn ability of a person to produce antibodies and fight disease.

(Total 10)

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 to 1.3.10) in the ANSWER BOOK.

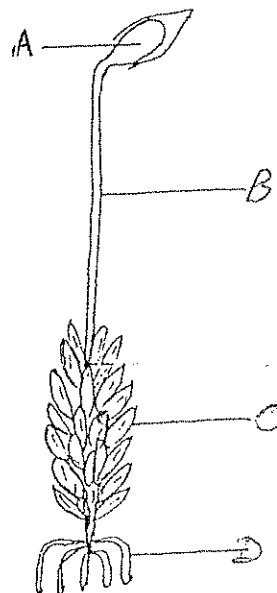
COLUMN I	COLUMN II
1.3.1. Organisms that cause rusts, ringworms and thrush	A Fungi B Porifera
1.3.2. Number and variety of species in a community	A Population B Biodiversity
1.3.3. Gametophyte is the dominant generation	A Angiosperm B Gymnosperms
1.3.4. May occur as autotrophs, saprotrophs or parasites	A Bacteria B Fungi
1.3.5. The result of an increase in Sulphur Dioxide in the atmosphere	A Greenhouse effect B Acid rain
1.3.6. Site constructed to dispose of waste	A Landfill B Reservoir
1.3.7. Reproduce by binary fission	A Vertebrates B Flowering plants
1.3.8. Plants or animals restricted to a country or parts of a country	A Endemic B Alien
1.3.9. Conducting tissue found in flowering plants	A Xylem B Phloem
1.3.10. Succulent plant that has been widely used by the San people of the Kalahari	A African potato plant B Hoodia plant

(Total 20)

SECTION B

QUESTION 2

2.1. Study the drawing of a moss and answer the questions which follow:-



2.1.1 What type of reproductive structures is formed in A? (1)

2.1.2. Is structure B, haploid or diploid? (1)

2.1.3. (i) Identify structure D (1)

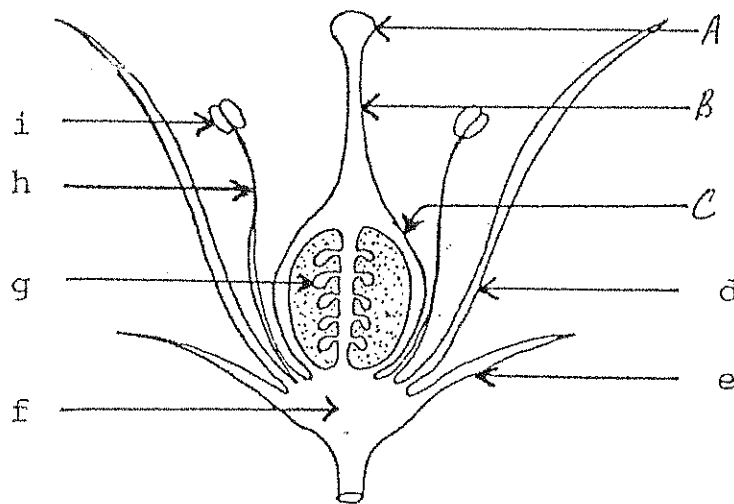
(ii) State the functions of D (2)

2.1.4. Structure labeled C has no cuticle.

In what way does this limit the environment in which the moss can live? (2)

(Total 7)

2.2. The drawing represents a flower of an angiosperm.



2.2.1. Give one reason why the plant of this flower is classified as an angiosperm. (1)

2.2.2. Give the labels for A, B and C. (3)

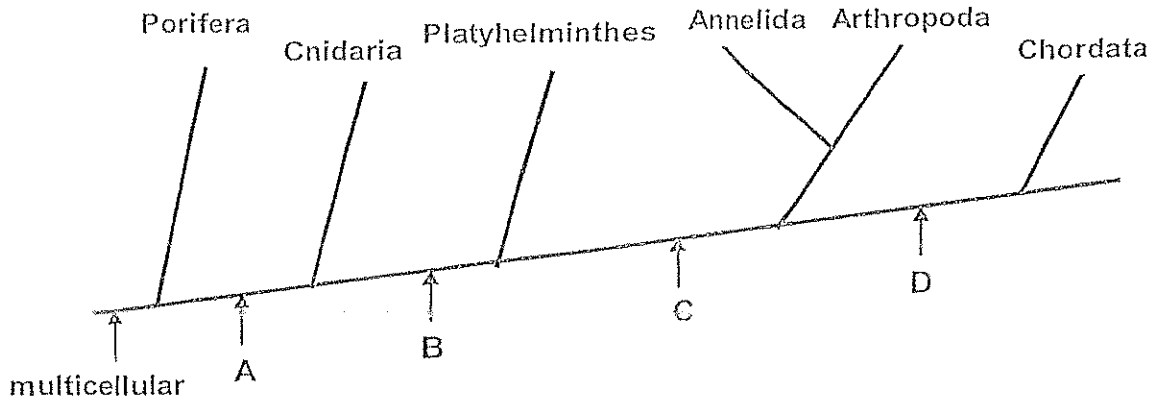
2.2.3. Which letter refers to the whorl that is important for insect pollination? (1)

2.2.4. (i) Is this the flower likely to be self-pollinated or cross-pollinated? (1)

(ii) Give a reason for your answer. (2)

(Total 8)

2.3. The diagram below represents a cladogram (phylogenetic tree) showing relationships between animal phyla. The letters (A to D) indicate the characteristics shared by the different phyla of animals which follow the letter. The point where phyla differ from each other is indicated by the branching-off/split into new phyla.



A simplified cladogram showing relationships between some animal phyla

2.3.1. Which characteristic is shared by all the organisms in the animal kingdom according to the cladogram? (1)

2.3.2. Which LETTER represents each of the following characteristics with respect to the body plan:

- (a) Cephalisation (1)
- (b) Triploblasty (1)
- (c) Coelom (1)
- (d) Bilateral Symmetry (1)
- (e) Segmentation (1)
- (f) Vertebral column (1)
- (g) Symmetry (1)

2.3.3. Explain one importance of the development of a coelom. (2)

2.3.4. Write down the names of the phyla that display the characteristic represented by C but not the characteristic represented by D. (2)

2.3.5. Describe ONE way in which the coelom of annelids and anthropods are different. (2)

2.3.6. State ONE role of anthropods in agriculture. (1)

(Total 15)

2.4. Study the extract about malaria.

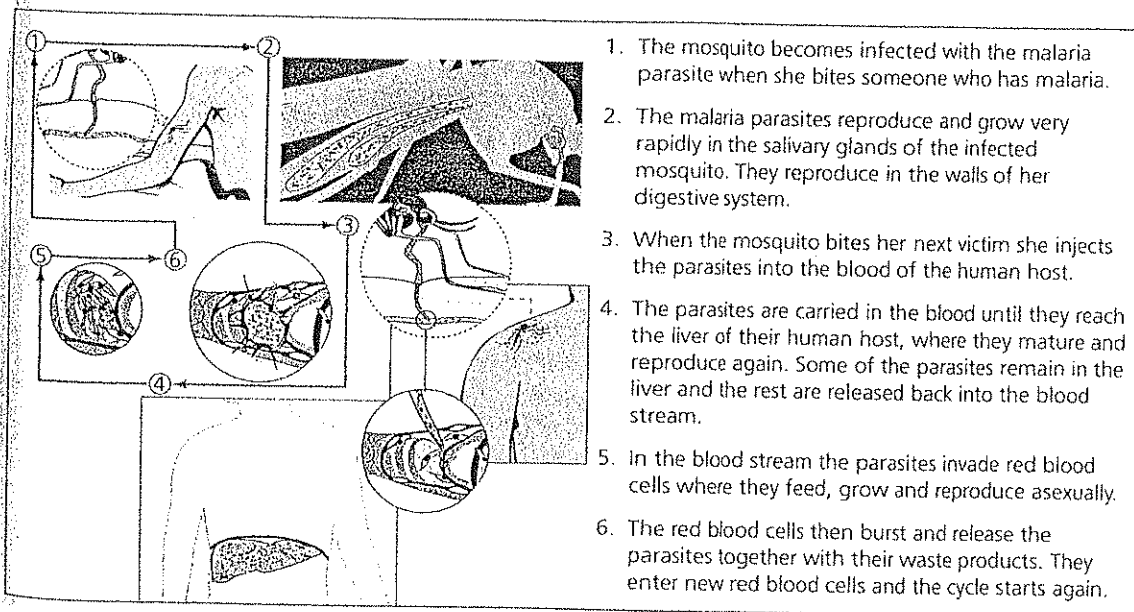
Managing diseases

The spread of disease can have negative effects on the growth of a population. To prevent the spread of disease in populations, various steps can be taken.

Managing malaria

Every year about two million people die from malaria. Most of the victims are children in tropical regions of Africa and Asia. The parasite which causes malaria is a protozoan called *Plasmodium*. The parasite is spread by female *Anopheles* mosquitoes. Malaria only occurs in places where the mosquito is found.

Malaria is a disease that involves three populations: Mosquitoes, the malaria parasite and humans. The three populations interact as follows:



2.4.1. How does the mosquito spread malaria? (2)

2.4.2. State two ways to avoid contracting malaria. (2)

2.4.3. (i) Can a person get malaria from a male mosquito? (1)

(ii) Explain your answer. (2)

2.4.4. Explain how an increase in the number of malaria infections would affect the South African economy. (3)

(Total 10)

QUESTION 3

3.1. Study the table below showing the amount of food wasted per person per year in different developed and developing regions of the world.

Region	Level of development	Food loss and waste per person per year (kg)		
		Total	At production and retail stages	By consumers
Europe	Developed	280	190	90
North America and Oceania	Developed	295	185	110
Industrialised Asia	Developed	240	160	80
Sub-Saharan Africa	Developing	160	155	5
North Africa, West and Central Asia	Developing	215	180	35
South and Southeast Asia	Developing	125	110	15
Latin America	Developing	225	200	25

[Adapted from *CUP Biology*, Jones and Jones, 2010]

- 3.1.1. For Sub-Saharan Africa, calculate the food wastage by consumers as a percentage of the total food waste. (3)
- 3.1.2. Give a possible explanation for the low percentage calculated in QUESTION 3.1.1. (2)
- 3.1.3. Give an explanation for the difference in the pattern of food wastage in developed and developing regions. (4)
- 3.1.4. State TWO possible ways of preventing the high levels of food waste that is found in developed countries. (2)

(Total 11)

3.2. Read the passage below and answer the questions that follow:-

The African potato has often been referred to as a 'miracle muthi'. The Zulu name for the African potato is 'inkomfe'. The potato as we know it is a stem tuber. The African potato is a corm. Research has shown that the African potato increases the level of T-cells in the body and as a result boosts the immune system. This has now resulted in the increased use of this plant in the treatment of AIDS sufferers.

It is claimed that the hypoxis extracts from this plant can be used as an agent to slow down the growth of certain types of cancer, to heal testicular tumours and prostate hypertrophy.

3.2.1. List the ailments that extracts of the African potato are used to treat. (3)

3.2.2. 'Scientific research on the plant has resulted in over-harvesting of this plant.' Explain this statement. (4)

3.2.3. Give the difference between the potato and the African potato. (2)

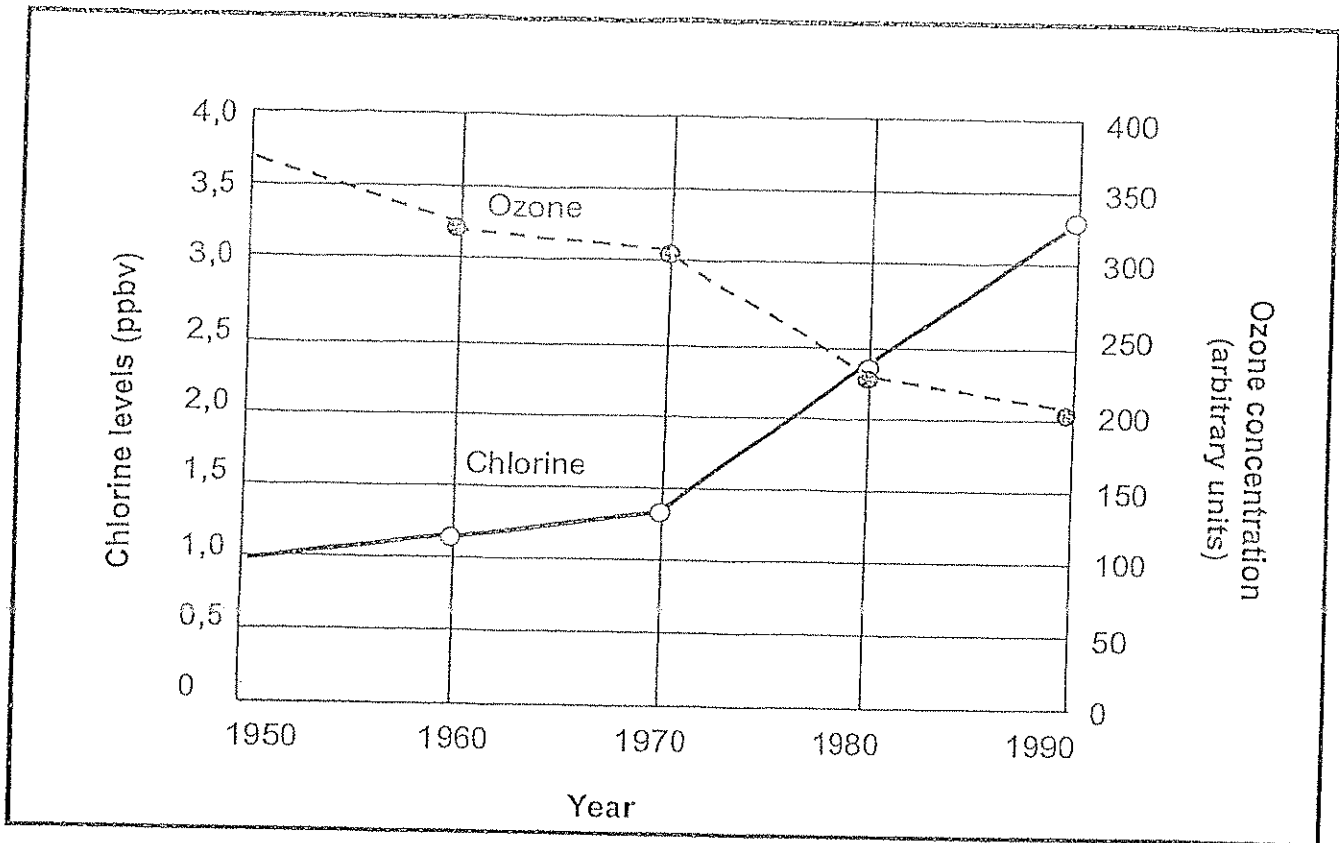
(Total 9)

3.3. List **TWO** advantages and **TWO** disadvantages of constructing dams. (4)

3.4. Ozone is found at low concentrations 15-50km above the Earth's surface in the stratosphere. Measurements showed that there is a significant decrease in the amount of ozone. It has been observed that there are holes in the ozone layer which get bigger each year.

The main chemical responsible for the depletion of the ozone layer is chlorine, which comes from the breakdown of CFC's (chloroflouro-carbons). The CFC's are broken down by sunlight into chlorine atoms which then react with the ozone. Ozone is destroyed in this reaction. The problem is worse in the Polar Regions because of the low temperatures.

An investigation to measure the ozone concentration and the chlorine levels have been done in Antarctica since 1950 and the results are shown in the graph below:



[Adapted from *Ecology and Conservation*, Cambridge University Press]

- 3.4.1. Give a caption for the graph (2)
- 3.4.2. What is the relationship between the levels of chlorine and the concentration of ozone? (2)
- 3.4.3. Name the dependent variable(s) in the investigation. (2)
- 3.4.4. In which 10-year period was the ozone depletion the greatest? (1)
- 3.4.5. In 1987 the Montreal Protocol was signed to lay down targets to reduce the use of CFC's by countries. Give TWO reasons why, despite a reduction in the use of CFC's, there was a decline in the ozone layer. (2)
- 3.4.6. Name ONE item that humans were using which contained CFC's. (1)
- 3.4.7. Explain why the ozone layer is important for humans. (2)

(Total 12)

- 3.5. List FOUR ways in which industries impact on water quality. (4)

SECTION C

QUESTION 4

The greatest threat to biodiversity is the destruction of habitats. Describe how various human activities may lead to habitat loss.

Content: (17)

Synthesis: (3)

NOTE: NO marks will be awarded for answers in the form of flow charts or diagrams.

TOTAL SECTION C: 20

GRAND TOTAL: 150