Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE 11

NOVEMBER 2013

LIFE SCIENCES P2

MARKS: 150

TIME: 2½ hours

This question paper consists of 15 pages.

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. Answer ALL the questions.
2. Write ALL the answers in your 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. If answers are NOT presented according to the instructions of each question, candidates will lose marks.
6. All drawings should be done in pencil and labelled in blue or black ink.
7. Draw diagrams and flow charts ONLY when requested to do so.
8. The diagrams in this question paper may NOT necessarily be drawn to scale.
9. The use of graph paper is NOT permitted.
10. You may use a non-programmable calculator, protractor, and compass.
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–D) next to the question number (1.1.1–1.1.10) in the ANSWER BOOK, for example 1.1.11 D.

1.1.1 Bacteria are…

A unicellular and without a nucleus.
B unicellular and parasitic in plants and animals.
C microscopic plants with a saprophytic mode of nutrition.
D unicellular with a nucleus and parasitic in plants and animals.

1.1.2 Viruses have a …

A nucleic acid core and a protein coat.
B DNA-containing nucleus and a lipid envelope.
C nucleic acid core and a plasma membrane.
D DNA core and a protein coat.

1.1.3 The following is a list that describes viruses:

(i) Play a significant role as decomposers
(ii) Are the major pathogens of humans
(iii) Are parasites
(iv) Reproduce within host cells

Which of the following are of biological importance in viruses?

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

1.1.4 Bryophytes are terrestrial plants that have NO…

A cellulose.
B rhizoids.
C vascular tissue.
D sporophyte phase.

1.1.5 Leaves that bear sporangia, are called …

A sporophylls.
B sori.
C cones.
D sporogonia.

1.1.6 The causes of global warming can be classified as:

A A biophysical issue
B A political issue
C A socio-economic issue
D All of the above

1.1.7 The quantity and quality of water is sustained by …

A the building of several dams along the streams of a catchment.
B clearing wetlands alongside streams in the catchment.
C reforestation of the catchment with indigenous trees.
D cutting canals to relay water from wetlands to streams and rivers.

1.1.8 A water sample taken from a stream reveals the presence of the following invertebrates: leeches, rat-tail maggots, bloodworms, and dragonfly larvae. This indicates that the stream is …

A clean and contains no pollutants.
B suitable for human consumption downstream.
C severely polluted.
D polluted.

1.1.9 A seed and a spore differ in that:

A Spores are diploid and seeds are haploid
B Spores can withstand dehydration while seeds cannot
C Spores are gametes while seeds give rise to new plants
D Spores can only be unicellular

1.1.10 Triploblastic animals that lack a through-gut and coelom.

A Cnidaria
B Flatworm
C Annelids
D Arthropods (10 x 2) (20)

1.2 Give the correct BIOLOGICAL TERM for each of the following descriptions. Write only the term next to the question number (1.2.1–1.2.10) in the ANSWER BOOK.

1.2.1 The vegetative part of a fungus

1.2.2 The bacterium type which is spherical in shape

1.2.3 A relationship between two organisms which live together for the benefit of one or both organisms

1.2.4 The concentration of sense organs at the anterior end of an animal leading to the formation of a head

1.2.5 Drugs that fight infections caused by bacteria

1.2.6 A fluid-filled cavity lined with the mesoderm

1.2.7 Places where seeds are stored to help preserve biodiversity

1.2.8 The division of the body of an animal into a series of similar units

1.2.9 The storage tissue found in the embryo sac

1.2.10 Animals that are attached to a substrate (10 x 1) (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 in the ANSWER BOOK.

	COLUMN I		COLUMN II
1.3.1	A division of plants with a vascular system, seeds, and no flowers	A B	Gymnosperm Angiosperm
1.3.2	The purpose of flowers	A B	Attract pollinators Form fruit
1.3.3	Act as decomposers	A B	Tape worms Snails
1.3.4	A body plan with two layers of cells	A B	Triploblastic Diploblastic
1.3.5	This layer is responsible for the development of organs	A B	Mesoderm Endoderm
1.3.6	A product, which is formed during the making of beer	A B	Alcohol Carbon dioxide
1.3.7	Many are parasitic and therefore have a negative impact on agriculture	A B	Platyhelminthes Annelida
1.3.8	The highly modified floral leaves, which make up the pistil of the flower	A B	Carpels Corolla
1.3.9	The beginning of the growth of the seed	A B	Pollination Germination
1.3.10	The outer layer of the ovule	A B	Receptacle Micropyle

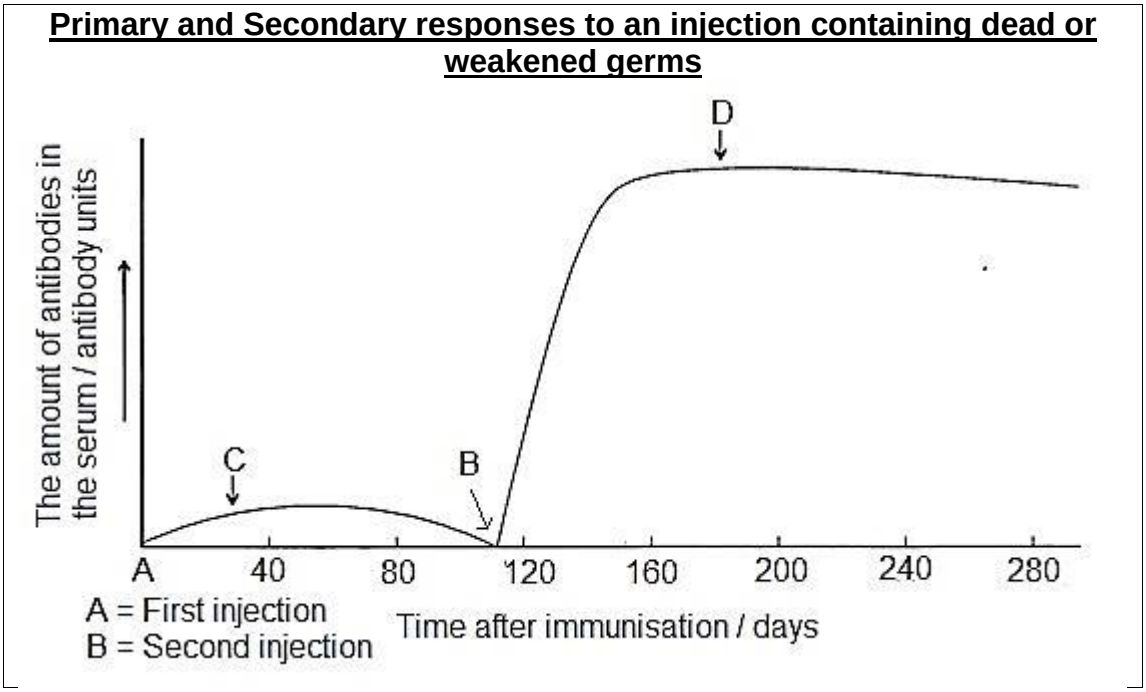
(10 x 2) (20)

TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1 Study the graph below, which shows the body's response to a vaccination given by an injection and a booster injection. Answer the questions that follow.



2.1.1 Mention TWO common ways of receiving vaccines. (2)

2.1.2 What in the vaccination stimulated the body to make antibodies? (1)

2.1.3 Which cells in the immune system produce the antibodies? (1)

2.1.4 What happened to the antibody level after the first injection? (2)

2.1.5 What happened to the antibody level after the second injection? (2)

2.2 The following table shows how effective Post Exposure Prophylaxis (PEP) drugs are if taken after different periods of exposure to the HI-virus. Study the table and answer the questions that follow.

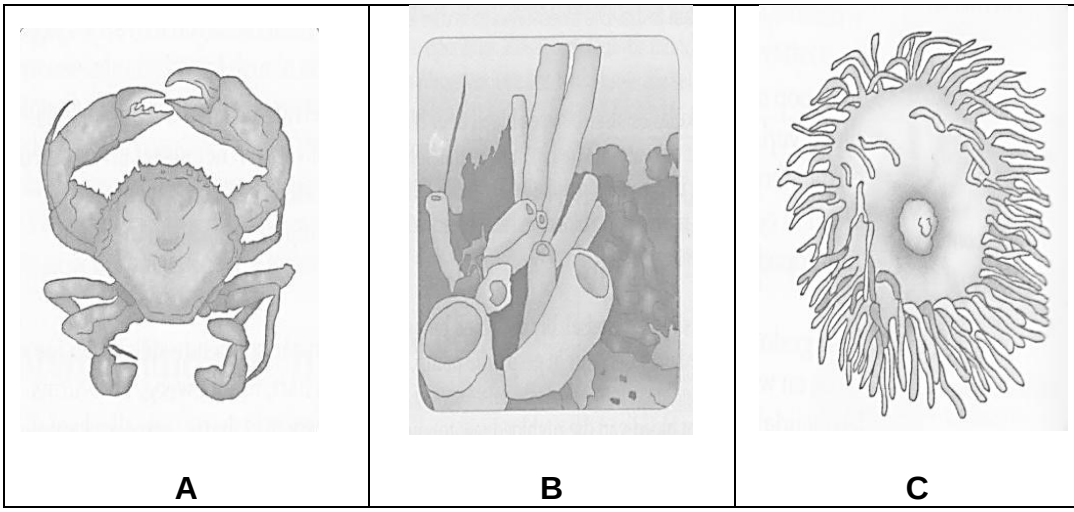
Period of Exposure (hours)	0	24	72	76	96
Effectiveness (%)	100	100	52	0	0

2.2.1 Draw a simple line graph to show the above information. (7)

2.2.2 How effective would the PEP drugs be if taken 48 hours after exposure to HIV? (2)

2.2.3 A schoolboy touched the blood of an injured rugby player with his bare hands on a Friday afternoon. On the advice of his parents he decided to see his doctor, but he only did so on the following Tuesday. Do you think that the doctor would have given him PEP drugs? Give a reason for your answer. (2)

2.3 Study the diagram, which represent three animals and answer the questions that follow.



A **B** **C**

2.3.1 What kind of symmetry does each of the animals possess? (3)

2.3.2 Explain the advantages for the animals (**A** and **C**) to have this type of symmetry. (3)

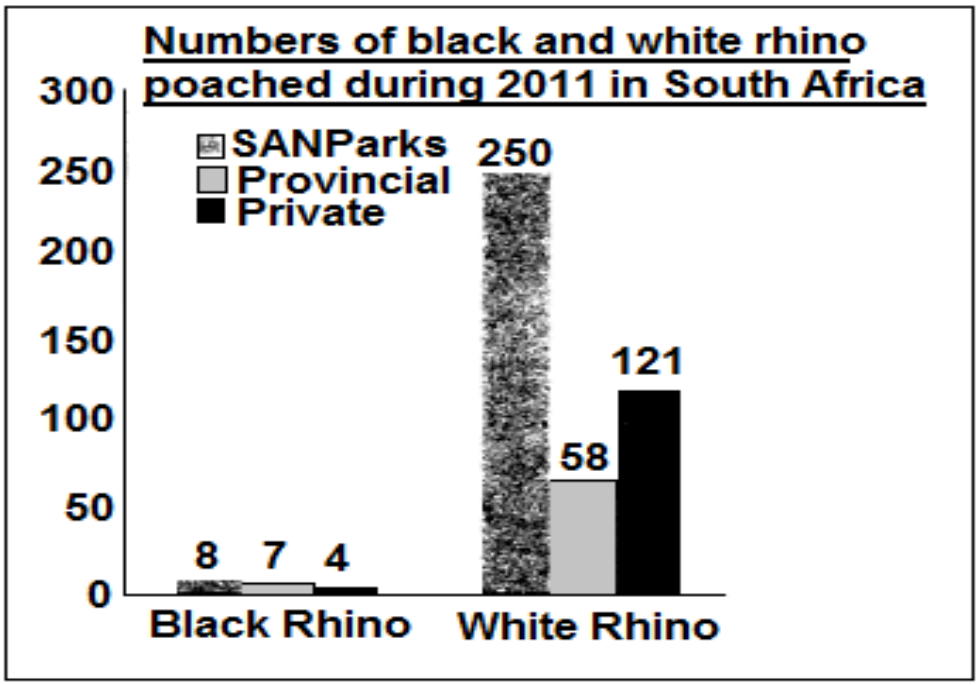
2.4 Read the information on rhino poaching and refer to the graphs to answer the questions that follow.

Rhino poaching still increasing

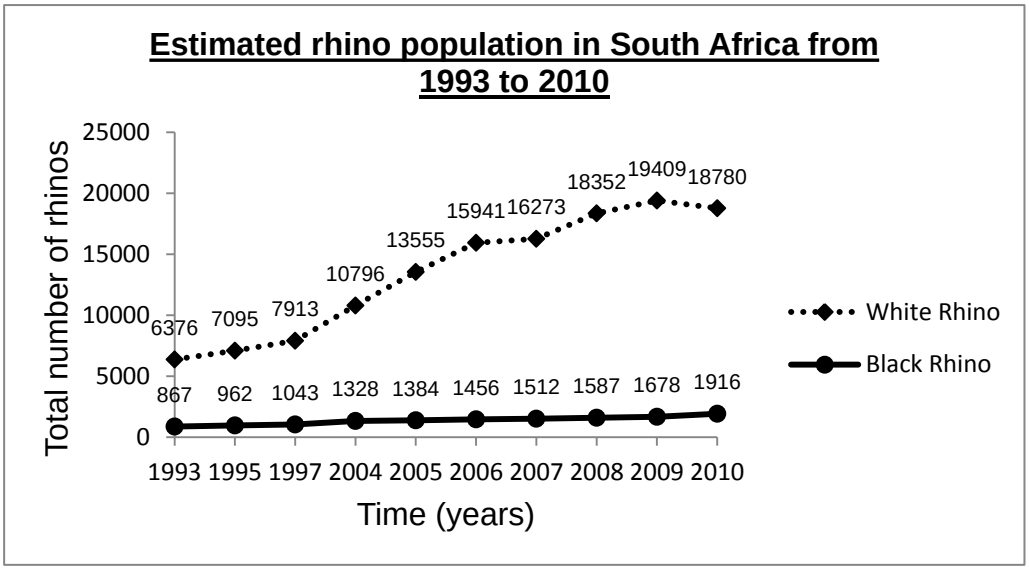
Economic forces drive rhino poaching. The number of rhinos illegally killed in South Africa during the first 134 days of 2013 has reached a staggering 313 — just 20 less than 2010's death toll of 333. Rhinos are poached for their horns which fetch high prices in Asia – rhino horn in 2011 sold for R400 000 per kilogram. In Asia rhino horn is used for medicinal purposes. The ban of trade in rhino horn has not helped as the black market price of the horn has increased. This has led to an increase in poaching. So much so that the army has been brought in to fight poachers in 2011. One way to protect rhino would be to educate people about the real medicinal value of rhino horn. It is difficult to change people's cultural beliefs, as they are not usually based on scientific facts. So, the idea that a living rhino is more valuable than a dead rhino is something that could be used to protect rhinos. Rhino horn is made of keratin and is similar to fingernails. If the horn is cut off, it will grow again.

[Adapted from: *www.rhino-economics.com*]

Graph 1



Graph 2



2.4.1 Calculate the total number of rhino poached in 2010 and in 2011. Show all calculations. (4)

2.4.2 Draw a table to compare the populations of black and white rhino in 1997 and 2010. (4)

2.4.3 Describe the trend of white rhino numbers as shown in graph 2. Explain your answer. (4)

2.4.4 What can be done to protect rhinos from poachers? Suggest THREE ways. (3)

[40]

QUESTION 3

3.1 Read through the text below and answer the questions that follow.

Cape Towns landfill crisis

Approximately 6 000 tons of waste are currently generated daily within the City of Cape Town. Fifty-five percent of waste ending up at the Council's six landfill sites is directly received from the industrial and commercial sectors, whereas the domestic waste from households account for approximately 30% of the waste stream.

A total of 1,7 million tons of waste was received in landfill sites in Cape Town during 2002 compared to the 1,6 million tons in 2001 and the 1,5 million tons in 2000. This is roughly an annual increase of 7%.

Waste from lower income households are shown to contain about 80% organic waste compared to that from affluent suburbs, which typically contains about 60–70% of packaging waste. Of the total amount of waste produced, more than 90% is landfilled by the City of Cape Town.

There is an urgent need for a new regional landfill site as the city faces the closure of most of its current landfill sites. Clean-up costs of litter and dumping exceed R100 million a year. This is money that could be put to far greater use within the city, particularly given the housing crisis.

[Adapted from: *www.capetown.gov.za/en/SolidWaste*]

3.1.1 Calculate how many tons of domestic waste are produced per day. Show all calculations. (3)

3.1.2 Landfills are known to cause pollution to the environment. Briefly describe TWO possible ways in which this could happen. (4)

3.1.3 Give ONE way in which lower income households could reduce the amount of waste that they send to landfills. (1)

3.2 Read the following paragraph and answer the questions that follow.

Modern-Day Plague

Deforestation is the permanent destruction of indigenous forests and woodlands. One of the reasons for deforestation is the conversion of forests and woodlands to agricultural land to feed growing numbers of people. Currently, 12 million hectares of forests are cleared annually. With the loss of a protective cover of vegetation by deforestation, more soil is lost. Annual soil loss in South Africa is estimated at 300–400 million tons. Our forests also act as a major carbon store because carbon dioxide (CO_2) is taken up from the atmosphere. Currently, up to 20 per cent of global carbon emissions come from deforestation and forest degradation – more than the total emissions from the global transportation sector.

Deforestation will have an impact on the water cycle as well, because trees are responsible to draw ground water up through their roots and release it into the atmosphere (transpiration). Almost all of this deforestation occurs in the moist forest and open woodlands of the tropics. At this rate, all moist tropical forests could be lost by the year 2050.

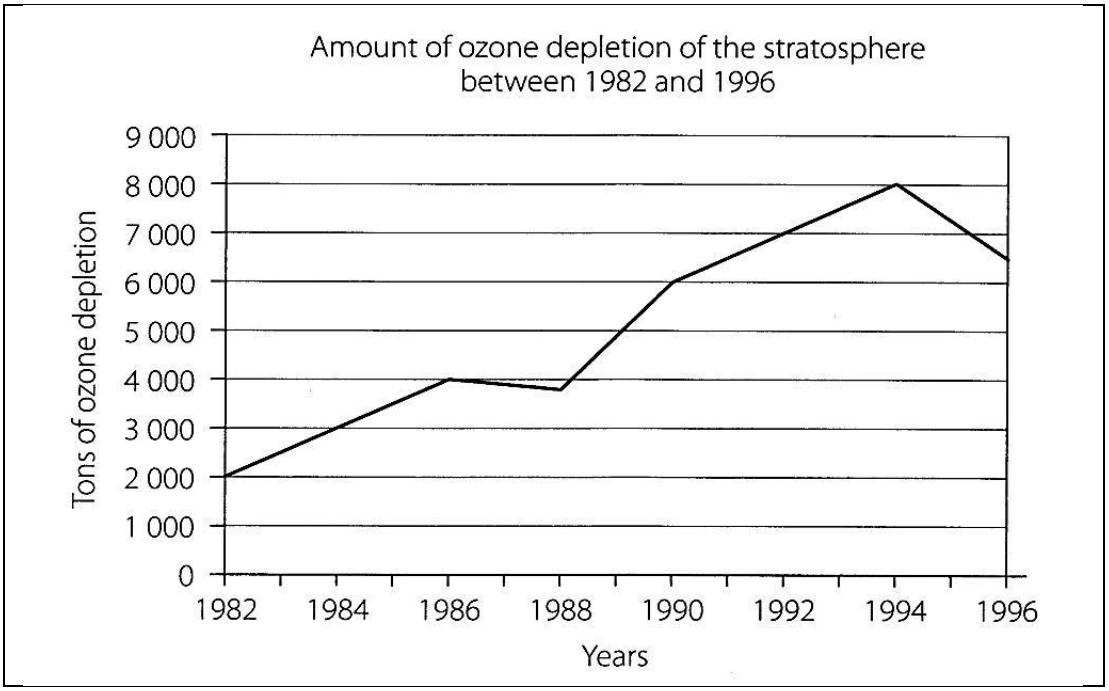
[Adapted from: *www. botany.uwc.ac.za*]

3.2.1 Explain how the removal of plants by deforestation contributes to an increase in the concentration of greenhouses gasses. (3)

3.2.2 Explain how deforestation increases soil erosion. (3)

3.2.3 Explain how deforestation affects the water cycle. (3)

3.3 Study the graph below, which indicates the amount of ozone depletion in the stratosphere between 1982 and 1996.



3.3.1 Comment on the ozone depletion over the period 1982–1996. (4)

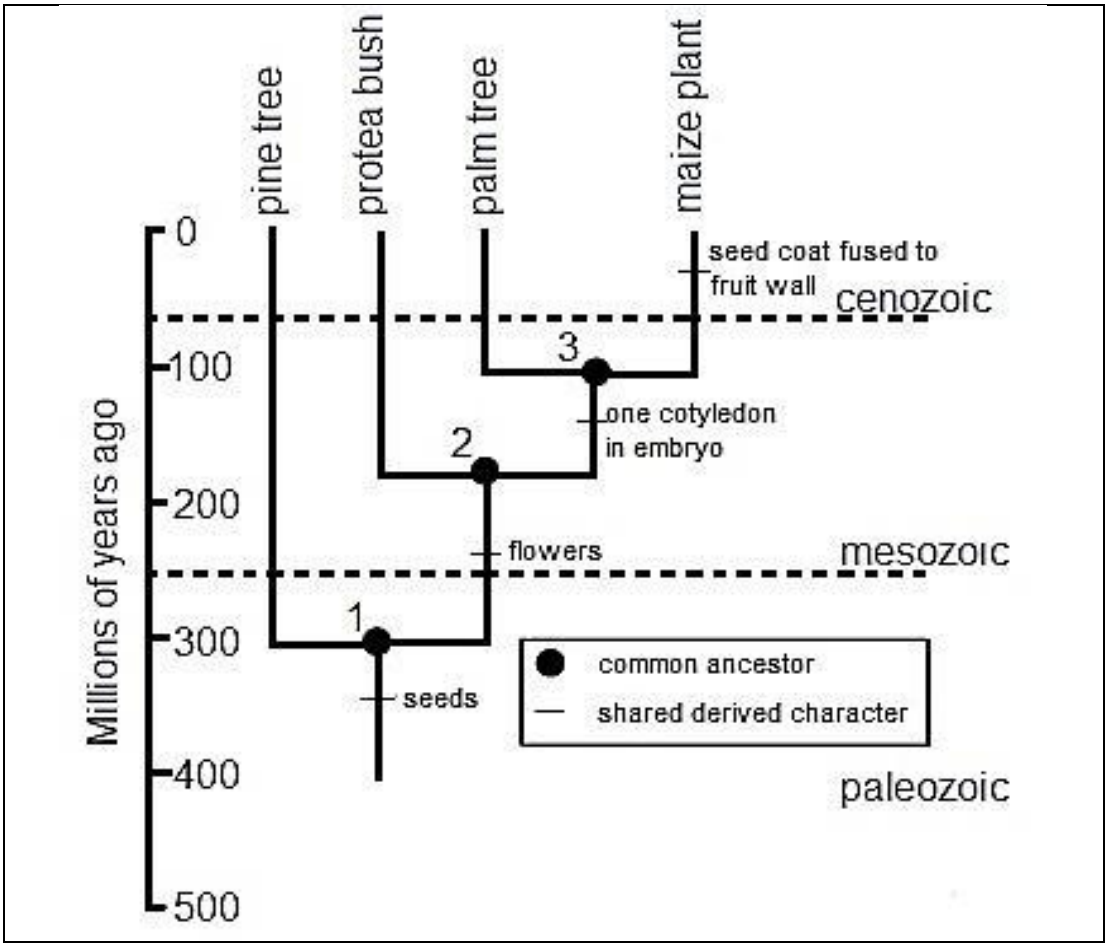
3.3.2 How much of the ozone was lost from the atmosphere in 1990? (1)

3.3.3 Besides chlorofluorocarbons (CFCs), name THREE other greenhouse gases. (3)

3.3.4 CFCs can stay around for 100 years. What is the implication of this for the ozone layer? (1)

3.3.5 Give THREE possible reasons for the decrease in ozone depletion after 1994. (3)

3.4 Study the diagram which shows a phylogenetic tree of four plant species and answer the questions that follow.



3.4.1 Provide a definition of a *phylogenetic tree*. (2)

3.4.2 State whether the following statements are true or false. In each case give a reason for your answer.

(a) The solid circle numbered **3** represents the common ancestor of the protea bush, palm tree and maize plant. (2)

(b) The protea bush is more closely related to the pine tree than it is to the maize plant because they are located next to each other on the phylogenetic tree. (2)

(c) Palm trees evolved from pine trees. (2)

(d) Protea bushes, palm trees and maize plants are all flowering plants. (2)

3.4.3 How many millions of years ago did the ancestor of the palm tree and maize diverge? (1)

[40]

TOTAL SECTION B: 80

SECTION C

QUESTION 4

4.1 Eutrophication and acid mine drainage are two of the most important water quality problems in South Africa. Write a mini-essay describing what they are, what causes them and their effects on the environment.

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