

**NORMAN HENSILWOOD HIGH SCHOOL**  
**JUNE EXAMINATION**



**INSTRUCTIONS AND INFORMATION**

Read the instructions that follow carefully before answering the questions.

1. Answer **all** the questions.
2. Start the answer to each question at the top of a **new** page.
3. Number the answers correctly according to the numbering system used in this question paper.
4. Write neatly and legibly.
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 or 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. Non-programmable calculators, protractors and compasses may be used.

DATE	2 JUNE 2011
GRADE	Grade 11
SUBJECT AND PAPER	Life Sciences
TIME	2½ Hours
MARKS	150
EXAMINER	Ms S Sirmon
MODERATOR	Ms A Campher

*D. P. Pampard*

*Checked 23.5.2011*

## SECTION A

## QUESTION 1

1.1 Various possible answers are provided for each question. Write **only the letter** of the correct answer next to the corresponding number.

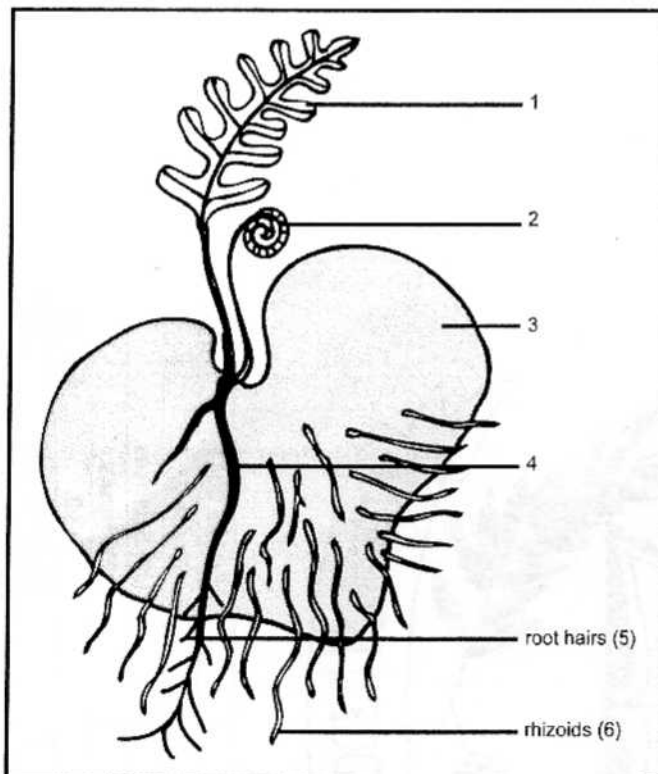
1.1.1 A cell of a living organism has a nucleus, cell wall of chitin and does not contain any chloroplasts. The living organism belongs to the kingdom ...

- A Monera.
- B Protista.
- C Fungi.
- D Animalia.

1.1.2 The production of beer and wine depends on which of the following micro-organisms?

- A Yeast
- B Viruses
- C Bacteria
- D Protists

1.1.3 The diagram below shows the development of a fern sporophyte generation.



The structures in this diagram that are haploid (n) are ...

- A 1, 2 and 3.
- B 4, 5 and 6.
- C 2, 4 and 5.
- D 3 and 6.

- 1.1.4 In moss plants, fertilisation is followed by the formation of a ...
- A zygote and then a protonema.
  - B diploid sporangium and diploid spores.
  - C male and female bud that form haploid spores.
  - D zygote and then a sporangium.
- 1.1.5 The **two** main structural features of viruses are ...
- A RNA and DNA core and a protein sheath.
  - B RNA core and a protein sheath.
  - C DNA core and a protein sheath.
  - D nucleic acid and a protein sheath.
- 1.1.6 Which of the following structures are found in both eukaryotic and prokaryotic cells?
- A Plastids
  - B Nucleus
  - C Golgi apparatus
  - D Chromosomes
- 1.1.7 By which of the following methods may fungi obtain their energy?
- (i) By feeding on dead organic matter
  - (ii) By undergoing photosynthesis
  - (iii) By undergoing anaerobic respiration to produce lactic acid
  - (iv) From other organisms in a symbiotic relationship
- A (i) only
  - B (i), (ii) and (iii)
  - C (i), (ii), (iii) and (iv)
  - D (i) and (iv)

[7 x 2 = 14]

1.2 Give the correct **term** for each of the following. Write only the **term** next to the relevant question number.

- 1.2.1 A parasite that lives on the surface of its host. (1)
- 1.2.2 The method of obtaining energy used by gymnosperms. (1)
- 1.2.3 The gymnosperm species of tree common to forested parts of South Africa. (1)
- 1.2.4 Prokaryotic organisms that cause disease. (1)
- 1.2.5 The process by which bacteria reproduce. (1)
- 1.2.6 The type of organism responsible for tuberculosis (TB). (1)

[6]

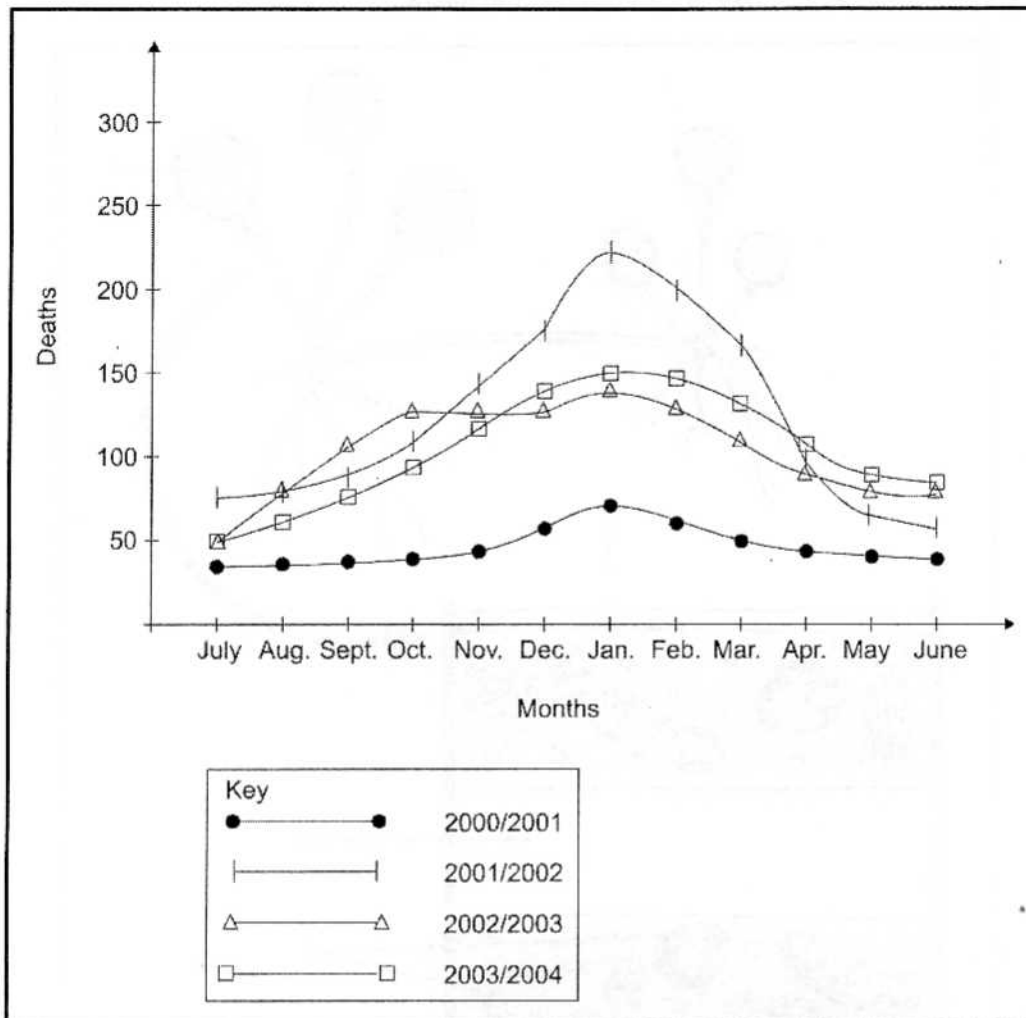
- 1.3 Each of the following questions consists of a **statement or description** in the first column and two **items** [numbered (a) and (b)] in the second column. Consider which item(s) relate(s) to the statement or description. Write your choice next to the relevant question number by using the following codes:

- A – if only item (a) refers to the statement or description
- B – if only item (b) refers to the statement or description
- C – if both items (a) and (b) refer to the statement or description
- D – if neither of the items refers to the statement or description.

Statement or description		Item	
1.3.1	The molecule that is produced by lymphocytes in response to a pathogen	(a)	Antigen
		(b)	Antibodies
1.3.2	When a small amount of the antigen is injected into a person to stimulate the immune response	(a)	Vaccination
		(b)	Immunisation
1.3.3	The lymphocytes that are targeted by HIV	(a)	T cells
		(b)	B cells
1.3.4	Phagocytosis and inflammation	(a)	Specific immunity
		(b)	Acquired immunity
1.3.5	Types of T lymphocytes	(a)	Plasma cells
		(b)	Memory cells

[10]

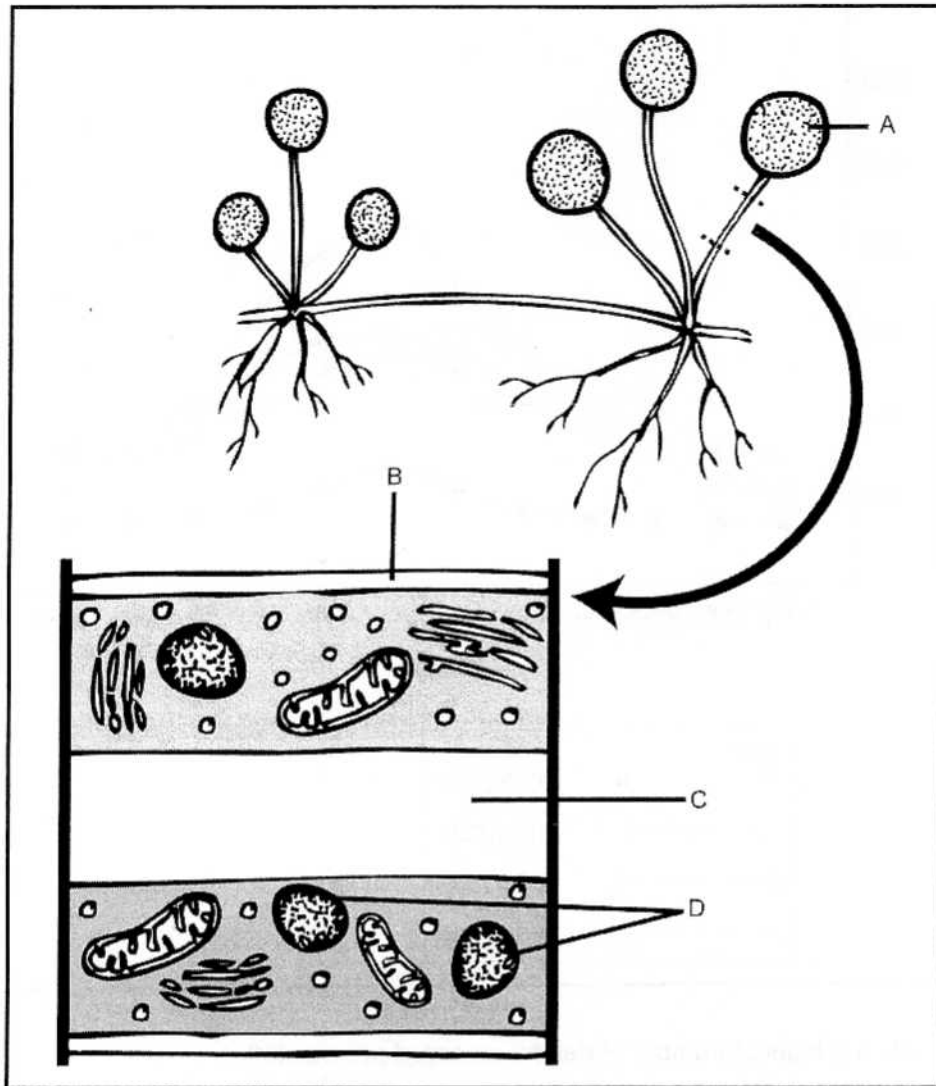
- 1.4 A group of scientists conducted a five-year study of malaria deaths in KwaZulu-Natal. They presented their findings in the graph below.



- 1.4.1 What was the highest number of deaths recorded per month? (2)
- 1.4.2 In which month and year did this take place? (2)
- 1.4.3 Which year probably had the lowest annual rainfall? (1)
- 1.4.4 Give a reason for your answer in Question 1.4.3. (2)
- 1.4.5 What conclusion can the scientists make from their study over the five-year period? (3)

[10]

- 1.5 Although fungi have for a long time been regarded as plants, many biologists now prefer to place them in a separate kingdom. Examine the diagram below, which shows the structure of bread mould, and answer the questions that follow.



- 1.5.1 Explain why fungi belong to their own kingdom. (2)
- 1.5.2 Provide a label for A and also name what factors that growth of the fungi depend on. (4)
- 1.5.3 Compare the structure of fungi with bacteria. Give **two** differences. Tabulate your answer. (4)  
[10]

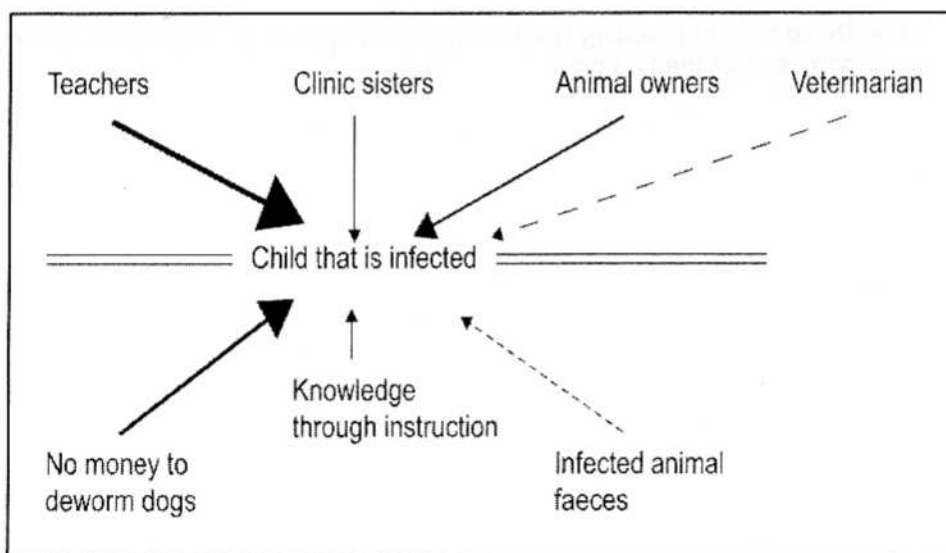
TOTAL SECTION A: 50 MARKS

## SECTION B

## QUESTION 2

2.1 Read the passage below and answer the questions that follow.

The roundworm lives in garden soil and children pick up the eggs when they are playing. When a child's dirty fingers inevitably get into his or her mouth, the egg is transported into the child's stomach. Eggs can also be swallowed by eating unwashed salads or vegetables grown in contaminated soil. The eggs hatch in the small intestine and larvae cross the gut wall into the blood vessels, from where they are transported into the lungs. From here, the larvae enter the airways and are swallowed, getting into the stomach. Once in the stomach, they are passed into the rest of the gut, where they mature into adult worms, which in turn lay eggs. These are passed in the child's stool and so the cycle of infection continues. The involvement of various influences in a child's life is shown below. The degree to which these influences can affect children is indicated by the thickness of the arrow.



- 2.1.1 A group of students want to research the degree to which a garden is infected with roundworms. They take soil samples and count the eggs present by placing a coloured dye that stains the eggs on the soil sample. Five statements have been recorded below. Of these, select the three statements that would ensure that accurate results would be obtained.

Write down the number of each of the three statements you selected and explain why you think it would affect the research.

- (i) Many samples should be taken over the whole garden.
- (ii) Samples must also be taken from sterilised vegetables purchased at the local store.
- (iii) The students should control the watering of the garden during the research.
- (iv) Soil samples must not be returned to the garden during the experiment.
- (v) The children need to bath and wash regularly. (6)

- 2.1.2 After reading about the round worm use this and draw a flow diagram showing the pathway of the eggs of the tape worm. (8)

- 2.1.3 Is the following statement true?  
Teachers are more influential in educating disadvantaged children about worms than clinic sisters.  
Explain your answer. (1)

[15]

- 2.2.1 Explain how the theory of evolution presented by Darwin tries to explain speciation of the flightless birds to support your answer. (Ostrich, the rhea and the emu) (6)

- 2.2.2 From the list of options a) and b) choose **one** only:

- a) Name **three** vertebrates and explain how the different limb bones of each of them are suited to their function.

OR

- b) Name **three** different feeding types in insects. Explain how the modifications of each one's mouthparts suit its feeding type. (9)

[15]

## QUESTION 3

3.1 The following describes the steps taken to investigate the effectiveness of three different antibiotics, called AB1, AB2 and AB3, on three different strains of disease-causing bacteria called X, Y and Z.

- The investigator prepared nine agar plates (Petri dishes with the nutrient agar).
- Bacteria X is spread on three agar plates, bacteria Y is spread on another three agar plates and bacteria Z is spread on the last three agar plates.
- The investigator then places the same amount of AB1 in the centre of each of three agar plates: one with bacteria X, one with bacteria Y and one with bacteria Z.
- The investigator repeats this step using AB2 and then with AB3.
- The nine Petri dishes are then incubated and examined for bacterial growth.
- The diameter of the area where no bacteria grew was measured for each agar plate. The results are given in the table below.

	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

- 3.1.1 Plot the results on a bar graph. (13)
- 3.1.2 Which antibiotic is the:
- a) Most effective in stopping bacterial growth?
  - b) Least effective in stopping bacterial growth? (2)
- 3.1.3 What is the dependent variable in this investigation? (1)
- 3.1.4 Name **two** variables that the investigator kept constant to make sure that it was a fair test. (2)
- 3.1.5 Explain **one** improvement that could be made in this investigation. (2)

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

Gymnosperms and angiosperms are very important to humans. Cycads form part of one of these groups. If you wish to keep cycads, you must have a permit. Permits are issued by conservation organisations. Cycads can be recognised by their hard, spiky leaves. Some leaves have smaller spikes on their edges. Pollination in cycads is carried out by special beetles. Owing to the removal of cycads from the wild, plants are further apart than they were previously. This makes it difficult for insects like beetles to pollinate them. Encephalartos woodii is the most endangered cycad species in South Africa, as there only a few male specimens alive. This species will survive if these male plants continue to produce suckers from the base of their stems.

- 3.2.1 To which plant group do cycads belong? (1)
- 3.2.2 Give **one** reason why it is necessary to obtain a permit if a person wishes to keep a cycad. (1)
- 3.2.3 What would be the advantage of spikes on the leaf of a cycad? (2)
- 3.2.4 What evidence from the article points to the fact that there are separate sexes of cycad? (1)
- 3.2.5 List **three** ways in which pine trees are economically important. (3)
- 3.2.6 Give **two** reasons why pine trees are not wanted in national parks. (2)

[10]

SECTION B: 60 MARKS

## SECTION C

## QUESTION 4

- 4.1 Read the passage below and answer the questions that follow. Use only the data provided unless the questions specify otherwise.

**Abalone population under threat**

One species of abalone is collected and sold to China as a highly prized delicacy. The local abalone population of this species is about to collapse. Fossil records show that abalone have been collected by humans for more than 6 000 years. However, in the last twenty years, the collection of these animals has caused a collapse in the population. In one bay near the town of Saldanha, a record of the endangered abalone species was kept over seven years. The measurements were made every year on the first day of September. Abalone take between eight and ten years to reach sexual maturity. The results of the research are recorded in the table below. There are six species of abalone but only one, the largest, is collected commercially.

**Abalone population records for bay X near Saldanha**

Year	Males counted	Females counted
1998	798	599
1999	467	383
2000	181	149
2001	74	34
2002	26	0
2003	2	7
2004	0	2

Abalones prefer to live at between zero and five metres below the surface and live on rocky outcrops. They are thus visible from the surface when the weather is calm. Abalone are either male or female. A mature female can produce a maximum of fifteen million eggs per spawning. Spawning occurs only once a year. Abalone feed on algae and diatoms (free-living plankton that photosynthesise). Diatoms can cause the sea water to look green, brown or yellow at times. These changes in sea colour can lead to a condition known as red tide. This happens in calm weather. The diatoms remain in one area and produce a toxin that kills off filter feeders like mussels.

- 4.1.1 Read the statements that follow and decide whether they are **true** or **false**. Support your answers with a quote from the article.
- All abalone species are in crisis. (2)
  - Abalone have been collected by humans in recent years owing to changes in eating behaviour. (2)
  - A red tide is an unnatural phenomenon that can have an effect on mussel populations. (2)
- 4.1.2 Using the information provided, draw a food chain showing and naming one producer, one primary consumer and one secondary consumer. Provide a suitable heading for your food chain. (5)

- 4.1.3 Assume that all the females sampled in 2003 produced a maximum number of eggs once in the year. How many eggs would have been produced that year? Show all calculations. (2)
- 4.1.4 Between which years did the male abalone population decrease the most? (1)
- 4.1.5 Molluscs are not as advanced as arthropods from an evolutionary point of view. Explain what body plan arthropods have with regard to symmetry and number of tissue layers. State two ways in which body-plan symmetry and the number of tissue layers have helped to make arthropods the most successful animal group. (6)

[20]

- 4.2 Read the passage below and answer the question that follows.

Vaccination programmes are vital in controlling the spread of many diseases. Childhood vaccination programmes have reduced the incidence of diseases such as measles and mumps. However, vaccination programmes are only effective if most of the children of a particular age group are vaccinated. If the percentage of children that is vaccinated falls below 60%, the disease will spread again amongst the unprotected children. Measles is the leading cause of vaccine-preventable death. The major reason for this is not the failure of the vaccine, but the failure to vaccinate. Outbreaks of measles occur often in various parts of South Africa with tragic consequences.

Write an essay in which you highlight the advantages and disadvantages of vaccinations. Describe the social factors in South Africa that make it difficult for health officials to ensure that everyone who needs to be vaccinated is vaccinated. Include strategies that the Department of Health could implement to overcome the difficulties in this regard. Conclude your essay by giving your opinion on whether the vaccination programme in South Africa is effective.

**Note:** No marks will be awarded for answers in the form of flow charts or diagrams. (20)

[20]