DIRECTORATE FOR QUALITY AND STANDARDS IN EDUCATION
Department for Curriculum Management and eLearning
Educational Assessment Unit
Annual Examinations for Secondary Schools 2010

Track 2

BIOLOGY – FORM 3
TIME: 1H 30MIN

NAME: _____ CLASS: _____

	Section A								Section B				
Question No.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**	**5**
Max mark	4	5	7	7	5	9	8	10	15	15	15	15	15
Actual mark													**TOTAL MARK**

85% Theory Paper	**15% Practical**	**100% Final Score**

Section A
Answer all questions in this Section.

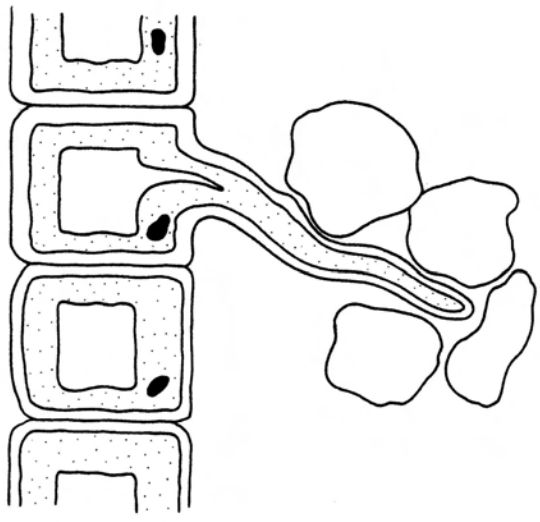
1. The following sentences describe the biological control method of the Prickly Pear Cactus. The sentences are not in the right order. Re-arrange the sentences in the right order and write the letters in the correct sequence in the boxes below.

A	In six years the caterpillars had completely destroyed all the cacti.
B	The fast growing plants made the land useless for agricultural purposes.
C	During the 1920's the Prickly Pear Cactus was introduced into Australia from America.
D	So in 1927, scientists decided to try and attack the cactus by using predators.
E	The caterpillars of these moths fed on the prickly pear cactus.
F	Scientists released thousands of moths called *Cactoblastis cactorum.*
G	Getting rid of the cactus by spraying or cutting would have been too expensive.
H	The first few plants spread very quickly and nothing else could grow.

(4 marks)
Total: 4 marks

2. The following diagram shows part of a root in soil.
a. Label the diagram with the words in the box.

cell wall, vacuole, cytoplasm, nucleus, soil particle, root hair



(3 marks)

b. Name the process by which water is absorbed by the roots from the soil.

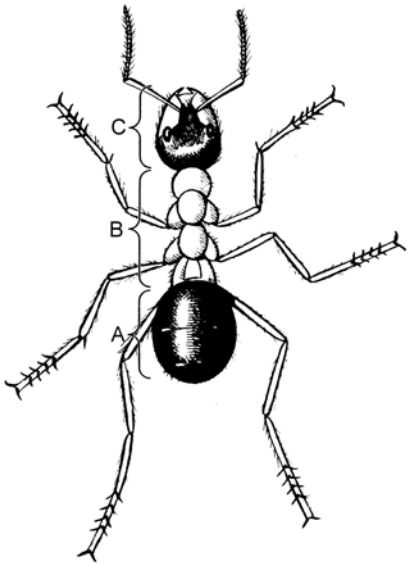
_____ (1 mark)

c. Mineral salts in the form of ions are drawn into the roots along with the water. They are taken up partly by passive diffusion. However they can be absorbed by the roots even when they are present in the soil in a lower concentration than inside the root cells. Name the process by which mineral salts can be taken up into the root cells when they are present in a low concentration in the soil.

_____ (1 mark)

Total: 5 marks

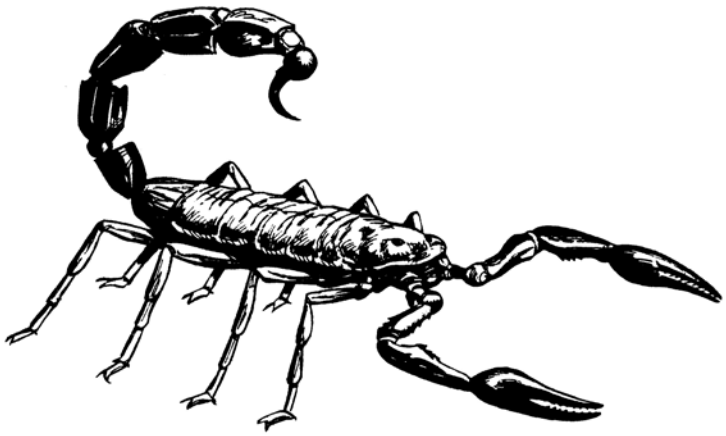
3a. Label the parts A, B and C of the ant shown in the diagram below.



A:
B:
C:

(1, 1, 1 mark)

b. The diagram below shows a scorpion.



(i) Describe the appendages of both the scorpion and the ant.

_____

(ii) Name the class to which the scorpion belongs.

_____

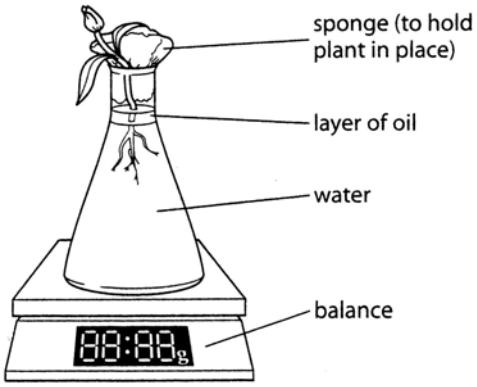
(iii) List TWO structural differences (visible in the two diagrams) between the ant and the scorpion.

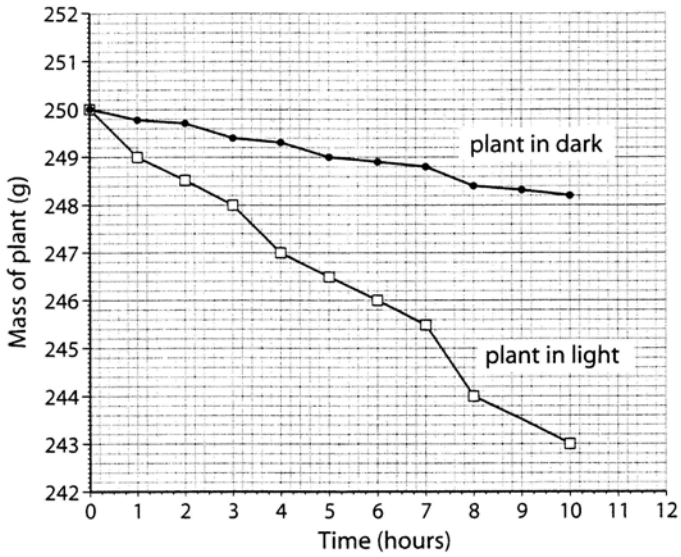
_____

_____

(1, 1, 2 marks)
Total: 7 marks

4. Two similar plants were set up like the one shown in the diagram below, to measure the amount of water lost by each plant. One plant was placed in the light while the other was placed in the dark. The masses of each plant were measured every hour for 12 hours. A graph of the results is shown below.





a. Why is there a layer of oil on the water?

_____ (1 mark)

b. List TWO conditions that need to be kept the same for this experimental investigation.

_____

_____ (2 marks)

c. Compare the results obtained from this experiment.

_____

_____

_____ (2 marks)

d. The plant that was in the lit place was placed in front of a heater. Predict the changes in water loss that you would expect.

_____ (1 mark)

e. Work out the percentage loss of water for the plant placed in light conditions after 6 hours.

_____ (2 marks)

Total: 8 marks

5. Plants respond to stimuli by growing in a particular direction.

a. (i) Name the growth response of a plant towards light.

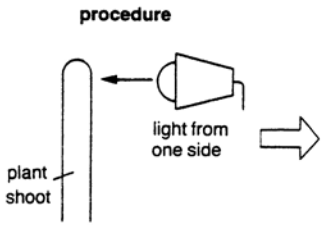
_____

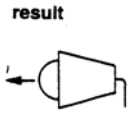
(ii) Name ONE other stimulus (besides light) that plants respond to.

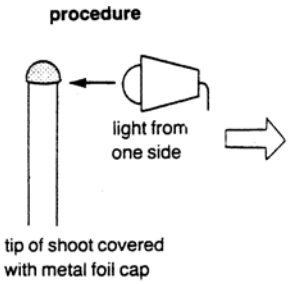
_____

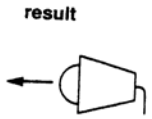
(1,1 mark)

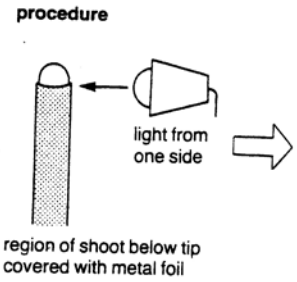
b. A biology student carried out three investigations to study the effect of light on plant shoots. Draw the result for **each** of the following experimental investigation shown below.

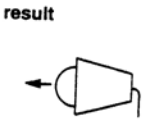






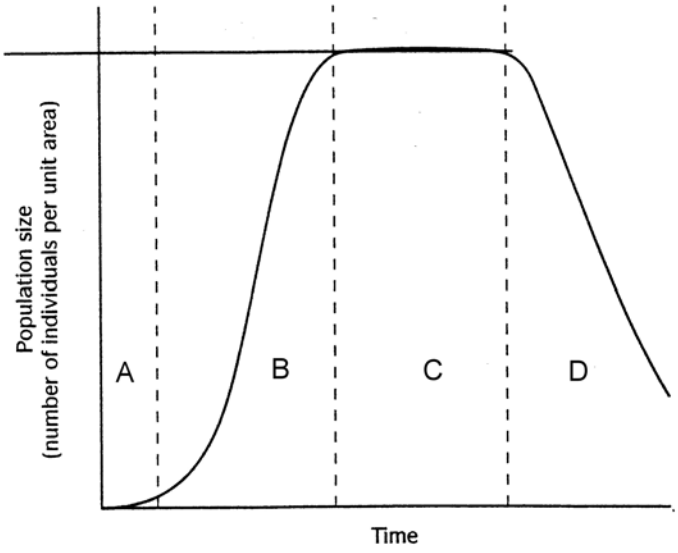






(1, 1, 1 mark)
Total: 5 marks

6. The following diagram shows the population growth curve for yeast over a period of time.



a. From the diagram above, write the letter that shows that:

(i) population size remains the same _____

(ii) population size decreases. _____

(1, 1 mark)

b. Explain why there is little change in the population size in part A.

_____ (1 mark)

c. Yeast reproduce asexually by budding. List TWO other types of asexual reproduction.

_____(2 marks)

d. Explain why:

(i) asexual reproduction occurs much faster than sexual reproduction.

_____

(ii) asexual reproduction is advantageous to organisms such as desert lizards living in habitats with a low population density.

_____

(1, 1 mark)

e. Compare the genetic make up of the offspring by asexual and sexual reproduction.

_____

_____ (2 marks)

Total: 9 marks

7. In good soil there are plenty of air spaces between the soil particles and crumbs. These spaces are filled with air.

a. List ONE reason why the oxygen in soil air is important.

_____ (1 mark)

b. What happens to the water in a soil that contains:

(i) very large soil particles

_____

(ii) very small soil particles that are tightly packed?

_____

(1, 1 mark)

c. Sandy soil is loose and light.

(i) List ONE advantage of this.

_____

(ii) Sandy soil dries up quickly in hot weather. List ONE way of preventing sandy soil from drying up.

_____

(1, 1 mark)

d. Name:

(i) the substance that gives a black colour in the topsoil layer

_____

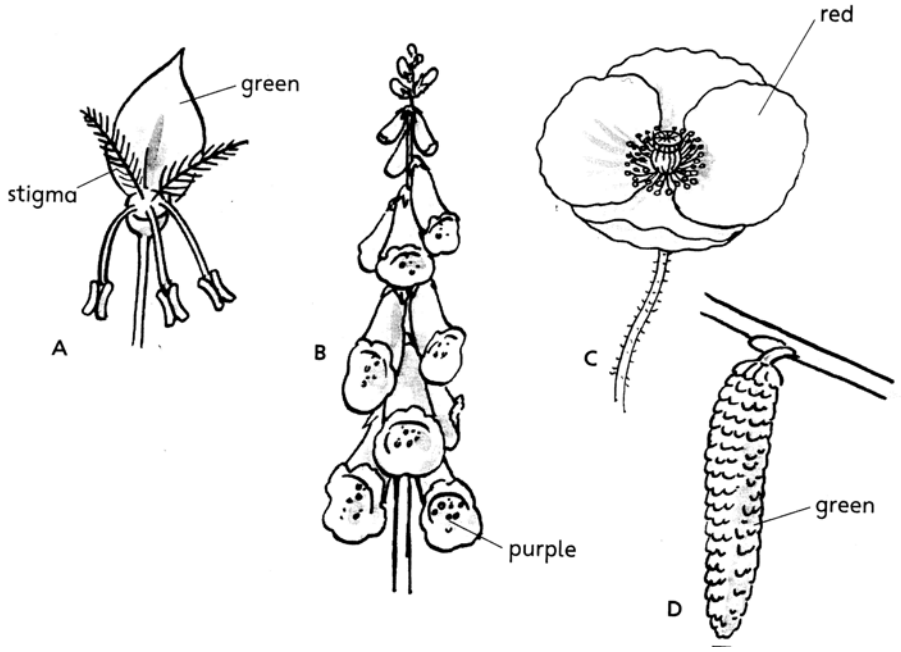
(ii) the type of soil that tends to stick to garden tools. Give a reason for your answer.

_____

(1, 2 marks)

Total: 8 marks

8. The following diagram shows four flowers (A, B, C and D).



a. Complete the following Table by ticking (✓) in the correct boxes.

characteristic	FLOWER			
	A	**B**	**C**	**D**
produces lots of pollen				
produces nectar				
Pollen grains with spiky surfaces				

(3 marks)

b. Write TWO features (visible in the diagram) that help plant A with its type of pollination.

_____

_____ (2 marks)

c. Define the term self-pollination and list ONE reason why it might be advantageous.

_____

_____ (2 marks)

d. Self pollination takes place regularly in orchids. Some orchids like *Neottia* lack chlorophyll. Such orchids obtain their energy and nutrients by parasitizing soil fungi.

(i) What is the function of chlorophyll?

_____

(ii) Define the term parasitism.

_____

(1, 1 mark)
Total: 9 marks

Section B

Answer question 1 and choose TWO others. This section carries 45 marks. Write the answers for section B on a foolscap.

1. Rabbits introduced in New Zealand as a food source by sailors in the 1800's have become a severe nuisance to farmers. The *myxomatosis* virus was imported and released to control the rabbit population.

a. Name the type of pest control described in the passage above and list ONE advantage and ONE disadvantage of it. (3 marks)

b. Draw a labelled diagram to show the basic structure of a virus. (3 marks)

c. Common gorse, originally a hedge plant in Scotland was also introduced in New Zealand and it survived well. Common gorse is widely used in land reclamation purposes because of its nitrogen-fixing capacity.
(i) Explain the term *nitrogen-fixation*.
(ii) List ONE reason why agricultural weeds such as the common gorse is a nuisance to gardeners. (2, 2 marks)

d. In New Zealand there are five species of kiwi (a flightless bird). These are the Great spotted kiwi (*Apteryx haastii*), the Little spotted kiwi (*Apteryx owenii*), the Okarito brown kiwi (*Apteryx rowi*), the Tokoeka (*Apteryx australis*) and the North island brown kiwi (*Apteryx mantelli*).

(i) Explain why the five different species of kiwi have a common first scientific name.
(ii) Kiwi are usually nocturnal. This means that they are active at night and sleeping during the day. Give ONE benefit of this behaviour for the kiwi.
(iii) Explain why flightless birds have more feathers than flying birds.

(1, 2, 2 marks)
Total: 15 marks

2. Give a biological explanation for **each** of the following statements.

a. Sperms are specialised cells.
b. Living things produce energy.
c. Monocotyledons are easily identified from their leaves.
d. The hoverfly has striking yellow and black stripes similar to those of a bee.
e. Arctic mammals such as the polar bear are relatively large.

(3, 3, 3, 3, 3 marks)
Total: 15 marks

3. Explain the importance of:

a. excretion in living things
b. feathers in a bird
c. nitrifying bacteria in the nitrogen cycle
d. a slimy capsule in bacteria
e. reproduction in living things.

(3, 4, 3, 2, 3 marks)
Total: 15 marks

4. A person enters a sauna and remains there for half an hour. In a sauna the temperature reaches 80^{o}C or above.

a. List TWO physical changes that the person undergoes during the time spent in the sauna. (4 marks)
b. After the sauna the person takes a cold shower and starts shivering. Explain why shivering takes place. (2 marks)

c. Name the:
(i) muscle in the skin that contracts to make the body hair stand straight
(ii) gland in the skin that makes the secretion that helps to cool down the body
(iii) process by which the arterioles close to the skin dilate.

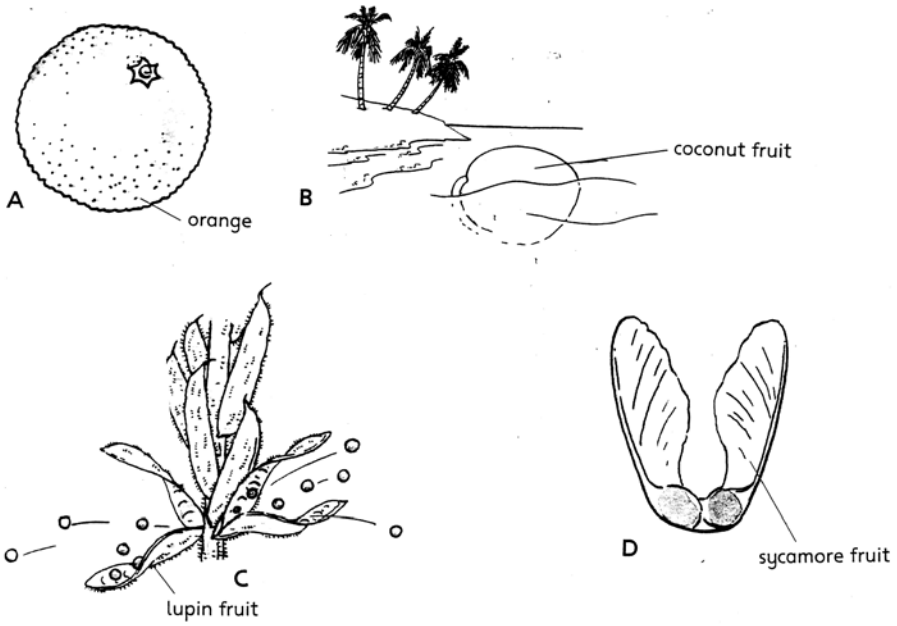
(1, 1, 1 mark)

d. Describe the role of:
   (i) fat in the adipose tissue
   (ii) sebum produced by sebaceous glands. (2, 2 marks)

e. Distinguish between the dermis and the epidermis. (2 marks)

Total: 15 marks

5a. For **each** of the following fruits (A to D) shown in the diagram below explain how seeds are dispersed. You may present your answer in the form of a table. (4 marks)



b. List TWO reasons why seed dispersal increases the chance of survival of the plant species. (4 marks)

c. The carpel is the female part of the flower.
   (i) Name the male part of the flower.
   (ii) Distinguish between the stigma and style. (1, 2 marks)

d. Draw a labelled diagram to show the process of fertilisation in a flowering plant. (4 marks)

Total: 15 marks