DIRECTORATE FOR QUALITY AND STANDARDS IN EDUCATION
Department for Curriculum Management and eLearning
Educational Assessment Unit
Annual Examinations for Secondary Schools 2012

Track

BIOLOGY – FORM III
TIME: 1H 30MIN

NAME: _____ CLASS: _____

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

1a. Write the term that best describes **each** of the following statements:

(i) the organic component of soil formed by the decomposition of plant and animal remains

_____

(ii) fertile soil made of organic matter mixed with clay, sand and silt

_____

(iii) the type of soil that is easily eroded by rain and wind

_____

(iv) the type of soil that is sticky when wet and hard when dry

_____

(v) the network of hyphae that forms the body of a fungus

_____

(vi) organisms such as fungi and bacteria that feed by absorbing dead organic matter.

_____

(1, 1, 1, 1, 1, 1 mark)
Total: 6 marks

2. In Malta there are over ten different breeding species of the order Odonata. This order, within the class Insecta, includes dragonflies.

a. Name the phylum to which dragonflies belong.

_____ (1 mark)

b. List TWO structural features of dragonflies.

_____

_____ (2 marks)

c. Dragonflies carry out incomplete metamorphosis. Define the term *incomplete metamorph*

_____

_____ (2 marks)

d. Insects are at a disadvantage when they shed their exoskeleton during moulting. Describe TWO such disadvantages.

_____

_____ (2 marks)

e. Dragonflies are very efficient predators. They feed on mosquitoes while in flight.

(i) Explain the importance of large compound eyes for dragonflies to be efficient predators.

_____

_____

(ii) Dragonflies are often used to control mosquito populations.
Name this method of reducing the mosquito population.

_____

(1, 1 mark)

f. Dragonflies are not related to common flies. Explain the importance of using scientific names in order to avoid confusion between species.

_____

_____ (1 mark)

Total: 10 marks

3. The following diagrams (A, B, C, D and E) show different plants from the plant kingdom.

A

B

C

D

E

Use the dichotomous key below to identify **each** plant type.

1. Large plants with vascular tissue and true leaves……. **Go to 2**
   Small plants with primitive stems, root leaves with capsules……**Moss**

2. Vascular plants that produce seeds…….**Go to 3**
   Vascular plants that produce spores……. **Fern**

3. Seeds enclosed by fruit…….. **Go to 4**
   Naked seeds that develop in cones……..**Gymnosperm**

4. Leaves have long blades with parallel veins…….. **Monocotyledon Angiosperm**
   Leaves are broad with a network of veins……**Dicotyledon Angiosperm**

Letter	Plant type
A	
B	
C	
D	
E	

(1, 1, 1, 1, 1 mark)

Total: 5 marks

4a. (i) *Amoeba* are simple eukaryotes forming part of the protist kingdom. List ONE characteristic of protists.

_____

(ii) Freshwater *Amoeba* have contractile vacuoles. Describe the function of contractile vacuoles.

_____

_____

(1, 2 marks)

b. The sleeping sickness disease is caused by an animal-like protist called *Trypanosome*. *Trypanosome* has a flagellum. Describe the function of a flagellum.

_____

_____ (2 marks)

c. *Euglena* are plant-like protists while *Amoeba* are animal-like protists. List

(i) TWO structural similarities and
(ii) ONE structural difference between plant-like protists and animal-like protists.

Similarities: _____

_____

Difference: _____

_____

(2, 1 mark)
Total: 8 marks

5. The petals of the snapdragon flower (*Antirrhinum tortuosum*) form a tube-like structure surrounding the stamen and carpel completely. The nectaries in the snapdragon are positioned towards the bottom of the flower. On the other hand, the flowers of the brome (*Bromus squarrosus*) are drooping, open clusters. The following diagram shows these two flowers.

snapdragon

brome

a. From the information provided in the passage name the type of pollination that is [illegible] place in the:

(i) brome _____

(ii) snapdragon. _____ (1, 1 mark)

b. From the passage write the term that best describes **each** of the following statements:

(i) the female part of the flower _____

(ii) the male part of the flower. _____ (1, 1 mark)

c. Compare the structure of the stigma in the brome with that in the snapdragon.

_____

_____ (2 marks)

d. Name the sugary liquid produced in a snapdragon flower.

_____ (1 mark)

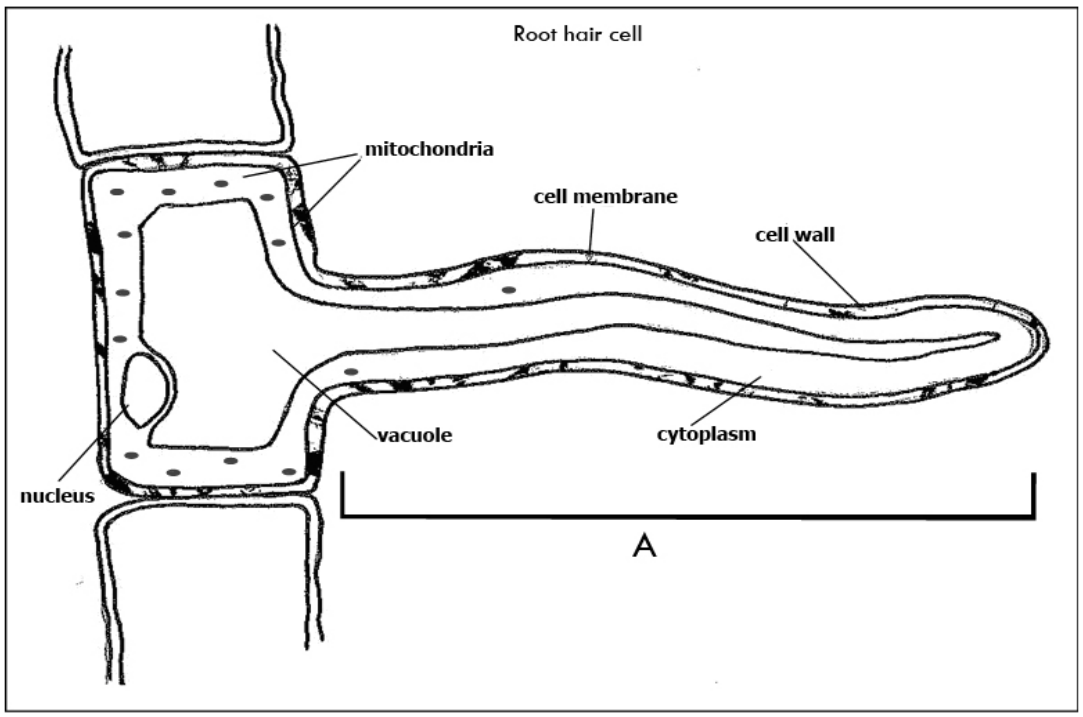
e. The snapdragon is a dicot while the Brome is a monocot. Describe the difference in the root system of monocots and dicots.

_____

_____ (2 marks)

Total: 9 marks

6. The diagram below shows a root hair cell.



a. From the root hair cell diagram name the part that:

(i) allows the cell to become turgid _____

(ii) is made up of cellulose fibres _____

(iii) controls the functions of the cell. _____

(1, 1, 1 mark)

b. The root hair cell absorbs water and mineral ions from the soil. Explain how the structure labelled A increases the efficiency of root absorption.

_____

_____

_____ (2 marks)

c. Explain why root hair cells are rich in mitochondria.

_____

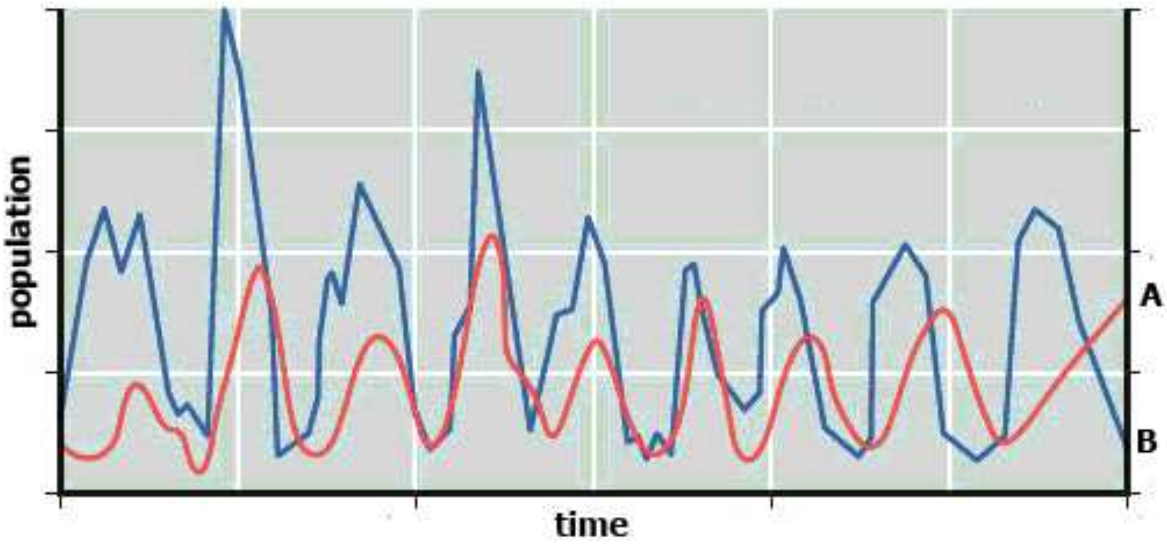
_____ (2 marks)

d. The root hair cell is a specialised cell. Name TWO other specialised cells.

_____ (2 marks)

Total: 9 marks

7. The graph below compares the rat and lizard populations on a very small island. Lizards are preyed upon by rats.



a. From the graph above write the letter that represents the rat population. Give a reason for your answer.

Rat population: _____

Reason: _____

_____

(2 marks)

b. Define the term *population*.

_____

_____ (2 ma

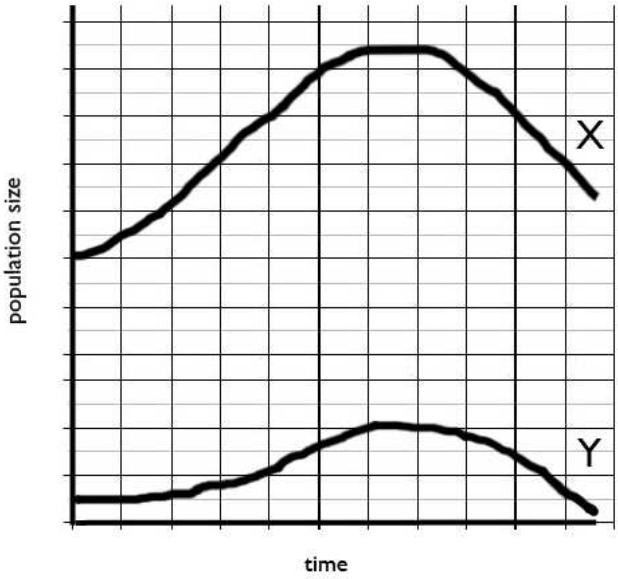
c. After the introduction of a viral disease, the rat population decreased drastically. As a result there was a rapid increase in the lizard population until stabilisation was reached. List TWO reasons why after some time, the lizard population stops increasing even though the rat population decreased drastically.

_____

_____

_____ (2 marks)

d. The following graph shows the variations of the populations of two organisms X and Y over time. The two organisms have a mutualistic relationship.



Explain why the two populations increase and decrease almost at the same time.

_____

_____

_____ (2 marks)

Total: 8 marks

Section B

Answer any THREE questions. This section carries 45 marks.
Write the answers for section B on a foolscap.

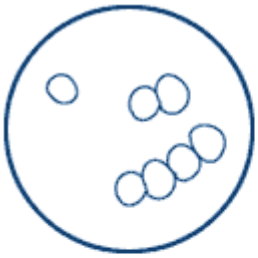
1. Read the following passage and answer the questions that follow.

Food Preservation

The aim of food preservation is to protect food from contamination by micro-organisms like bacteria and to slow down their growth. Different types of foodstuff require different methods of preservation. Perhaps the most common method to preserve food against bacteria is freezing. This method stops completely all the actions of bacteria and prevents the food from spoiling. Before the introduction of electricity and fridges, salt was added to food such as meat and fish in order to preserve it.

a. Describe the structure of the bacteria shown in the following diagrams A, B and C. (3 marks)

A



B

C

b. List ONE difference between a bacterium and a typical animal cell. (2 marks)
c. Apart from spoiling food, name ONE other harmful effect of bacteria to humans. (2 marks)
d. Not all bacteria are considered as harmful organisms. Mention TWO beneficial effects of bacteria to humans. (2 marks)
e. Salt kills bacteria by bringing about water loss. Name the process that causes water to move out of the cell. (1 mark)
f. Freezing does not kill bacteria, but stops them from reproducing.
   (i) Name the asexual method of reproduction in bacteria.
   (ii) Give ONE advantage of asexual reproduction. (1, 2 marks)
g. The first barrier of our body against bacteria is the skin. List TWO other functions of the skin in mammals. (2 marks)

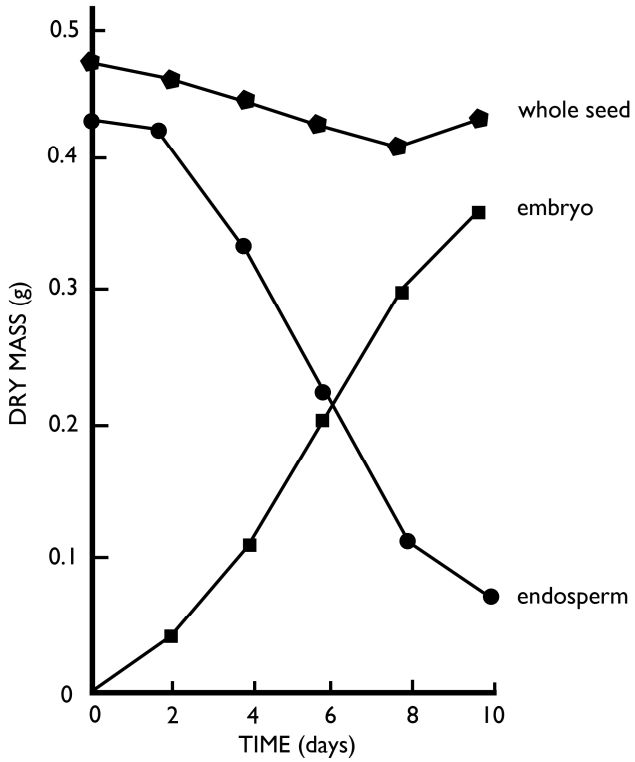
Total: 15 marks

2a. A biology student bought a packet of sweet pea seeds. The instructions on the pack[illegible] the seeds should be planted during the month of November, with a distance of not[illegible] 8cm apart from each other.

Explain why plants will **not** germinate successfully if:

(i) the student sows the seeds only 4cm apart
(ii) the soil is waterlogged
(iii) no water is added to the soil
(iv) seeds are planted during June instead of November. (2, 2, 2, 2 marks)

b. The graph below shows the changes in dry mass of a whole sweet pea seed, its embryo and its endosperm, over a ten-day period.

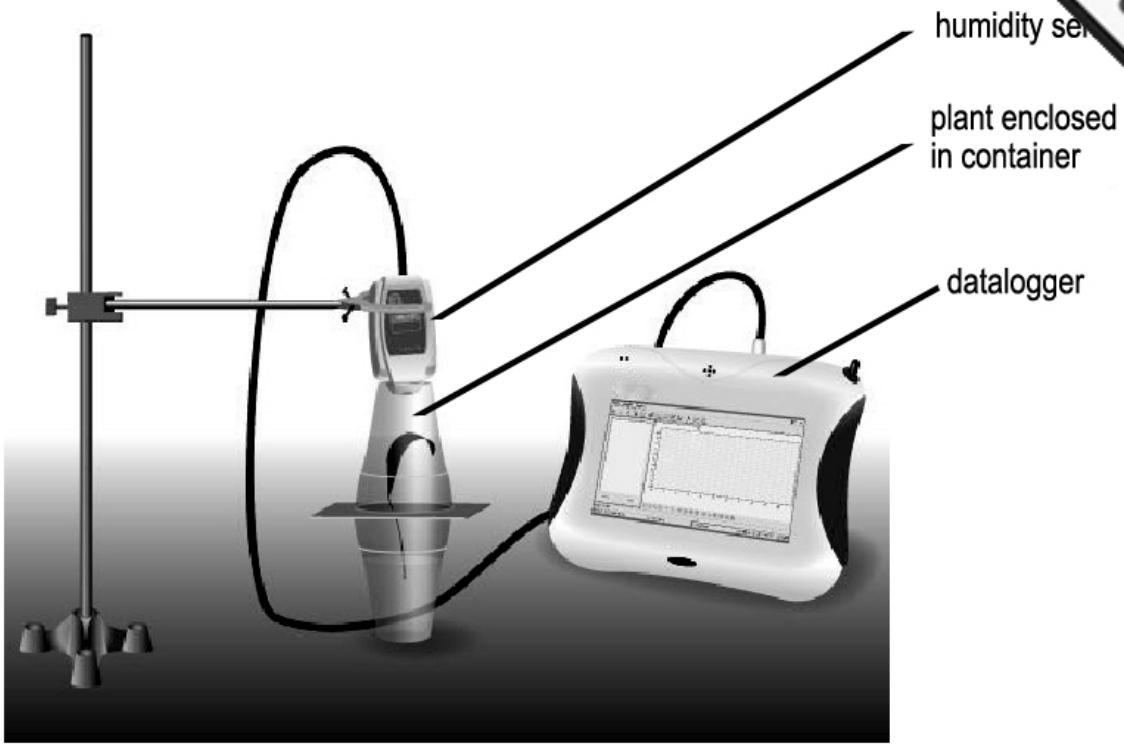


(i) Describe the changes in dry mass of the embryo and the endosperm.
(ii) Give a reason why the dry mass of the whole seed starts increasing again after the 8th day. (2, 2 marks)

c. (i) Name the plant structure that encloses the seeds before these are dispersed.
(ii) Name TWO methods of seed dispersal. (1, 2 marks)

Total: 15 marks

3. A datalogger is an electronic device that records data with the use of appropriate sen



a. A student sealed a plant branch with a leaf in a container, together with a humidity sensor connected to a datalogger as shown in the diagram above. A similar set-up without the plant branch enclosed was also set-up by the student. The sensors recorded the humidity level in both set-ups every second for 20 minutes.

Explain why:

(i) the humidity level is expected to increase in the container with the plant branch but not in the container without the plant branch

(ii) it is important to keep the two set-ups at the same temperature. (2, 2 marks)

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

(i) The leaves of desert plants are covered in hairs.

(ii) The leaves of trees found in dry areas have a thick waxy cuticle. (2, 2 marks)

c. (i) Name the leaf pores through which gases are exchanged.

(ii) Name the cells that control the opening and closing of these leaf pores. (2, 2 marks)

d. The leaf pores were examined under a light microscope with an eyepiece lens of x10 and an objective lens of x45.

(i) Calculate the total magnification.

(ii) Name the microscope part used for focusing. (2, 1 mark)

Total: 15 marks

4a. Explain why **each** of the following statements is incorrect:

(i) A virus is considered to be alive because it is cellular and can reproduce on its own.

(ii) Many molluscs including snails, mussels and crabs are good to eat.

(iii) The main organs in the circulatory system include the heart and the blood.

(iv) Yeasts grow hyphae.

(v) When a plant cell is placed in a strong sugar solution it's size does not change.

(vi) Chloroplasts are found in all parts of a plant. (3, 2, 2, 2, 3, 3 marks)

Total: 15 marks

5a. Fish, mammals and birds are all vertebrates.
(i) List ONE structural feature of vertebrates.
(ii) Explain the importance of a streamlined shape in fish.
(iii) List TWO functions of feathers.
(iv) List ONE visible structural characteristic of mammals.
(v) Name the TWO other classes of vertebrates (besides fish, mammals and birds).
(2, 2, 4, 2, 2 marks)

b. A seed was dropped from a bird's beak while flying to a branch. The seed fell on moist soil and a seedling grew from the seed. Describe the direction of the growth of the shoot. Give a reason for your answer. (3 marks)

Total: 15 marks