

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 metamorphosis*.
- _____ (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: _____

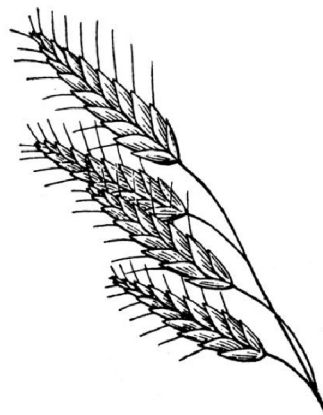
(2, 1 mark)

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.

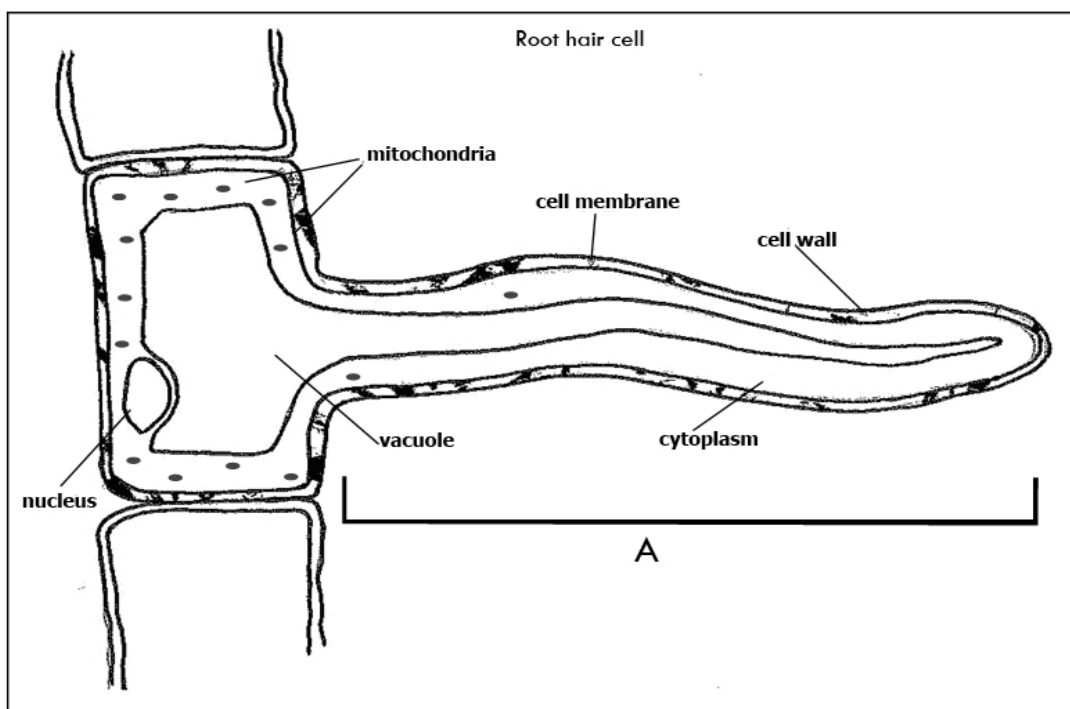


snapdragon



brome

- a. From the information provided in the passage name the type of pollination that is in 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.

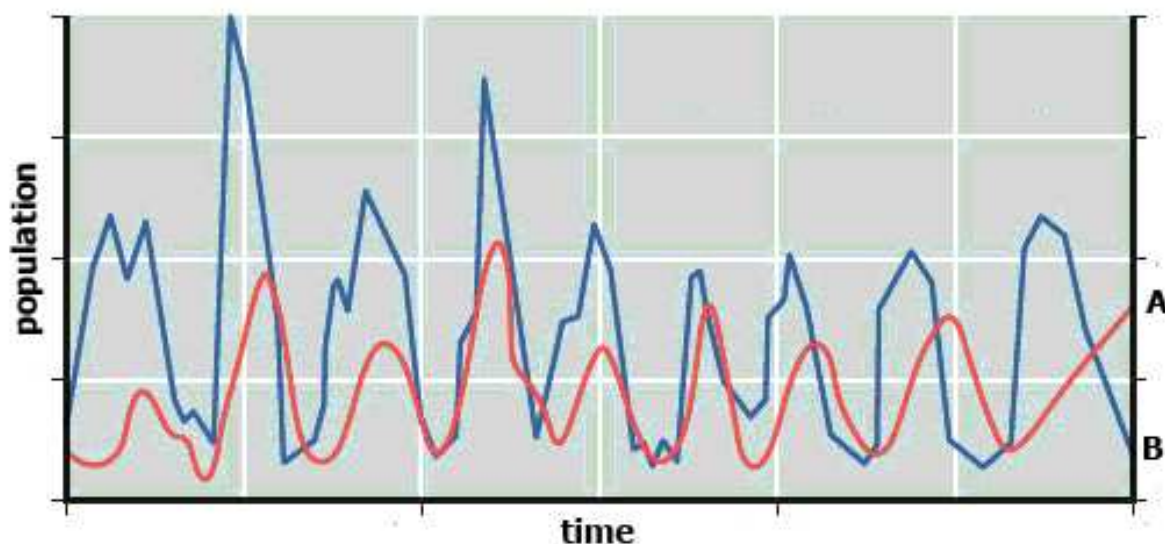
_____ (2 marks)

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)

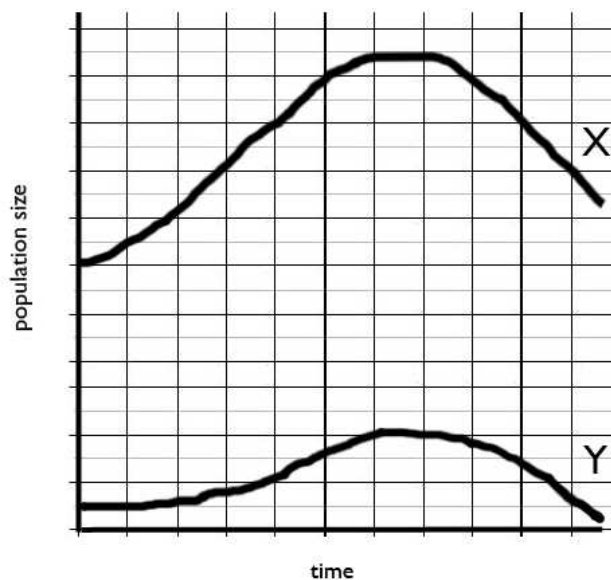
- b. Define the term *population*.

_____ (2 marks)

- 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 question ONE and choose any other TWO. 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 completely stops 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.

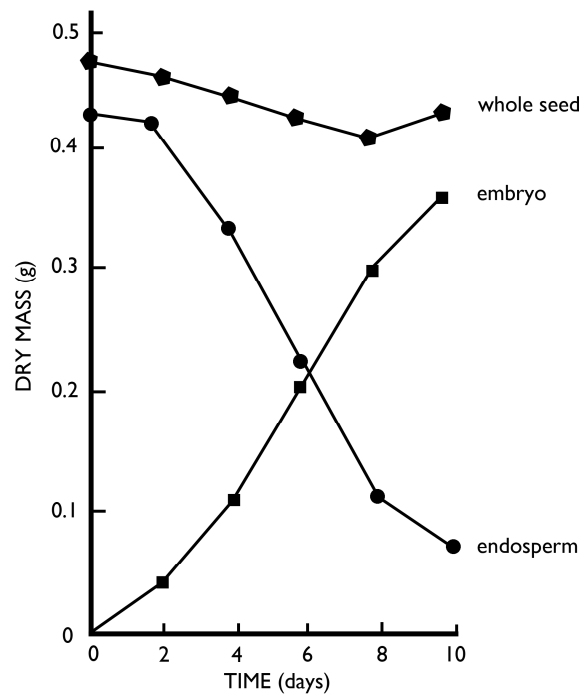
- a. Draw a labelled diagram of a bacterium. (4 marks)
- b. Bacteria are prokaryotes. Mention ONE characteristic feature shown in your diagram that distinguishes prokaryotic from eukaryotic organisms. (1 mark)
- c. Apart from spoiling food, name ONE other harmful effect of bacteria to humans. (1 mark)
- d. Not all bacteria are considered as harmful. Mention TWO beneficial effects of bacteria to humans. (2 marks)
- e. In terms of osmosis, explain how adding salt to food stops bacteria from spoiling food. (3 marks)
- f. Freezing does not kill bacteria, but stops them from reproducing. Describe the method of reproduction in bacteria. (2 marks)
- g. The skin is the first barrier of the body against bacteria. List TWO other functions of the skin. (2 marks)

Total: 15 marks

2. A biology student bought a packet of sweet pea seeds.

- a. The instructions on the packet state that the seeds should be planted 8cm apart.
 - (i) Explain why an adequate sowing distance between seeds increases the success rate of germination.
 - (ii) List **TWO** other factors (besides sowing distance between seeds) that may limit the success rate of germination. (2, 2 marks)
- b. Each of three containers labelled A, B and C contained some dry cotton wool and 10 soaked sweet pea seeds on top. In container A no water is added. In container B, the cotton wool was uniformly moist. In container C water was added until the seeds were covered completely. The three containers were left at the same temperature for a whole week.
 - (i) Write the letter of the container in which the largest number of seeds will germinate. Give a reason for your answer.
 - (ii) List the condition in **each** of the other two containers that keeps a low rate of germination. (2, 2 marks)

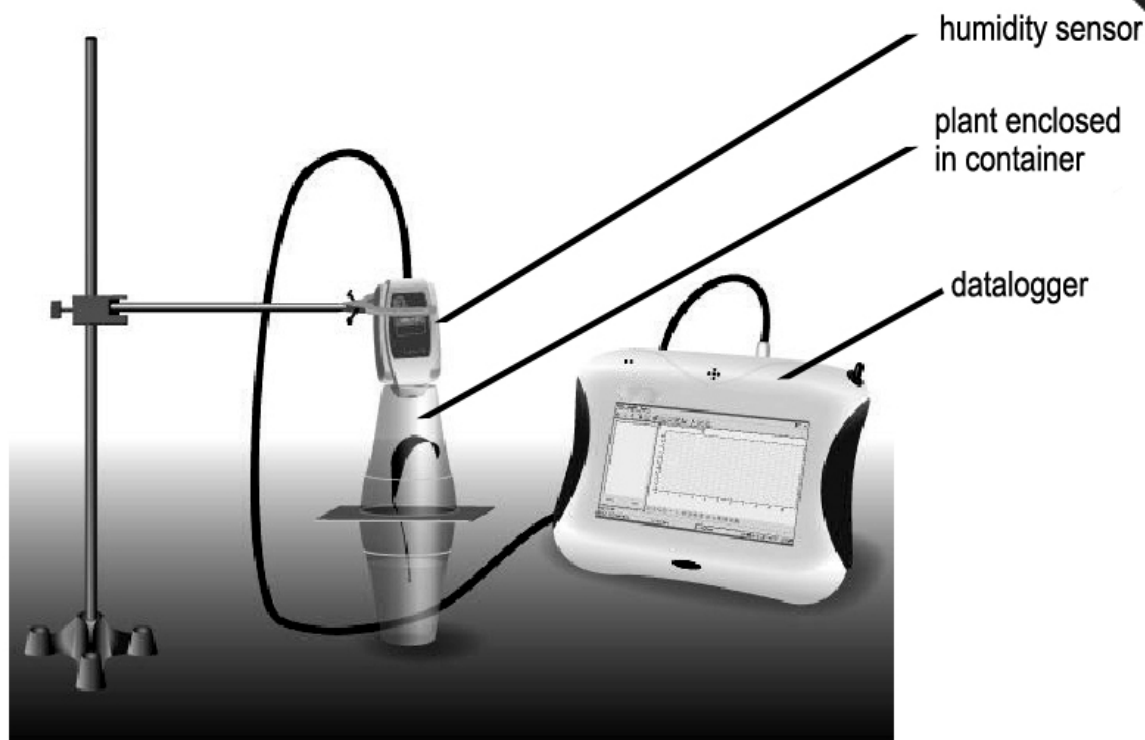
- c. The graph below shows the changes in dry mass of a whole sweet pea seed, its embryo and endosperm, over a ten-day period.



- Describe the changes taking place in the endosperm and in the embryo over the 10-day period. Give a reason for the changes described.
 - Give a reason why the dry mass of the whole seed starts increasing again after the 8th day. (3, 1 mark)
- d. Seeds undergo a dormant period during which a hard coat is developed. Explain why this is of an advantage to the embryo. (1 mark)
- e. Distinguish between epigeal and hypogeal germination. (2 marks)

Total: 15 marks

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



- a. A student sealed a plant branch with a leaf in a clear plastic container together with a humidity sensor connected to a datalogger as shown in the diagram above. The student also prepared a similar set-up without the plant branch. The sensors in each set-up recorded the humidity level every second for 20 minutes.
- (i) The humidity level in both set ups before the start of the experiment was 63%. After 20 minutes the humidity level in the container with the plant branch increased to 79%. Give a reason for this.
 - (ii) A student suggested that a temperature sensor should also be enclosed in each of the two set-ups. Give ONE reason for this.
 - (iii) Explain the biological importance of the set-up without the plant branch. (2, 1, 1 mark)
- b. Explain how **each** of the following adaptations helps plants survive in their respective environmental conditions.
- (i) The leaves of desert plants are covered in hairs.
 - (ii) Grasses in sand dunes have curled leaves.
 - (iii) The leaves of trees found in dry areas have a thick waxy cuticle. (1, 1, 1 mark)
- 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. (1, 1 mark)
- d. The cells and pores mentioned above were studied using a light microscope with an eyepiece lens of x10 and an objective lens of x45. Calculate the total magnification. (2 marks)
- e. Leaves are usually less than a millimetre thick.
- (i) What is the advantage of thin leaves?
 - (ii) Since leaves are thin they would be liable to droop. Explain how this is prevented. (2, 2 marks)

Total: 15 marks

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

- (i) The main organs in the circulatory system include the heart and blood.
- (ii) Yeast grow hyphae.
- (iii) When a plant cell is placed in water it bursts.
- (iv) Tapeworms and earthworms are both flatworms.
- (v) Animals living in cold climates such as Emperor penguins and seals are small organisms.
- (vi) In waterlogged soil, material decays faster.

(2, 2, 3, 2, 3, 3 marks)

Total: 15 marks

5a. Fish, reptiles, amphibians, birds and mammals are different types of vertebrates.

- (i) List ONE characteristic feature of vertebrates.
- (ii) List TWO adaptations of fish to their aquatic environment.

(1, 2 marks)

b. Tadpoles have gills but adult frogs have lungs and a moist skin. Explain. (3 marks)

c. Turtles are reptiles while dolphins are mammals. Distinguish between the method of giving birth to their young, in turtles and dolphins. (2 marks)

d. Birds and mammals are endothermic vertebrates.

- (i) Define the term *endotherm*.
- (ii) List ONE structural characteristic of mammals.

(2, 1 mark)

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

- (i) Some of the largest feathers are attached to the bird's wing.
- (ii) Feathers help to keep water out.

(2, 2 marks)

Total: 15 marks