DIRECTORATE FOR QUALITY AND STANDARDS IN EDUCATION
Department for Curriculum Management and eLearning
Educational Assessment Unit
Annual Examinations for Secondary Schools 2013

Track

BIOLOGY – FORM 3
TIME: 2 HOURS

NAME: _____ CLASS: _____

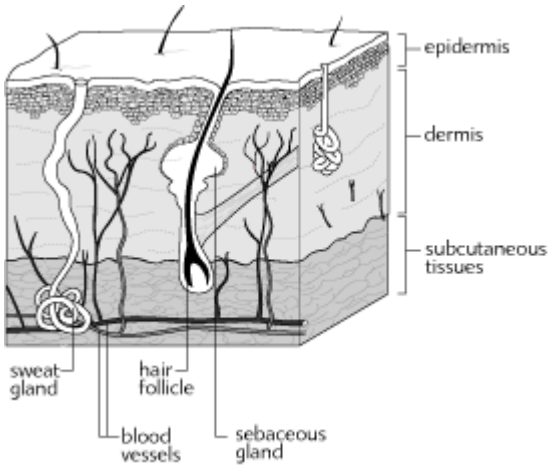
Question No.	**Section A**							**Section B**					
	1	**2**	**3**	**4**	**5**	**6**	**7**	**1**	**2**	**3**	**4**	**5**	
Max mark	10	10	10	5	7	6	7	15	15	15	15	15	
Actual mark													**TOTAL MARK**

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

Section A

Answer ALL questions in this section.

1. The diagram below shows a cross-section of the skin.



a. From the diagram above name:

(i) the layer of skin rich in blood vessels _____

(ii) the gland that secretes sebum. _____

(1, 1 mark)

b. Dark coloured persons have a high content of the pigment melanin. Name the layer of the skin that contains melanin.

_____ (1 mark)

c. On the diagram label the erector muscle. (1 mark)

d. A teacher wrote the following statement:

Sweating helps to cool the body.

(i) Explain how sweating helps to cool the body.

_____

_____

_____

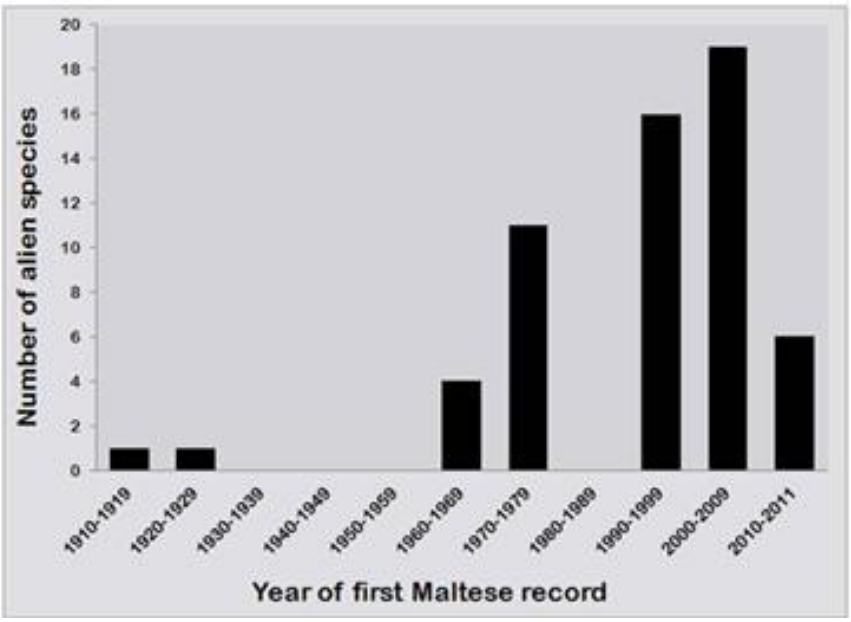
(ii) Name and describe ONE other process which allows the body to cool down.

_____

_____

(3, 3 marks)
Total: 10 marks

2. The bar chart below shows the number of animal or plant alien species observed in Maltese waters. These organisms enter the Mediterranean Sea from the Atlantic Ocean through the Gibraltar Strait or from the Red Sea through the Suez Canal.



Source: Tropical Signals-Biology UoM

a. Write the number of alien species recorded during the years 2010-2011.

_____ (1 mark)

b. Predict the expected trend in numbers of alien species in the next decade (2010-2019) by comparing the number of alien species during the years 2010-2011 with that in the previous ten-year period 2000-2009.

_____

_____ (2 marks)

c. The Bluespotted Cornetfish *Fistularia commersonii* is an alien species observed in Maltese waters since 2005.

(i) Write the species name of the Bluespotted Cornetfish.

_____

(ii) In the last years the number of this fish species has increased. It was recorded in Maltese waters in shoals (groups) of about 20 individuals. List ONE reason for the rapid growth in the population of this fish.

_____

_____

(iii) Describe the body covering of fish.

_____

(iv) Shoals of fish distract the predator from concentrating on one particular [illegible]. Describe TWO other methods that help prey species to avoid capture.

_____

_____

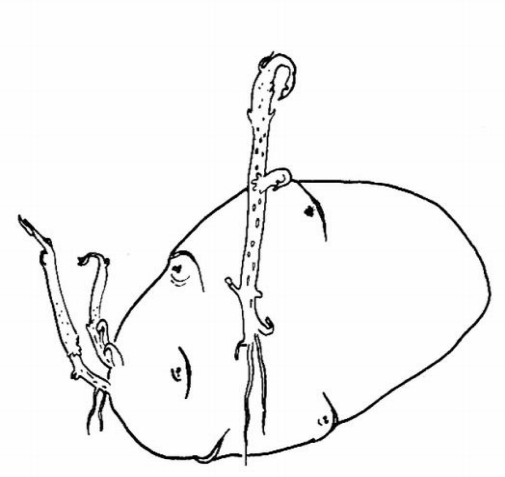
(1, 2, 1, 2 marks)

d. The slipper limpet, *Crepidula fornicata,* a mollusc, was one of the first alien species observed in the Mediterranean sea. Describe ONE characteristic feature of molluscs.

_____ (1 mark)

Total: 10 marks

3a. The diagram below shows the potato tuber with asexual growths arising from it.



(i) List ONE characteristic of plants produced by asexual reproduction.

_____

(ii) Describe ONE advantage of sexual reproduction in plants.

_____

_____

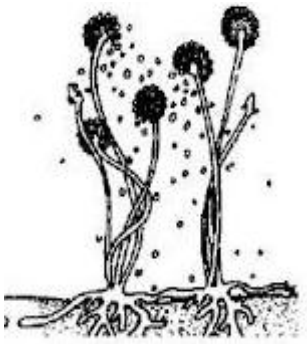
(iii) The potato tuber is defined as a storage organ. Explain why the tuber becomes soft and shrivelled when a new plant grows from it.

_____

_____

(1, 1, 2 marks)

b. The diagram below shows a multicellular fungus reproducing asexually.



(i) Name this type of asexual reproduction.

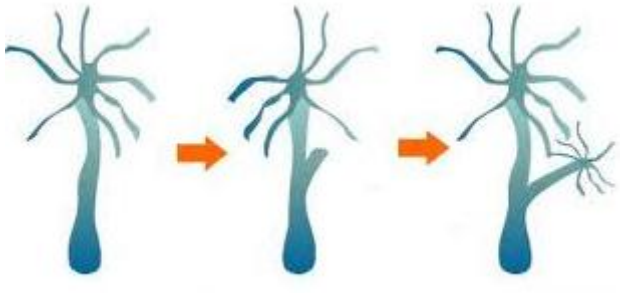
_____

(ii) A biology student decided to grow fungal moulds on a piece of bread. List TWO conditions necessary to grow mould on a piece of bread within a short time.

_____

(1, 2 marks)

c. The following diagram shows another type of asexual reproduction taking place in *Hydra*.



(i) Name the type of asexual reproduction shown in the diagram above.

_____

(ii) *Hydra* shows division of labour between its cells. Explain.

_____

_____

(1, 2 marks)
Total: 10 marks

4. The Għammieri Government Farm uses biological control methods rather than pesticides to control crop eating pests. The predator bug *Orius laevigalus,* is used to control the insect pest thrip. Thrips deposit eggs on leaves of greenhouse plants.

a. List TWO advantages of using biological control methods.

_____

_____ (2 marks)

b. Explain why biological control methods are used mainly in greenhouses.

_____

_____ (2 ma

c. The wasp, *Aphidius colmani*, is used to control the population of aphids. The female wasp lays an egg in the body of an aphid. The young wasp feeds on the body of the aphid until it kills its host. Write the term that describes the association between the wasp and the aphid.

_____ (1 mark)

Total: 5 marks

5a. Diffusion is a passive type of transport. Explain.

_____

_____ (1 mark)

b. Students were provided with three blocks (A, B and C) of gelatine of different sizes containing an indicator which is red in an alkali solution but yellow in acidic conditions. The three blocks were simultaneously put in an acidic solution and the time for the red colour to disappear was recorded. The results are shown in the table below:

Block	***Surface area: Volume ratio***	***Time for colour to disappear (minutes)***
A	3:5	12
B	4:5	6.5
C	1:1	4.75

(i) From the results shown in the table above, compare the time taken for the colour to disappear in relation to surface area to volume ratio.

_____

(ii) Describe ONE other factor that affects the rate of diffusion, apart from the surface area to volume ratio.

_____

(1, 1 mark)

c. In living things, molecules and ions are sometimes pumped across the cell membranes. Name this type of transport.

_____ (1 mark)

d. Describe TWO functions of the cell membrane.

_____

_____ (2 marks)

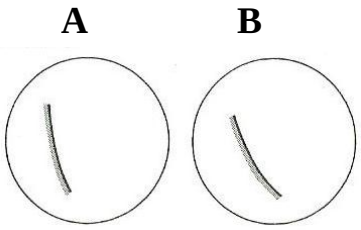
e. Name the outer layer surrounding the cell membrane in plant cells.

_____ (1 mark)

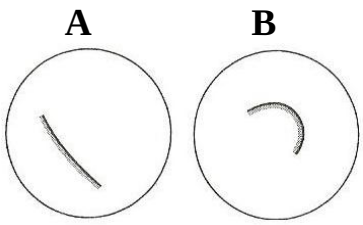
Total: 7 marks

6. In an investigation to observe the process of osmosis, narrow strips of the dan... were cut. One strip was put in a concentrated sugar solution while another strip was ... an isotonic (same concentration) solution. The following diagram shows the two strips ... and after the experiment.

Before experiment



After experiment



a. Write the letter of the strip placed in concentrated sugar solution. Give a reason for your answer.

Letter: _____ (1 mark)

Reason: _____

_____ (2 marks)

b. Explain why the strips used in this investigation were cut of equal size and thickness.

_____

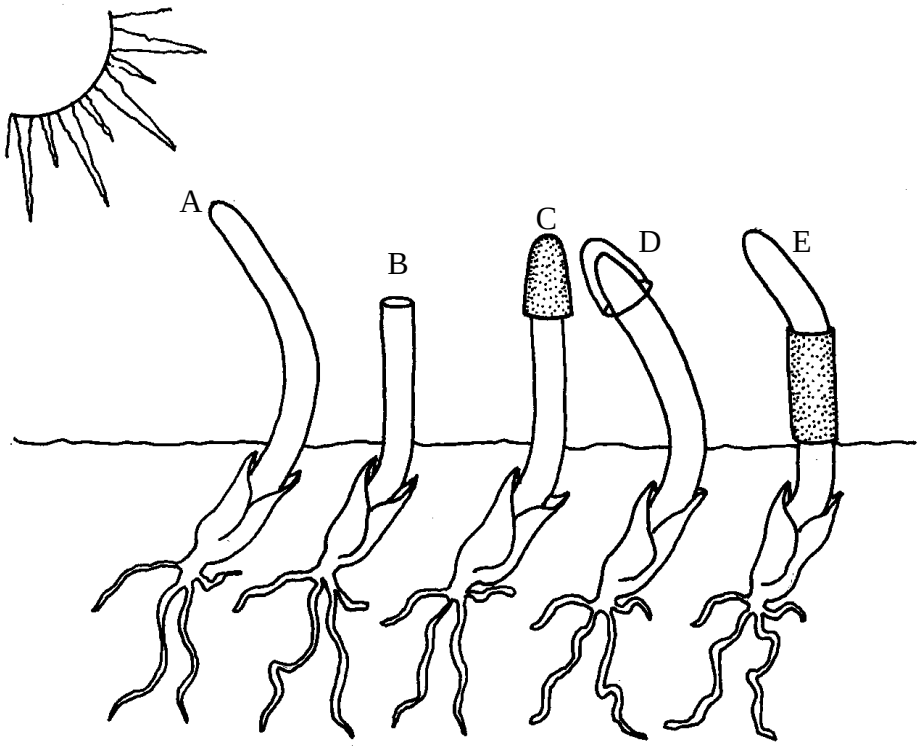
_____ (2 marks)

c. List ONE other variable, besides stem size and thickness, that must remain constant throughout the investigation.

_____ (1 mark)

Total: 6 marks

7. The diagram below shows five coleoptiles (small shoots) receiving unidirectional li



a. Name the type of response shown by shoot A.

_____ (1 mark)

b. Use your biological knowledge to explain why shoot C grows upwards but shoot D bends towards light.

_____

_____

_____ (3 marks)

c. A biology student remarked that shoot B whose tip was cut and removed will start growing after two weeks. Discuss whether you agree with the student's remark. Give a reason for your answer.

_____

_____

_____ (3 marks)

Total: 7 marks

Section B

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

1. A variety of insects including bees, flies and wasps pollinate flowers. Other flowers are wind-pollinated.

a. List THREE differences between insect-pollinated flowers and wind pollinated flowers. You may present your answer in the form of a table. (3 marks)

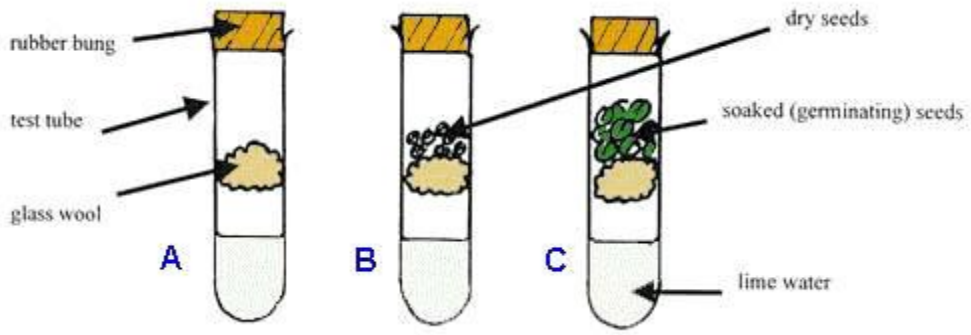
b. Distinguish between pollination and plant fertilisation. (2 marks)

c. Seeds are dispersed away from the parent plant when they are mature. One type of seed dispersal is wind dispersal.
(i) Name ONE other type of seed dispersal.
(ii) Describe ONE characteristic of a seed dispersed by wind.
(iii) Explain ONE benefit of seed dispersal. (1, 1, 2 marks)

d. A biology student remarked that the spider is also an insect because it crawls.
(i) Explain why the student's statement is incorrect.
(ii) Explain why insects are generally rather small.
(iii) Some insects undergo complete metamorphosis. Describe **each** stage of the life cycle of insects that undergo complete metamorphosis. (1, 1, 4 marks)

Total: 15 marks

2. A student carried out a laboratory investigation to determine if carbon dioxide is released by germinating seeds. The following set up was used for the investigation.



a. The lime water in test-tube C turned cloudy while the lime water in test-tubes A and B showed no visible change.
(i) What is the change in the lime water indicating?
(ii) Explain why the seeds in test-tube C were left to soak for two days before the experiment.
(iii) What is the purpose of test-tube A? (1, 2, 1 mark)

b. A student observes the germination of a Jasmine seed. The student records that the hypocotyl grows from the seed and pulls the cotyledons out of the soil. The cotyledons become the first leaves of the Jasmine seedling.
(i) Name the type of germination typical of the Jasmine seed.
(ii) The first leaves turn green quickly. What is the biological significance of this? (2, 2 marks)

c. The Jasmine plant is a dicotyledonous angiosperm. Describe the dicot leaf.

d. Mosses are small plants with no vascular system. Describe the environmental con necessary for these plants to grow and reproduce. (2 ma

e. Explain the biological significance of small reduced leaves in conifers. (3 marks)

Total: 15 marks

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

a. The skin of a lizard is different from that of a frog. (4 marks)

b. A bacterial population increases rapidly in optimum ideal conditions. (2 marks)

c. A shoot was enclosed in a plastic bag. When the plastic bag was removed, the inside of the plastic bag was covered with a thin layer of water. (4 marks)

d. Most plants are green. (2 marks)

e. Bacteria vary in their shapes. (3 marks)

Total: 15 marks

4a. A virus is not a living thing.

(i) Draw a labelled diagram of a typical virus.

(ii) Explain why a virus is not a living thing. (5, 2 marks)

b. The Australian bat lyssavirus (ABLV) is distributed throughout Australia in a variety of bat species. Bats are mammals. Describe the body covering of bats. (1 mark)

c. Describe the feeding typical in newborn bats. (2 marks)

d. A small group of carnivorous bats feed on other vertebrates such as frogs, lizards and birds.

(i) Distinguish between vertebrates and invertebrates.

(ii) Lizards are often observed basking in the sun or hiding under stones. Explain. (2, 3 marks)

Total: 15 marks

5a. A student was investigating the drainage properties of different soil samples. The student found out that the soil sample with poor drainage properties is difficult to dig. Name this type of soil and describe ONE method how the drainage of this type of soil can be improved. (3 marks)

b. Name the type of soil that is light and easy to dig. (2 marks)

c. Soil erosion is one of the main threats to soil in the local environment. Describe ONE farming activity that reduces soil erosion. (2 marks)

d. Explain ONE benefit of **each** of the following actions of earthworms in soil:

(i) Earthworms constantly burrow through soil.

(ii) Earthworms pull leaves into the soil.

(iii) Earthworms eat soil grinding it up in their gut. (2, 2, 2 marks)

e. Describe the structure of an earthworm that makes the organism well adapted to burrow through soil. (2 marks)

Total: 15 marks