

BIOLOGY – FORM 3
TIME: 1H 30MIN

NAME: _____

CLASS: _____

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

1. Name the cell structure described in **each** of the following statements:

the part of the cell that contains chromosomes	
the part that absorbs light energy used for photosynthesis	
large permanent spaces filled with cell sap (a solution of sugar and salts)	
the organelle that produces energy for the cell	
the outermost layer of plant cells	

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

Total 5 marks

2. The upside-down jellyfish, *Cassiopea andromeda*, is a cnidarian (coelenterate) that has been sighted at Marsamxett harbour in the recent months.

- a. State whether jellyfish are invertebrates or vertebrates. Give a reason for your answer

(2 marks)

- b. Jellyfish have photosynthetic algae attached to them. These provide food to the jellyfish. These algae live in the tissue on the top side of the jellyfish.

- (i) Define the term tissue.

- (ii) Give a reason why algae live on the top side of the jellyfish.

(2, 2 marks)

Total 6 marks

3. The table below shows the classification of three wild plants of the family *Crucifaceae*.

Family	<i>Crucifaceae</i>	<i>Crucifaceae</i>	<i>Crucifaceae</i>
Genus	<i>Brassica</i>	<i>Cabile</i>	<i>Brassica</i>
Species	<i>nigra</i>	<i>maritima</i>	<i>rapa</i>
Common name	Black mustard	Sea rocket	Wild turnip

- a. Which **TWO** plants are more closely related? Give a reason for your answer.

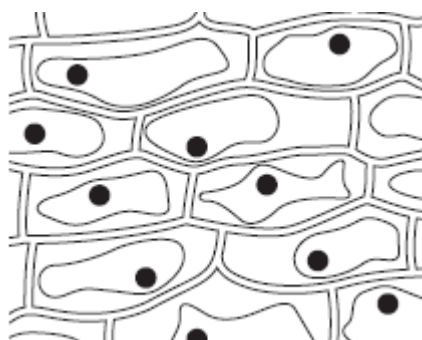
 _____(3 marks)

- b. The three plants listed in the table are dicotyledonous. Give **THREE** characteristics of dicotyledonous plants.

 _____(3 marks)

Total 6 marks

4. The following diagram shows plant cells that were left in a strong salt solution for six hours.



- a. i) Describe what has happened to these cells.

- ii) Name the process that brought about the effect shown in the diagram above.

 _____(2, 1 mark)

- b. Predict what happens to the plant cells if they were placed in distilled water instead in the strong salt solution.

_____(1 mark)

- c. Mineral salts are absorbed by root hair cells by **diffusion** or **active transport**. State TWO differences between these two processes.

(2 marks)

Total 6 marks

5. The fruit of the 'rough cocklebur' that grows at Chadwick Lakes, has hooks that stick to grazing animals. It is also woody enabling it to float. Its seeds are toxic to herbivores.



- a. Name the **TWO** methods of fruit dispersal used by the rough cocklebur.

(2 marks)

- b. Explain why it is important that fruits are dispersed away from the mother plant.

(2 marks)

- c. The seeds of the 'rough cocklebur' are toxic to herbivores and this increases the chances of seeds to germinate. Explain.

(1 mark)

- d. This plant has its sex organs on separate flowers which can be found on the same stem. Explain why the male flower is always found above the female flower.

(2 marks)

e. The wild radish plant also grows at Chadwick Lakes. It produces white flowers with yellow veins that attract insects. It has six stamens and a central carpel.

i) Name **ONE** function of the stamen and **ONE** function of the carpel.

Stamen: _____

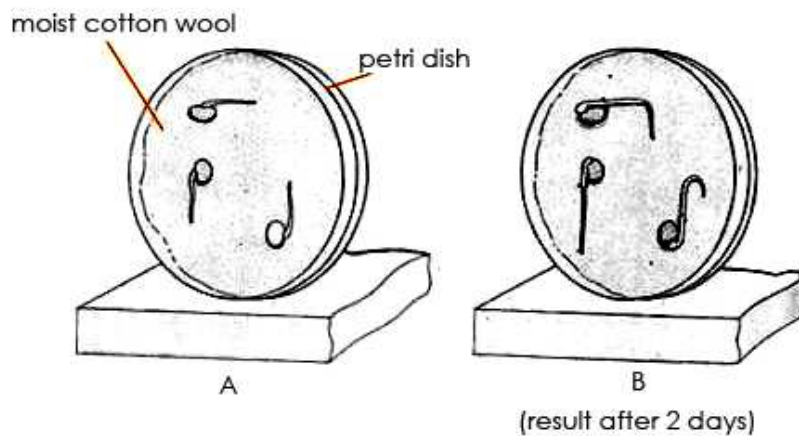
Carpel: _____

ii) Explain why it is beneficial for wild radish plants to attract insects.

(2, 1 mark)

Total 10 marks

6. Some broad bean seeds were soaked overnight and set up as in diagram **A** below. After 2 days the radicles grew as shown in diagram **B** below.



a. i) Describe what happened to the radicles in diagram 'B'.

ii) Give **ONE** benefit of the growth pattern of the radicles.

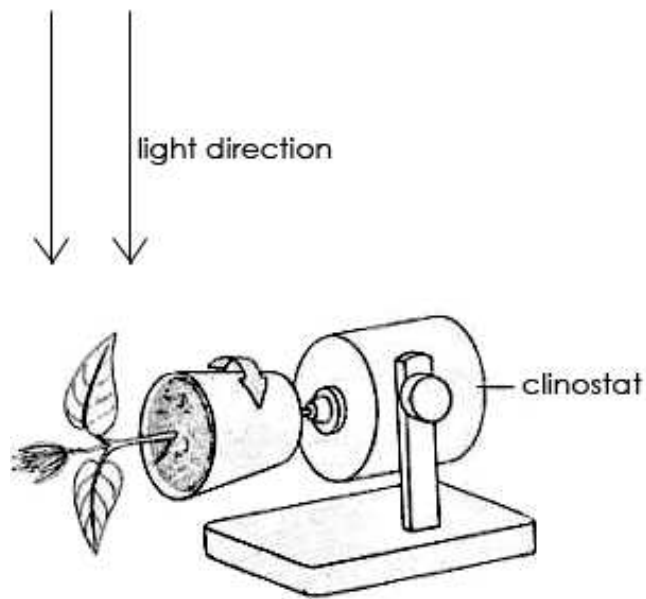
iii) Explain why seeds were soaked overnight before the experiment.

(1, 1, 1 mark)

b. Plants display a positive phototropic response. Explain.

_____(1 mark)

- c. A plant was placed on a clinostat as shown in the diagram below and was left to rotate for two days.



Write the letter of the diagram that represents the plant after two days rotating as shown above. Give a reason for your answer.

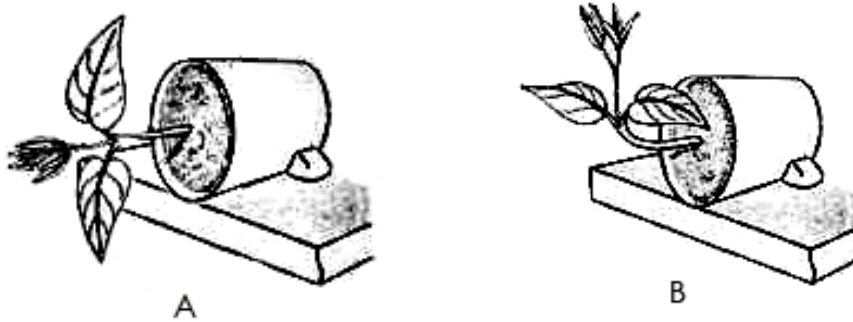


Diagram: _____

Reason: _____

(1, 2 marks)
Total 7 marks

- 7a. From the list in the box below choose and write the term that fits **each** description. (Each term can be used once, more than once or not at all)

parasitism	mutualism	predator-prey relationship
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Description	Term
a fungus damaging an oak tree by absorbing nutrients from its phloem	
an alga and a fungus living together as a lichen on a rock.	
a chameleon eating a locust	
an orb web spider feeding on a fly it has just captured	
hairs of a dodder plant extracting sap from wild thyme	

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

- b. A biology student took different soil samples from Buskett. These samples were tested and results showed that soil taken from an area full of the leguminous plant clover had a high content of nitrates. Explain.

(2 marks)

Total: 7 marks

- 8a. From the list in the box below choose and write the name of the correct type of soil to match **each** description.

(Each term can be used once, more than once or not at all).

loam	clay soil	sandy soil
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Description	Type of soil
minerals are easily washed out	
soil generally contains more nutrients	
can become waterlogged easily	
soil more prone to erosion	

(1, 1, 1, 1 mark)

- b. Some farmers add humus to soil. Give TWO benefits of adding humus to soil.

(2 marks)

- c. Earthworms help to fertilise the soil by pulling leaves into it. Explain.

(2 marks)

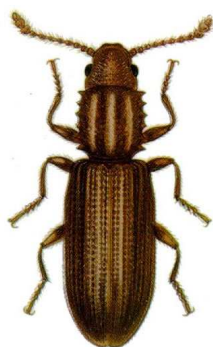
Total 8 marks

Section B

Answer any **THREE** questions from this section. This section carries **45** marks. Answer the questions of section B on a foolscap.

1. In Maltese most beetles are known as *hanfus*. Beetles can be found in almost all habitats. The scientific name for the beetle of the scarab family is *Phyllognathus excavatus*.
 - a. Write the genus name of the beetle mentioned in the passage above. (1 mark)
 - b. Beetles are common insects. List the **THREE** parts of the body of an insect. (3 marks)
 - c. Define the term habitat. (1 mark)
 - d. The longhorn beetle looks very similar to a wasp. What is the advantage of this resemblance? (2 marks)
 - e. Beetles show complete metamorphosis. Distinguish between complete and incomplete metamorphosis. (4 marks)
 - f. There are around 400,000 different species of beetles. Use the identification key below to name the four beetles **A**, **B**, **C** and **D**. (4 marks)

A



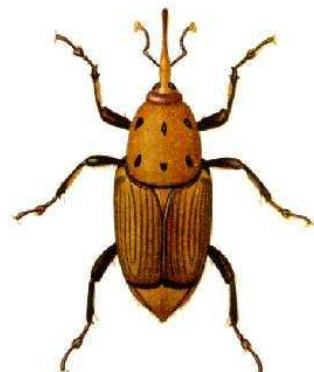
B



C



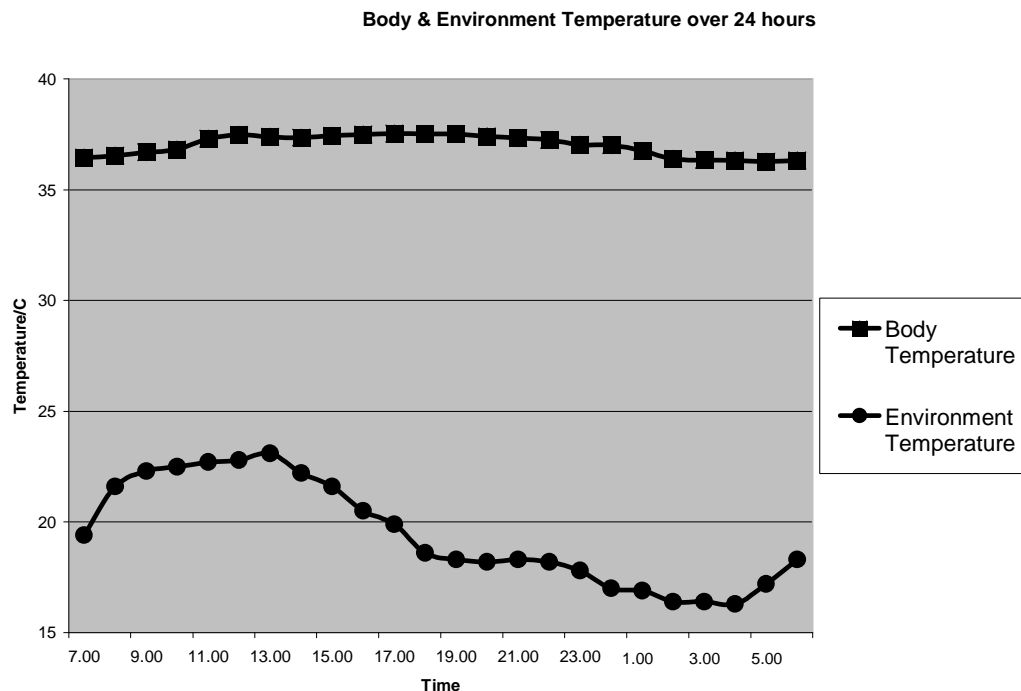
D



1. Body is striped go to 2
Body is spotted **Hercules beetle**
2. Long, pointed appendage attached to head **Red palm weevil**
No pointed appendage attached to head go to 3
3. Roundish abdomen **Colorado potato beetle**
Elongated abdomen **Sawtooth beetle**

Total: 15 marks

2. During a scientific investigation the body temperature of a human being and that of the surrounding environment were measured every hour over a period of 24 hours. The data is plotted on the chart below.



- Explain why the body temperature changed very little in spite of the changes in the temperature of the surrounding environment. (3 marks)
- List ONE way by which a human being can lose heat. (2 marks)
- List the function of the
 - adipose tissue under the skin
 - epidermis. (2, 2 marks)
- Explain how **each** of the following keeps our body warm:
 - shivering
 - extra clothing
 - eating more on cold days. (2, 2, 2 marks)

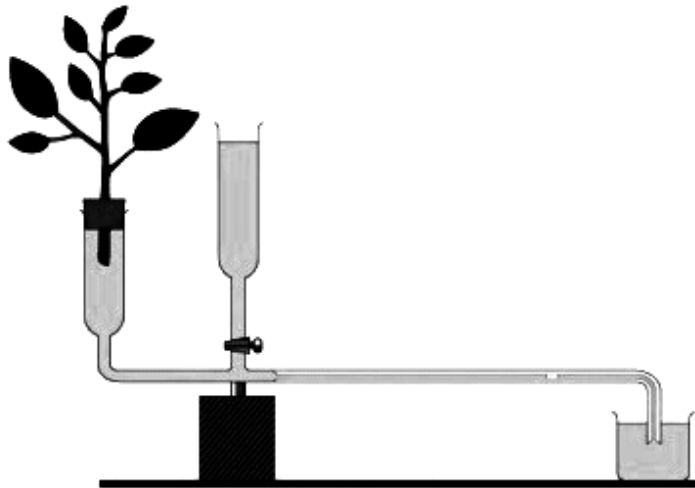
Total: 15 marks

3. A biology student owns an aquarium. The aquarium became infested with *Hydra* – a simple fresh water coelenterate that reproduces asexually by budding. All species of *Hydra* exist in a mutualistic relationship with various types of unicellular algae. The algae are protected from predators by the *Hydra* and in return photosynthetic products from the algae are beneficial as a food source to *Hydra*.
- Name TWO other methods of asexual reproduction besides budding. (2 marks)
 - Define the term predator. (1 mark)
 - The structure of the *Hydra* consists of a cylindrical column. At the top of the column is the mouth while at the bottom is the foot.
 - What structures surround the mouth?
 - The foot is sticky. Explain the importance of this. (2, 2 marks)
 - Name the structure/s in fish that:
 - are used for breathing
 - help in movement and keep the body of fish stable
 - prevent water passing through the skin. (1, 1, 1 mark)

- e. Fish lay hundreds of eggs. Give ONE advantage of this.
- f. One method to get rid of the *Hydra* population in an aquarium is to remove the fish from the tank temporarily and then treat the water with an appropriate concentration of salt. How does the addition of salt kill the fresh water *Hydra*? (3 marks)

Total: 15 marks

4. A biology student conducted an investigation about transpiration. The student used the apparatus shown in the diagram below.



- a.
 - (i) Define the term transpiration.
 - (ii) Name the apparatus used for this investigation about transpiration.
 - (iii) List THREE environmental factors that increase the rate of transpiration. (2, 1, 3 marks)
- b. The biology student compared the rate of transpiration using different leaves. Give ONE leaf feature that should be measured to obtain a fair comparison of the rate of transpiration in the different leaves. (2 marks)
- c. Explain why the biology student cut the plant shoot under water. (2 marks)
- d. Explain why cacti have:
 - (i) leaves reduced to spines
 - (ii) swollen stems
 - (iii) shallow and deep roots. (2, 1, 2 marks)

Total: 15 marks

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

- a. Whales are marine mammals. (3 marks)
- b. Amphibians live on land but lay eggs in water. (3 marks)
- c. Polar bears have a thick layer of fat. (4 marks)
- d. Soil benefits from the constant burrowing of earthworms. (3 marks)
- e. Mosses do not have true roots. (2 marks)

Total: 15 marks