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 V
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	6	10	8	5	11	6	9	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. Bats of the genus *Pteropus* are the largest bats in the world. They are commonly known as fruit bats or flying foxes. Scientists are urging the government of Malaysia to ban the hunting of the world's largest fruit bat. The bats are hunted for food, medicine, and sport. Shooting takes place at dusk as the bats set out to forage overnight. The researchers remark that population models suggest that if current hunting rates continue, the species can be hunted to extinction. Flying foxes can have a wing span of 1.5m and are crucial for the rainforest ecosystems in this part of Asia. They eat fruit and nectar and in doing so they drop seeds around and pollinate trees. So they are critical to the propagation of rainforest plants.

Adapted from http://news.bbc.co.uk/go/pr/fr/-/2/hi/science/nature/8221132.stm

a. From the passage above write the term that best describes **each** of the following descriptions:

(i) a fertilised ovule _____

(ii) sugary fluid found in flowers _____

(iii) the part that develops from the ovary of a flowering plant. _____

(1, 1, 1 mark)

b. Name the taxonomic group that comes before genus.

_____ (1 mark)

c. Describe the body covering of bats.

_____ (1 mark)

d. List ONE other human activity (besides overhunting) that can result in extinction of a species.

_____ (1 mark)

Total: 6 marks

2. Rett syndrome is a neurodevelopmental disorder of the grey matter of the brain. Rett syndrome is a sex-linked dominant condition (represented by **R**) and the disease-causing gene is located on the X chromosome.

a. The grey matter in the brain includes regions involved in muscle control and sensory perceptions such as seeing and hearing.

(i) Name the part of the brain responsible for co-ordination of movement.

_____

(ii) Name the endocrine gland present within the brain.

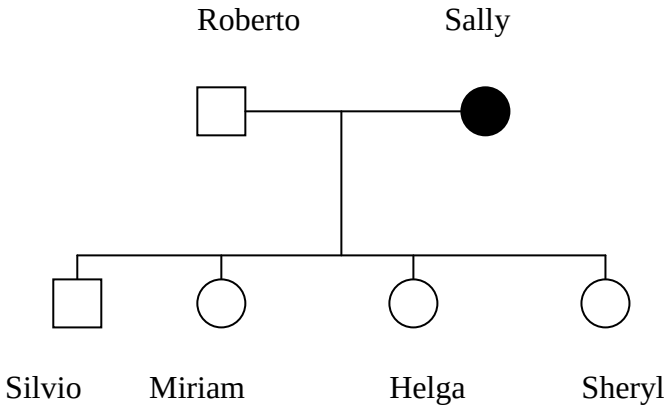
_____

(iii) Describe ONE structural feature that protects the brain.

_____

(1, 1, 1 mark)

b. The following diagram shows the pattern of inheritance of the Rett syndrome in a fa



Key:

Normal female

Normal male

Affected female

Affected male

In the space below draw a genetic diagram to explain why all four children (Silvio, Miriam, Helga and Sheryl) are not affected by the Rett Syndrome. In your answer indicate clearly the genotype of the son (Silvio) and the genotype of the daughters (Miriam, Helga and Sheryl).

(6 marks)

c. Explain why the sons of a father affected with Rett syndrome will not be affected by the disorder.

_____ (1 mark)

Total: 10 marks

3. Sports drinks are beverages designed to help athletes rehydrate when fluids are lo... after training. Sports drinks are divided into three types as indicated in the table below.

Type of Sports drinks	*Contents*
Hypotonic drinks	Have a lower sugar concentration than the body fluids
Isotonic drinks	Have the same concentration of sugar as the body fluids
Hypertonic drinks	Have a higher sugar concentration than the body fluids

a. From the table above, name the best type of sports drink suitable in **each** of the following situations:

(i) a long distance runner who needs a quick replacement of fluids lost by sweating and a boost of carbohydrate

_____

(ii) a drink necessary during heavy exercise to meet the energy demands

_____

(iii) a jockey who needs fluid without the boost of carbohydrates.

_____

(1, 1, 1 mark)

b. Athletes should gain weight through muscle mass and not fat. Name the important food substance necessary to gain muscle mass.

_____ (1 mark)

c. Female Athlete Triad is a serious health problem that involves disordered eating, low bone mass and amenorrhea (stopping of the menstrual cycle) in female athletes. Name ONE other situation when a woman of reproductive age does not menstruate.

_____ (1 mark)

d. A serious risk of amenorrhea is osteoporosis. This is a disease of bones that leads to an increased risk of fracture. The Health Department circulated the following poster in gymnasiums to help reduce the incidence of osteoporosis.

Discuss the biological significance of the poster.

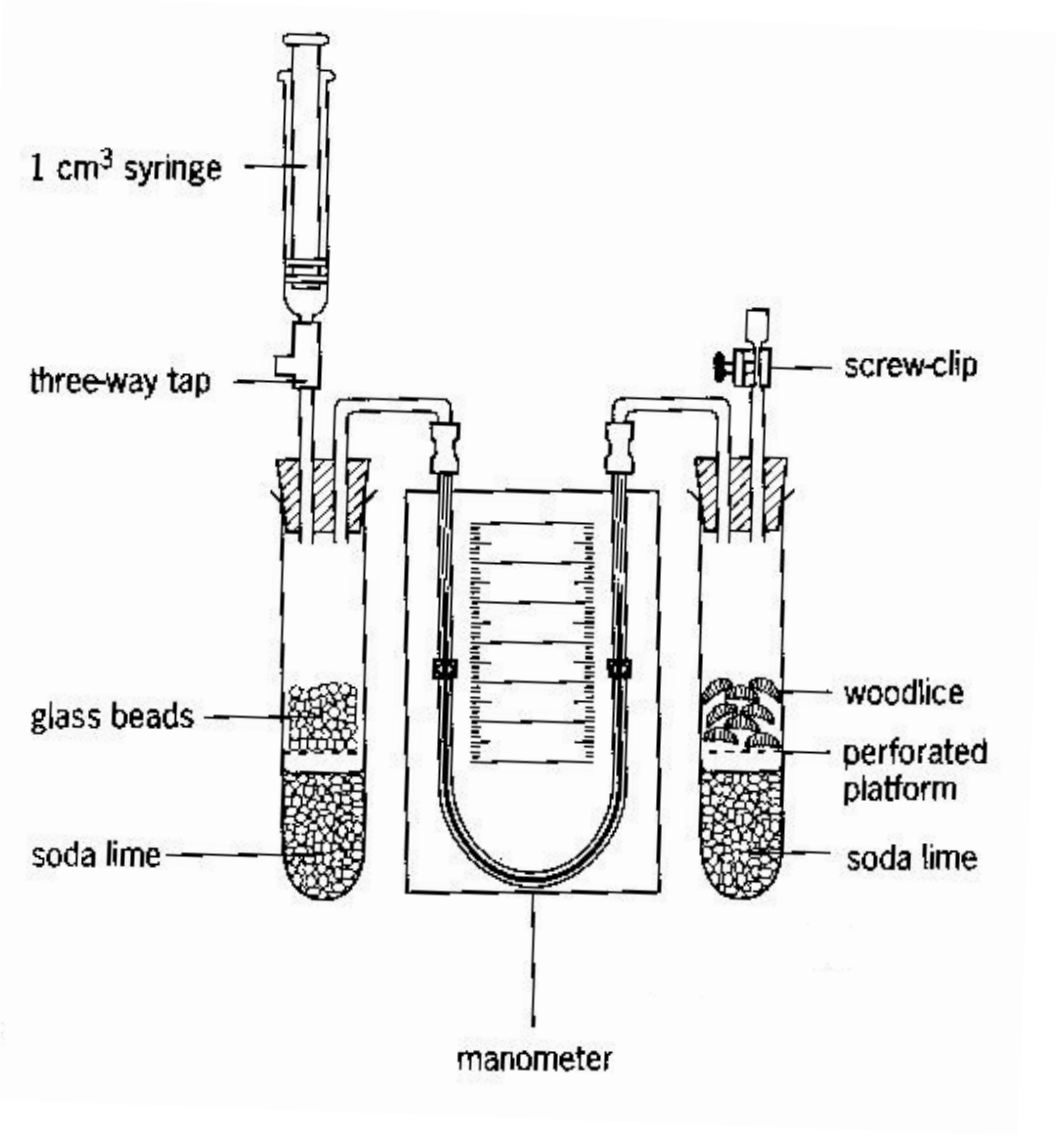
_____

_____

_____

(3 marks)
Total: 8 marks

4. The following diagram shows the apparatus set up by a biology teacher to investigate the rate of oxygen uptake in woodlice.



a. From the diagram, name the part acting as the control.

_____ (1 mark)

b. Describe how the biology teacher ensures a constant temperature during the course of the experiment.

_____ (1 mark)

c. The soda lime absorbs carbon dioxide evolved during respiration. Explain the importance of absorbing the carbon dioxide produced by the woodlice during respiration in this experiment.

_____ (1 mark)

d. The apparatus can only be used for a short while before renewing the air supply. Name the process that takes place if the oxygen is depleted.

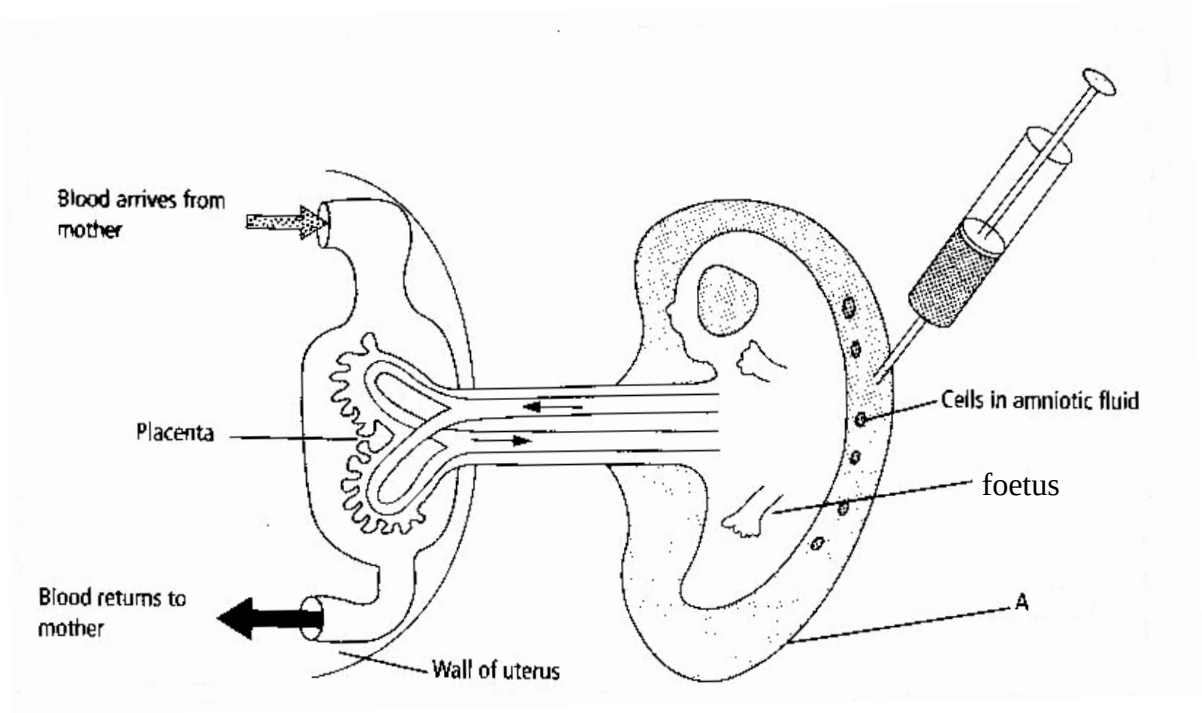
_____ (1 mark)

e. If the respirometer is used with plant material it is essential to ensure that no photosynthesis can take place. Describe ONE method that a biology teacher can use to ensure that no photosynthesis takes place in a respirometer with plant material.

_____ (1 mark)

Total: 5 marks

5. The following diagram shows the process of amniocentesis. In this process a sample of amniotic fluid is removed using a long needle.



a. Name the part labelled A.

_____ (1 mark)

b. Describe what happens to the part labelled A just before birth.

_____ (1 mark)

c. On the diagram above label the umbilical cord. (1 mark)

d. List ONE form of protection that the amniotic fluid provides to the foetus.

_____ (1 mark)

e. Amniocentesis is used to detect common abnormalities such as Down Syndrome, Edwards Syndrome and Turner's Syndrome. Edwards Syndrome is caused by the presence of three copies of chromosome 18, while Turner's Syndrome is a chromosomal abnormality in which one of the sex chromosomes is absent.

(i) Write the term that describes two chromosomes belonging to a pair that look exactly alike.

_____

(ii) Compare the full number of chromosomes of an individual suffering from Edwards Syndrome with that of an individual suffering from Turner's Syndrome.

Edwards syndrome: _____ Turner's syndrome: _____ (1, 1 mark)

f. Explain why the placenta is considered as a unique organ.

_____ (1 mark)

g. The umbilical artery takes blood from the foetus to the placenta while the umbilical vein carries blood from the placenta to the foetus. Compare the blood in the umbilical artery with that in the umbilical vein.

_____

_____

_____

(2 marks)

h. Name the:

(i) lower end of the uterus that opens into the vagina

_____

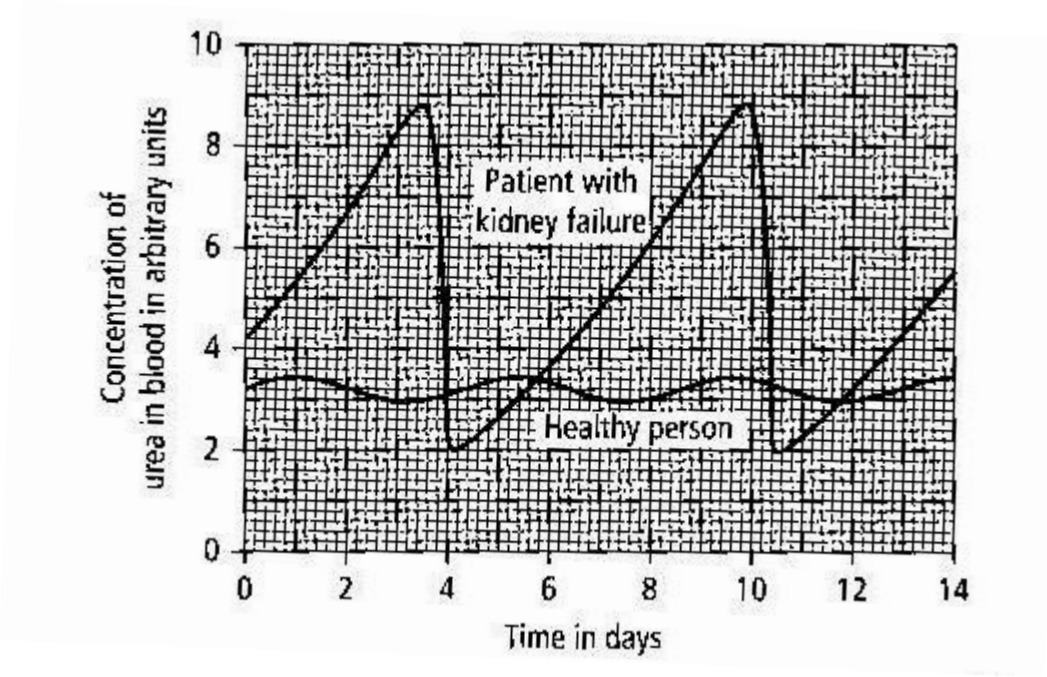
(ii) hormone that causes the lining of the uterus to thicken during pregnancy.

_____

(1, 1 mark)

Total: 11 marks

6. A patient has kidney failure. The patient visits hospital every few days for dialysis. The following graph shows the concentration of urea in the blood of a healthy person and of a patient with kidney failure.



a. Describe the pattern of the concentration of urea in the patient's blood over the 14-day period.

_____ (1 mark)

b. The patient undergoes dialysis on day 4. Compare the concentration of urea in the patient's blood on day 4 with that of the healthy person.

_____ (1 mark)

c. Dialysis works on the principles of the diffusion of solutes and ultrafiltration of fluid across a semi permeable membrane.

(i) Describe the process of ultrafiltration.

_____

_____

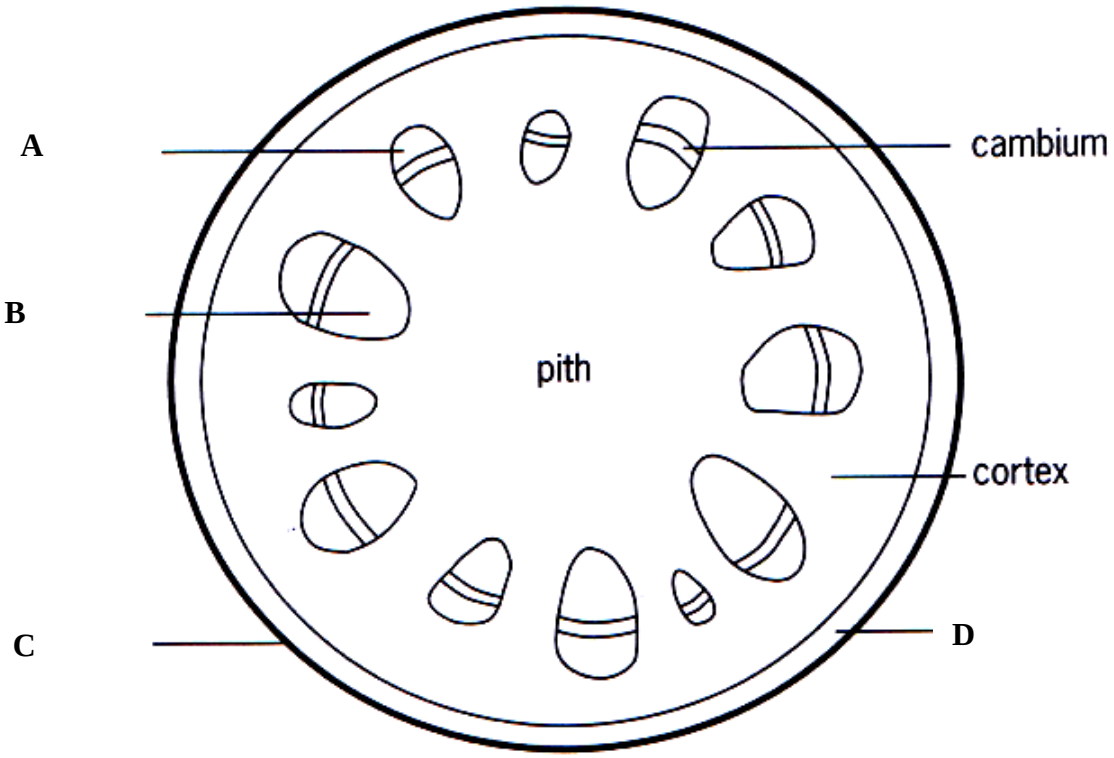
(ii) List TWO conditions that facilitate a faster rate of diffusion across a surface.

_____

_____

(2, 2 marks)
Total: 6 marks

7. The following diagram shows the transverse section of a young dicotyledonous stem



a. Label the parts **C** and **D**.

C: _____ D: _____ (1, 1 mark)

b. Compare the substances transported in A and B.

_____

_____

(2 marks)

c. Tree squirrels like the Gray Squirrel kill trees by gnawing (chewing) at the stem. Explain why gnawing by squirrels kills trees.

_____

_____

(2 marks)

d. The squirrel pox virus is a virus that causes squirrel pox. Gray squirrels are carriers of the infection and can spread the disease to red squirrels. Gray squirrels have developed immunity to the virus after a long exposure to the virus but the disease is fatal to red squirrels.

(i) Describe how the squirrel pox virus affects the population of red squirrels.

_____

(ii) Describe the basic structure of a virus.

_____

_____

(1, 2 marks)

Total: 9 marks

Section B

Choose ANY THREE questions from this section. Answer the questions of section B on a foolscap.

1. The Great Barrier Reef is the world's largest coral reef system, located off the coast of Queensland in Australia. The Great Barrier Reef supports a diversity of life including many endangered species. Thirty species of dolphins, whales and porpoises have been recorded in the Great Barrier Reef. The Great Barrier Reef's environmental pressures include lowered water quality from runoff water including suspended sediment, excess nutrients and pesticides.

a. When is a species classified as an endangered species? (2 marks)

b. A biology student remarked that although dolphins are not classified as fish they still have a streamlined body.
   (i) Name the class to which dolphins belong.
   (ii) Explain the importance of a streamlined body in dolphins. (1, 1 mark)

c. Corals are marine organisms belonging to the phylum Cnidaria. List ONE typical characteristic feature of Cnidarians. (1 mark)

d. Explain why farmers are encouraged to use biodegradable pesticides instead of persistent ones. (1 mark)

e. List ONE other practice (besides the use of pesticides) that leads to excess nutrients in water. (2 marks)

f. Other threats to coral reefs include sea temperature rise, sea level rise and pH changes that are all linked to greenhouse gas emissions.
   (i) Explain why greenhouse gas emissions result in temperature rise.
   (ii) List TWO greenhouse gases.
   (iii) List ONE possible solution to reduce greenhouse gas emissions. (2, 2, 1 mark)

g. Oil spills damage the reefs. Explain the effect of oil spills on marine birds. (2 marks)

Total: 15 marks

2. Compare and contrast **each** of the following:

a. colour blindness and night blindness (3 marks)
b. vena cava and aorta (3 marks)
c. maltase and sucrase (3 marks)
d. arachnids and insects (3 marks)
e. testis and epididymis. (3 marks)

Total: 15 marks

3. Two common lung diseases are pneumonia and lung cancer. Pneumonia is an infection in one or both lungs. The infection inflames the lungs' air sacs (alveoli). Lung cancer is a disease characterised by uncontrolled cell growth in tissues of the lung.

a. Define the term *tissue*. (2 marks)

b. Draw a diagram of an alveolus. In your diagram indicate clearly the exchange of gases. (5 marks)

c. Name the disease caused by smoking that reduces the surface area of alveoli.

d. In a patient suffering from pneumonia fluid collects in the alveoli and as a result th reduced surface area over which gas exchange can take place. Describe a consequence o reduced surface area. (2 mark

e. Describe the changes that bring about an increase in the lung volume during breathing in. (2 marks)

f. Name the fluid surrounding the lungs that acts as a lubricant during breathing. (1 mark)

g. Compare the percentage of oxygen and nitrogen in inspired (inhaled) air and expired (exhaled) air. (2 marks)

Total: 15 marks

4. Passion fruit juice is a good source of Vitamin C and dietary fibre.

a. Name ONE other source of Vitamin C. (1 mark)

b. Name the deficiency caused by lack of Vitamin C in the diet and describe ONE symptom of the disease you mention. (2 marks)

c. Explain why vegetarians have a diet high in dietary fibre. (2 marks)

d. The passion fruit plant uses gravity for seed dispersal. List TWO other possible ways of seed dispersal. (2 marks)

e. Name the plants with seed-bearing cones for reproduction. (1 mark)

f. During a site visit at Argotti Botanic Gardens a biology student observed a plant that contained reproductive spores on the undersides of large leaves called fronds.
   (i) Name the type of plant observed by the biology student and describe its typical habitat.
   (ii) During the visit students admired the brightly coloured flowers of some angiosperm (flowering) plants. List TWO structural features that enable a biology student to recognize an insect pollinated flower besides its brightly coloured flowers and scent.

(3, 2 marks)

g. The Argotti Botanic Gardens are involved in conservation projects focusing on the propagation of rare endemic plant species. Describe ONE benefit of such conservation of species. (2 marks)

Total: 15 marks

5. The marine iguana is an endemic species to the Galapagos Islands. It is the only species of lizard that lives partly in seawater. Marine iguanas must raise their body temperature to approximately 36°C before going in the cold water to feed.

a. Describe the behavioural adaptation typical of lizards that enables them to raise their body temperature. (2 marks)

b. The Galapagos tortoise is the largest living species of tortoise. Tortoises have a mutualistic relationship with some species of Galapagos finches. The tortoise will extend its neck to allow the finch to pick off ticks that live on the tortoise. Write the term that describes the type of relationship between the tick and the tortoise. (1 mark)

c. During his trip to the Galapagos Islands Charles Darwin listed the following types of finches in his diary: *Geospiza fortis; Certhidea olivacea; Pinoraloxias inornata; Geospiza difficilis and Camarhynchus pauper.*
   (i) Write the number of genera of finches listed by Charles Darwin in his diary.
   (ii) Write the number of species of finches listed by Charles Darwin in his diary.

(1, 1 mark)

d. Black rats and Norway rats which were introduced to the Galapagos Islands [illegible] pirates' ships in the 17th century, pose a significant threat to several unique species. [illegible] are using poison bait to attract rats but repulse other wildlife such as marine iguanas a[illegible] turtles. What is the benefit of using this type of poison bait on the Galapagos Islands?

(2 marks)

e. During his trip Charles Darwin described the feeding relationships between the organisms observed on the Galapagos Islands:

The hawk feeds mainly on giant centipedes as well as on lava lizards, snakes and mocking birds. Snakes and hawks feed on young marine iguanas. Scorpions prey on insects and in turn are preyed upon by lava lizards. Giant centipedes feed on lava lizards and insects. Mocking birds feed on insects, lava lizards and giant centipedes. Insects crawl up different plants for feeding, while marine iguanas dive in the water to feed on algae and seaweed.

From the passage above name:

(i) TWO primary consumers
(ii) TWO secondary consumers
(iii) the top carnivore.
(iv) TWO organisms found at the first trophic level besides plants
(v) ONE organism that is endothermic.

(2, 2, 1, 2, 1 mark)

Total: 15 marks