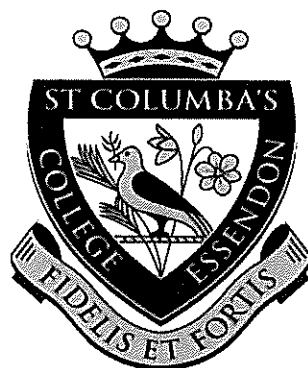


Name: _____

Teacher's Name: GLS MAN AYR



ST. COLUMBA'S COLLEGE

YEAR 11 BIOLOGY EXAM-
Unit 2

2012

Reading Time: 10 minutes

Writing Time: 90 minutes

Structure of Booklet

Section	Marks
Section A: Multiple Choice	40
Section B: Short Answer	50

Instructions

Write **your name** and **circle your teacher's name** at the top of this booklet.

Students are allowed to bring in pens, pencils, ruler and sharpener. No calculators are allowed.

Circle Multiple Choice questions **on the Answer Sheet provided**. Answer **all** Multiple Choice questions.

Answer Short Answer questions in the **spaces provided**. Answer **all** Short Answer questions.

SECTION A: MULTIPLE-CHOICE QUESTIONS

Instructions for Section A

Answer **all** questions in pencil on the answer sheet provided for multiple-choice questions.

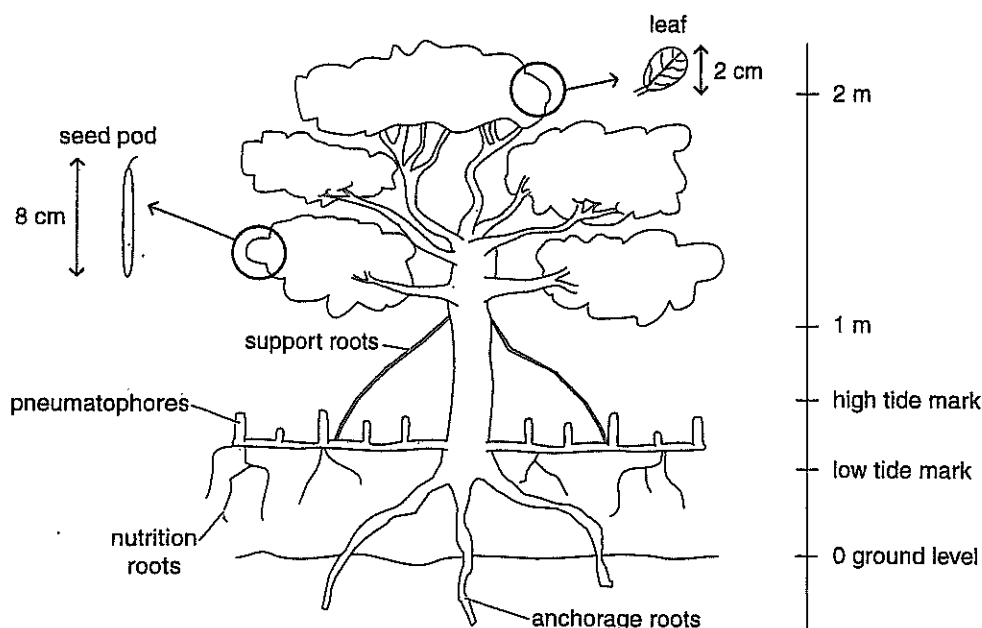
Choose the response that is **correct** for the question.

A correct answer scores 1, an incorrect answer scores 0.

Marks will **not** be deducted for incorrect answers.

No marks will be given if more than one answer is completed for any question.

Use the following diagram of a mangrove to answer Questions 1–3.



Question 1

Pneumatophores assist in survival by gaining oxygen

- A. at all times.
- B. at high tide only.
- C. at low tide only.
- D. at night.

Question 2

Mangrove leaves are able to excrete salt.

This is

- A. a physiological adaptation.
- B. a behavioural adaptation.
- C. an environmental response.
- D. a structural adaptation.

Question 3

For the mangrove, an environmental condition that would be greater at high tide compared to low tide would be the availability of

- A. oxygen.
- B. carbon dioxide.
- C. water.
- D. light.

Question 4

In an experiment, seeds from three different plant species were placed in Petri dishes (ten seeds per dish) with paper towelling and adequate water. The dishes were then stored at a range of temperatures and light levels, and were left for ten days. The results are shown below.

Plant species	Environmental conditions	Number of seeds germinated after ten days (out of ten seeds)
I	5°C, dark	5
	5°C, light	1
	20°C, dark	10
	20°C, light	3
	80°C, dark*	0
	80°C, light*	0
II	5°C, dark	0
	5°C, light	0
	20°C, dark	0
	20°C, light	0
	80°C, dark*	8
	80°C, light*	9
III	5°C, dark	8
	5°C, light	7
	20°C, dark	0
	20°C, light	0
	80°C, dark*	0
	80°C, light*	0

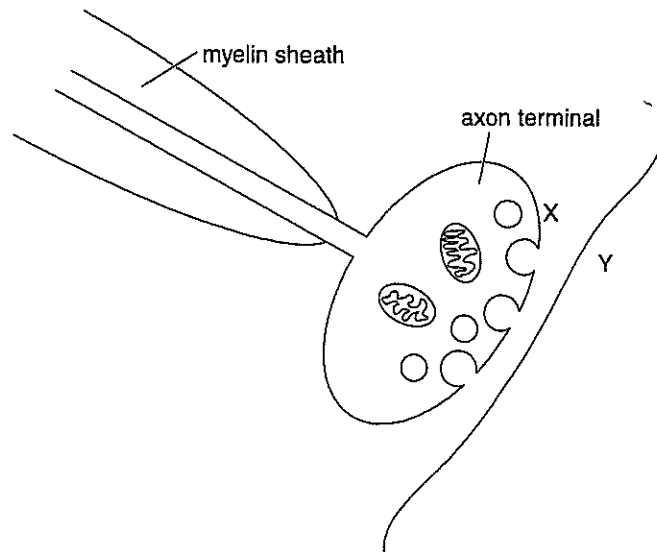
* These seeds were heated at 80°C for 10 minutes and then incubated at 20°C.

From the results and your knowledge, it is reasonable to conclude that

- A. light is necessary for seeds to germinate.
- B. seeds from species I and II would have a hard seed coat.
- C. all seeds would eventually germinate.
- D. seeds of species II would be suited to an Australian environment where bushfires often occur.

Use the following diagram to answer Questions 5–7.

The following diagram is of a neuromuscular junction.



Question 5

Information is transferred from X to Y. This is achieved by

- A. conduction of an action potential.
- B. diffusion of a neurotransmitter.
- C. diffusion of a hormone.
- D. the release of chemicals from the mitochondria.

Question 6

The junction illustrated above is

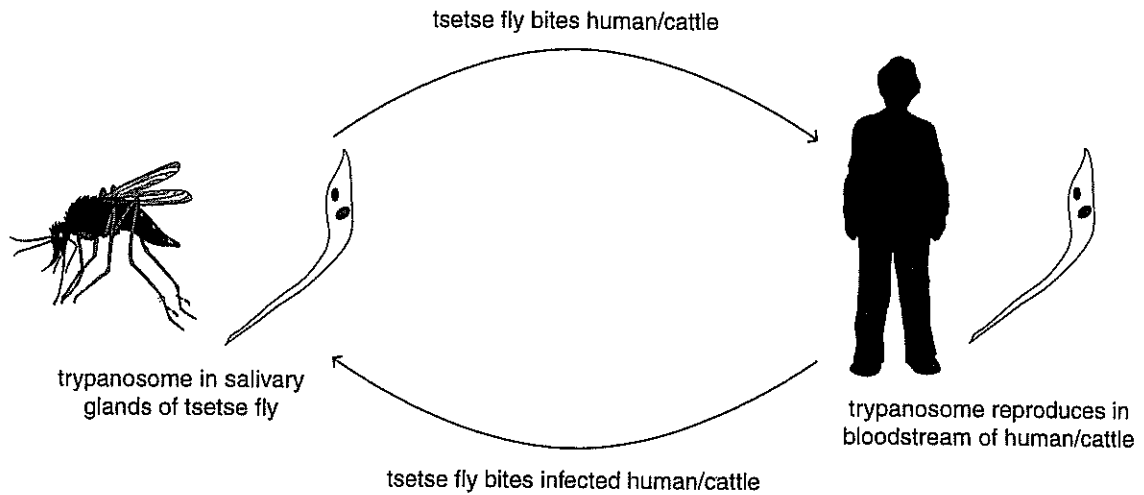
- A. a dendrite.
- B. an interneuron.
- C. a node of Ranvier.
- D. a synapse.

Question 7

Unlike messages travelling via nerves, mammalian hormones

- A. are fast acting.
- B. circulate throughout the whole organism.
- C. work for short periods.
- D. have specific pathways to the effector.

African sleeping sickness is caused by a single-celled organism: the trypanosome. Humans and cattle are affected by this disease which can result in short periods of fever, unresponsiveness and 'sleepiness'. 50 000 people die of this condition per year. The tsetse fly is a vector for trypanosomes. Below is a life cycle for this disease.



Question 8

The relationship between the tsetse fly and humans is

- A. predator-prey.
- B. competitors.
- C. parasite-host.
- D. disease-host.

Question 9

The salt bush, *Atriplex cinerea*, dominates the arid inland of Australia. It does so because it possesses many features which enable it to successfully live in areas subject to low rainfall and high salt concentrations. Which of the following features would not be expected to be seen in such plants?

- A. a short life cycle.
- B. the presence of hairs along leaf surfaces.
- C. many stomata.
- D. vertical orientation of very small leaves.

Question 10

The picture opposite demonstrates a type of learning known as

- A. problem solving.
- B. conditioning.
- C. observational learning.
- D. imprinting.



Question 11

The carabid beetle, *Calosoma prominens*, possesses a specialised gland at the tip of its abdomen which produces a secretion made up of salicylaldehyde. This secretion acts as a repellent against its predators and can be released as a jet of spray. Ants hit by this spray are instantly repelled. Other vertebrate predators, such as Blue Jays and grasshopper mice, can also be deterred from attacking the arthropod by the use of such a spray. This defence mechanism of *Calosoma prominens* is an example of:

- A. a reproductive adaptation;
- B. a behavioural adaptation;
- C. a structural adaptation;
- D. a physiological adaptation.

Question 12

The plant hormone ethylene is involved in

- A. stomatal closure.
- B. cell elongation.
- C. fruit ripening.
- D. seed dormancy.

Question 13

When a seed is planted, the roots of the plant grow downwards and the shoot system grows upwards and out of the soil.

The roots' response would be best described as

- A. negative phototropism.
- B. positive phototropism.
- C. negative geotropism.
- D. positive geotropism.

Question 14

A family moves from a quiet location to one near a railway line. For the first week, members of the family had trouble sleeping and awoke with the passing of the trains. After a few weeks, all members of the family slept well and even during the day seemed not to notice the passing of the trains.

The term to describe what has occurred is

- A. habituation.
- B. imprinting.
- C. associative learning.
- D. trial and error.

Question 15

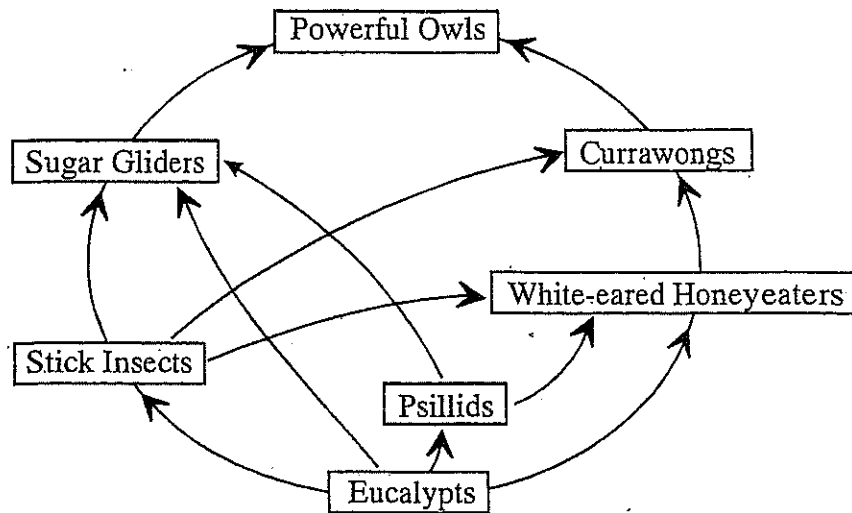
Each year, humpback whales in the southern hemisphere display a general migration pattern. Summer is spent in the cold waters of Antarctica where they feed on small crustaceans called krill. In autumn, as the temperature falls, the whales begin their migration northward to the temperate and tropical waters off Queensland and Western Australia. Here they give birth and mate before returning to the Antarctic waters at the end of spring.

The migration pattern shown by humpback whales is an example of a

- A. circadian rhythm.
- B. circannual rhythm.
- C. tidal rhythm.
- D. lunar rhythm.

The following information relates to Questions 16 to 18.

The diagram below shows a food web from a wet sclerophyll forest in Victoria.



Question 16.

The number of autotrophs in this food web is

- A. one.
- B. two.
- C. three.
- D. four.

Question 17.

The number of omnivores in this food web is

- A. zero.
- B. one.
- C. two.
- D. seven.

Question 18.

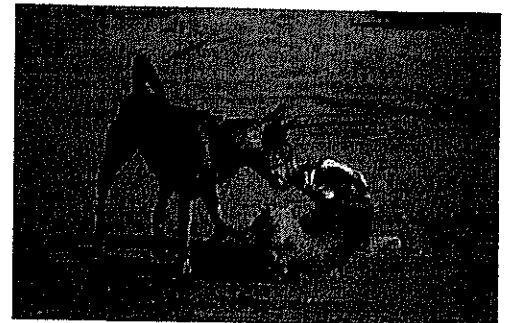
The species with the least biomass in this food web would be

- A. eucalypts.
- B. powerful owls.
- C. psillids.
- D. sugar gliders.

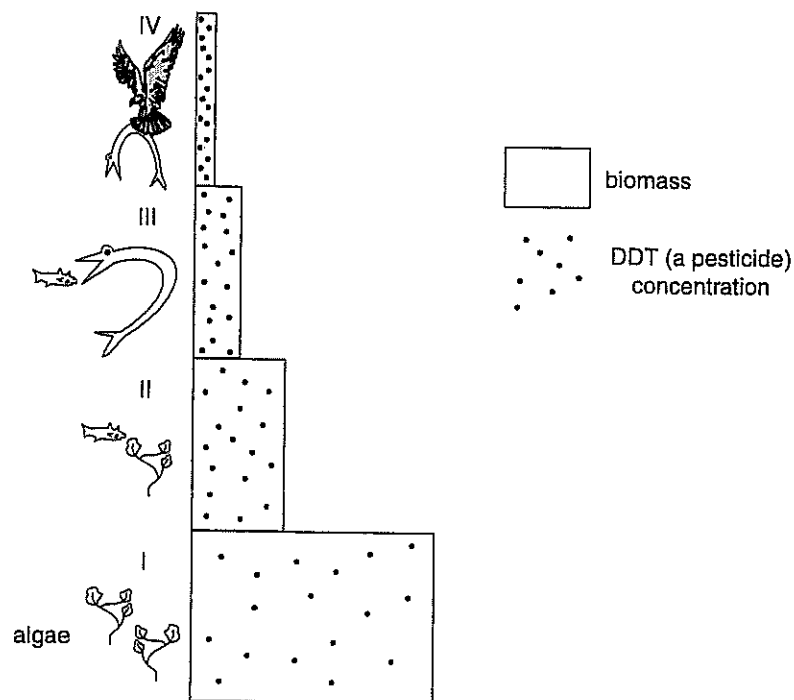
Question 19.

In the picture opposite,

- A. the dog on the left is displaying submissive behaviour while the dog on the right is displaying aggressive behaviour.
- B. the dog on the left is displaying aggressive behaviour while the dog on the right is displaying submissive behaviour.
- C. the dog on the left is displaying aggressive behaviour while the dog on the right is displaying territorial behaviour.
- D. the dog on the left is displaying territorial behaviour while the dog on the right is displaying submissive behaviour.



Use the following diagram to answer Questions 20–22.



Question 20

The above diagram illustrates the biological phenomenon of

- A. biomass.
- B. a food web.
- C. biological control.
- D. bioaccumulation.

Question 21

The DDT shown in this diagram is

- A. biodegradable.
- B. readily excreted by all organisms.
- C. is produced as a by-product of respiration.
- D. would affect the health of fish eating birds more than the health of fish.

Question 22

Using only the information provided in the diagram, organism III would best be described in terms of feeding as

- A. an omnivore.
- B. a third-order consumer.
- C. a first-order carnivore.
- D. an autotroph.

Question 23.

The plant shown opposite was found growing in soils containing large amounts of salt. The plant is best described as

- A. a hydrophyte.
- B. a halophyte.
- C. a mesophyte.
- D. a xerophyte



Question 24.

A marine aquarium ecosystem is shown in the diagram below. It contains plants, corals, crabs and several different species of fish, including seahorses.



A community in this aquarium consists of

- A. the plants.
- B. the different types of fish.
- C. the non-living parts of the aquarium.
- D. all the organisms present.

Question 25.

In the 1930's, many areas of Queensland were covered in a prickly pear, a cactus that was introduced from South America. A moth, *Cactoblastis*, was introduced and was successful in eradicating the cactus. This is an example of

- A. chemical control.
- B. biological control.
- C. the successful use of a herbicide.
- D. mechanical control.

Question 26.

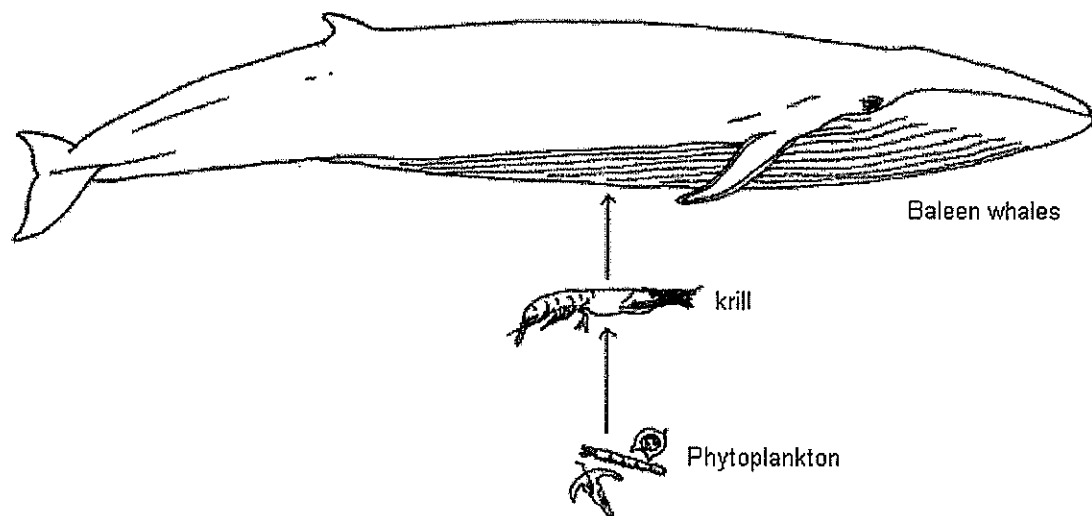
Clownfish live among tentacles of sea anemones. The sea anemones stun and consume other fish with their poison bearing tentacles. The tentacles, however, do not harm the clownfish. Clownfish that live among the tentacles of the sea anemones are territorial and attack butterfly fish that eat the ends of sea anemone tentacles.

The relationship between the clownfish and sea anemone is an example of

- A. competition.
- B. parasitism.
- C. mutualism.
- D. a predator and its prey.

Question 27.

The picture below shows a simple food chain from the Southern Ocean



The greatest biomass in this food chain would be expected to be in the

- A. baleen whales.
- B. phytoplankton.
- C. krill.
- D. consumers.

Question 28.

An abiotic factor affecting the survival of baleen whales in the ocean would be

- A. people hunting whales for food.
- B. the density of krill.
- C. the amount of sunlight reaching the surface waters.
- D. other animals that compete with baleen whales for food.

Question 29.

The picture opposite show's the beak of a wedge-tailed eagle. It could be assumed that the beak is a

- A. structural adaptation for eating plant matter.
- B. structural adaptation for eating animal matter.
- C. physiological adaptation for eating plant matter.
- D. physiological adaptation for eating animal matter.



The following information relates to Questions 30 to 33.

The brown antechinus (see picture below) is a native marsupial found in eucalypt forests of south-eastern Australia. Although small, it is a ferocious hunter, fossicking in rich topsoil with its sharp claws for insects, spiders and worms and small reptiles. The brown antechinus is mainly active at night. In winter, females build a nest of grass and leaves in cavities of logs and stumps or in burrows where they raise their young.

Brown antechinus are preyed upon by foxes and tiger quolls. To avoid being eaten by these predators, brown antechinus avoid areas where foxes and quolls are present. They do this by detecting the odours given off by the faeces of these animals and then moving to safer areas.



Question 30.

The habitat of the brown antechinus is best described as

- A. eucalypt forests.
- B. cavities of logs.
- C. burrows.
- D. topsoil

Question 31.

Foxes and quolls can be regarded as

- A. intra-specific competitors for antechinus.
- B. inter-specific competitors for antechinus.
- C. prey items of antechinus.
- D. parasites of antechinus.

Question 32.

From the information given, it would be expected that brown antechinus would

- A. have a well developed colour vision.
- B. lack canine teeth.
- C. have a well developed sense of smell.
- D. have poorly developed hearing.

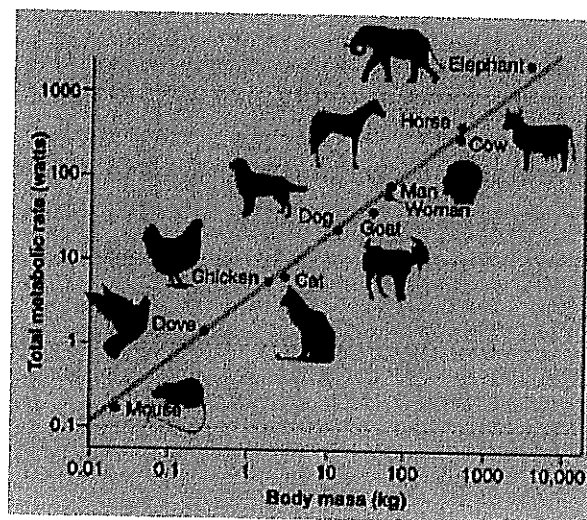
Question 33.

Baumea articulata (jointed twigrush) is an aquatic plant growing with its roots in mud covered by water. The stems of its leaves are above water and have large air spaces that connect to the plant's root system. The best explanation for these air spaces is that they allow

- A. oxygen gas to be transported from the stems down to the roots.
- B. oxygen gas to be transported from the roots up to the stems.
- C. carbon dioxide gas to be transported from the stems down to the roots.
- D. carbon dioxide gas to be transported from the roots up to the stems.

Refer to the following information to answer Questions 34 and 35.

The graph below shows the relationship between body mass and total metabolic rate.



Question 34.

This graph is best explained by knowing that

- A. as body mass increases, the surface area to volume ratio decreases.
- B. as body mass increases, the surface area to volume ratio increases.
- C. as body mass increases, the surface area to volume ratio remains constant.
- D. as body mass increases, the surface area decreases.

Question 35.

The animal that would require the greatest amount of food relative to its size would be

- A. the elephant.
- B. the human.
- C. the dove.
- D. the mouse.

Question 36.

The classification of the euro, *Macropus robustus*, is given below.

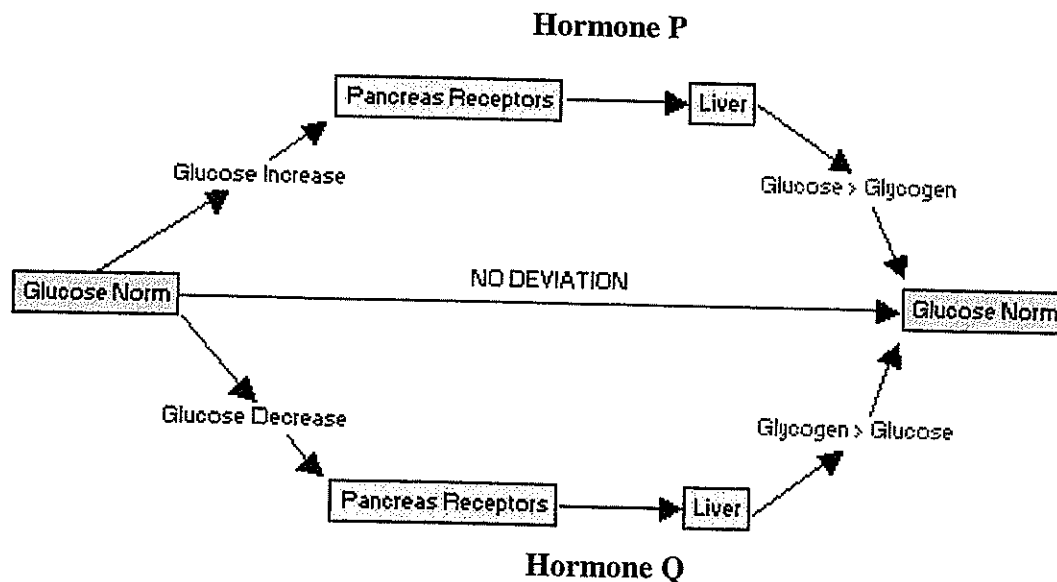
Kingdom	<i>Animalia</i>
Phylum	<i>Chordata</i>
Class	<i>Mammalia</i>
Order	<i>Diprotodontia</i>
Family	<i>Macropodidae</i>
Genus	<i>Macropus</i>
Species	<i>robustus</i>

From this table, it can be concluded that

- A. an organism in the family, *Macropodidae*, would also be in the genus, *Macropus*.
- B. all mammals belong to the order, *Diprotodontia*.
- C. some species belonging to the genus, *Macropus*, may not be in the family, *Macropodidae*.
- D. all members of the order, *Diprotodontia*, belong to the phylum, *Chordata*.

Refer to the diagram below to answer Questions 37-38.

The diagram below shows, in part, how blood glucose is regulated in the body.



Question 37.

In this diagram,

- A. Hormone P is glucagon and Hormone Q is insulin.
- B. Hormone P is glycogen and Hormone Q is insulin.
- C. Hormone P is insulin and Hormone Q is glucagon.
- D. Hormone P is insulin and Hormone Q is glycogen.

Question 38.

In this diagram, glucose concentration is

- A. regulated by two positive feedback systems.
- B. regulated by two negative feedback systems.
- C. regulated by one negative feedback system and one positive feedback system.
- D. not regulated by feedback systems.

Question 39.

Tortoises of southeastern Australia respond in various ways to environmental changes. As winter approaches, tortoises hibernate on land or in water. At other times of the year, when water levels become too low or water temperatures rise sharply, tortoises will aestivate. Before aestivating, a tortoise drinks a large amount of water. It then searches for a shaded area on land where it buries itself.

Which of the following statements is consistent with the information given above?

- A. Heavy rainfall would cause tortoises to come out of aestivation.
- B. Heavy rainfall would cause tortoises to come out of hibernation.
- C. Hot dry summers would stimulate tortoises to hibernate.
- D. An inactive tortoise found at the bottom of a pond is most likely aestivating.

Question 40.

Replicating an experiment involves

- A. Repeating the experiment a number of times.
- B. Keeping all variables in the experiment constant.
- C. Having a control in the experiment.
- D. Practising safe experimental technique during the experiment.

SECTION B: SHORT-ANSWER QUESTIONS

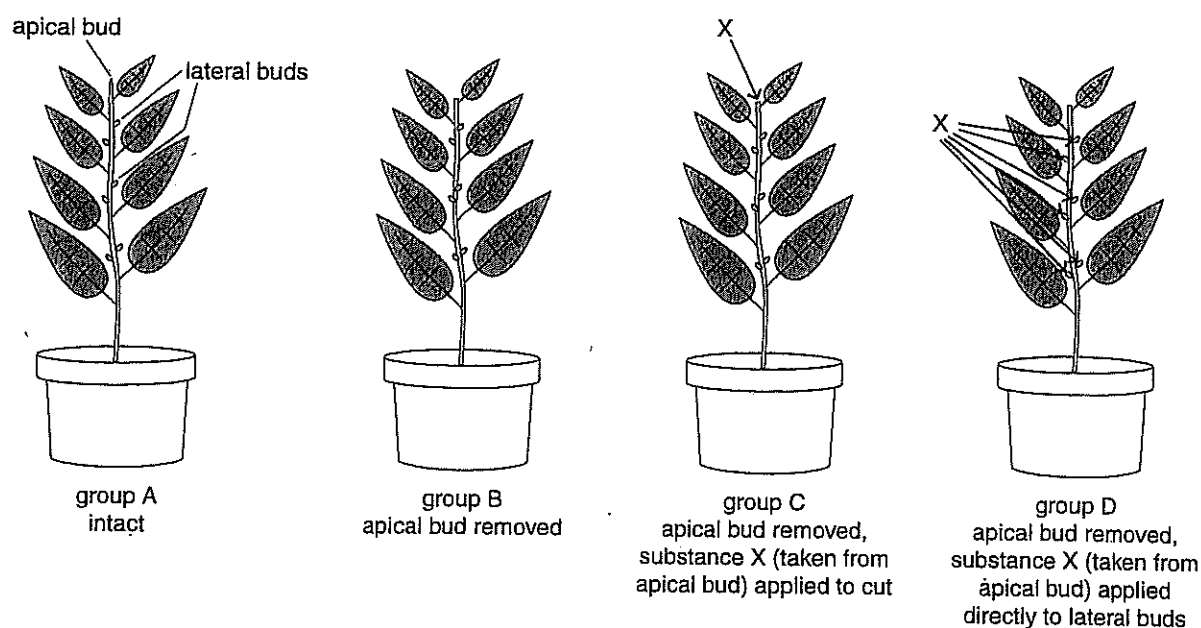
Instructions for Section B

Answer this section in pen.

Answer **all** questions in the spaces provided.

Question 1

In an experiment, four groups of healthy plants of the same type and age were grown under identical conditions except for the treatments shown in the diagrams below.



The results after one week of growth are shown in the following table.

Group	Result
A	continued upward growth
B	lateral bud growth
C	no upward growth or lateral bud growth
D	no upward growth or lateral bud growth

- a. Substance X is a plant hormone.
Where in the plant is it produced?

1 mark

- b. Substance X is also involved in phototropic and geotropic responses.
Name substance X.

1 mark

- c. Using the information provided, what effect does substance X have on lateral buds? Explain.

2 marks

- d. From the results observed for groups C and D, what else can be inferred about substance X?

1 mark

Total 5 marks

Question 2.

Respiration and photosynthesis are two key processes that are carried out in plants.

- a. Complete the box below by filling in the blank spaces.

PROCESS	REACTANTS	PRODUCTS
Photosynthesis		
Respiration		

(4 marks)

- b. Chlorophyll is needed for photosynthesis to occur. Name one other requirement (not a reactant) that is necessary for photosynthesis.

_____ (1 mark)

- c. Name a part of a plant where respiration would occur but photosynthesis would not occur.

_____ (1 mark)

Total = 6 marks

Question 3

Experiments have recently been conducted on the common raven (*Corvus corax*), which is a member of the crow family. Ravens are highly social, have well-developed means of communication and are highly intelligent.

- a. Name a mode of communication ravens could use. What information could be conveyed via this mode of communication?

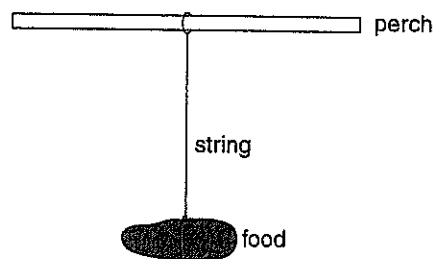
2 marks

- b. Ravens tend to feed in groups. The discovery of carrion (the carcass of a kill) draws the flock, and frenzied eating ensues.

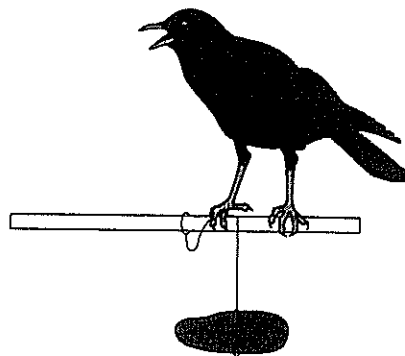
With respect to this information, what type of consumer is a raven? Explain.

2 marks

In an experiment, food was suspended from a perch as shown below.



To gain the food, birds must pull the string to raise the food, then hold the raised string with their foot. The process may need to be repeated six times for the food to become within reach.



One-year-old birds adopted various unsuccessful methods to retrieve the food and on average took six minutes to work out the successful method. Mature birds with no previous experience would examine the situation for several minutes and then perform the successful method in as little as 30 seconds.

- c. With respect to gaining the food, what type of learning is displayed by
i. the yearling ravens? Explain.

- ii. the mature ravens? Explain.

2 + 2 = 4 marks

Total = 8 marks

Question 4.

The owls of Australia belong to two separate families. The following is a key that can be used to identify the various owl species found in Australia.

- 1a. Owls having a large heart-shaped face. Eyes dark brown. Middle claw of each foot possessing a comb-like structure used for preening. _____ 2
- 1b. Owls having a hawk-like face. Eyes ranging in colour from grey-green to yellow. Middle claw lacking a comb-like structure for preening. _____ 5
- 2a. Ground-dwelling owls with long legs that lack feathers. _____ *Tyto longimembris*
- 2b. Owls not ground-dwelling. Legs fully feathered. _____ 3
- 3a. Owls sooty-grey in colour. Found in dense rainforest and fern gullies. _____ *Tyto tenebricosa*
- 3b. Owls of a different colour. Habitat various. _____ 4
- 4a. Owls white with a thin covering of feathers on legs. _____ *Tyto alba*
- 4b. Owls ranging in colour from white to brown. Legs heavily feathered. _____ *Tyto novaehollandiae*
- 5a. Large owls, adults ranging in size from 600 to 660 mm. _____ *Ninox strenua*
- 5b. Smaller owls, adults less than 600 mm in length. _____ 6
- 6a. Owls with large white spots on wings. _____ 7
- 6b. Owls lacking large white spots on wings. _____ *Ninox rufa*
- 7a. Owls with grey-green eyes. _____ *Ninox novaeseelandiae*
- 7b. Owls with bright yellow eyes. _____ *Ninox connivens*

a. From the information given and the key, answer the following.

- i. How many species of owls are there in Australia? _____ (1 mark)
- ii. How many genera of owls are there in Australia? _____ (1 mark)
- iii. Name two structural features that are used to separate the genera of Australian owls.

Structure 1. _____

Structure 2. _____

(2 marks)

iv. Do *Tyto* and *Ninox* belong to the same family. Justify your answer.

(2 marks)

b. From the information given in the key, complete the following table. If there is insufficient information in the key, indicate this by placing an 'X' in the box.

Species	Eye Colour	Shape of Face
<i>Tyto tenebricosa</i>		
<i>Ninox rufa</i>		

(4 marks)

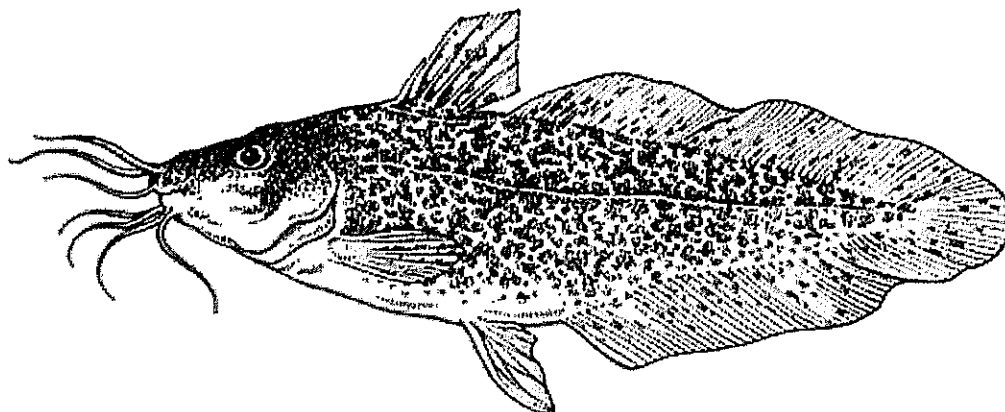
c. The powerful owl, *Ninox strenua*, nests in large hollows of eucalypt trees. Large hollows only form in trees that are over 150 years old. Describe a human activity that is likely to have a major impact on the breeding of powerful owls.

(1 mark)

Total = 11 marks

Question 5.

The picture below is of an eel-tailed catfish, *Tandanus tandanus* that is found in rivers of south-eastern Australia.



- a. Suggest whether eel-tailed catfish feed on the surface or bottom of a river. Justify your answer.

(2 marks)

- b. The scales of fish always point towards the tail. Suggest a reason for this.

(1 mark)

Fish also produce hormones via their endocrine system. Like mammals, they also possess a nervous system. The table below compares the action of the endocrine and nervous systems.

- c. Complete the spaces left blank in the table.

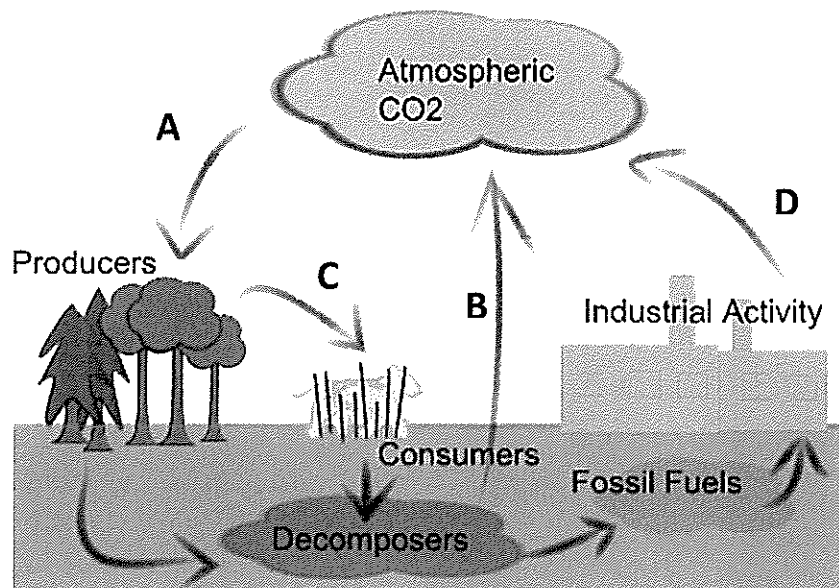
System	Relative Speed of System (Fast or Slow)	Example of Organ from System	Duration of Response (Long or Short)
Endocrine System			
Nervous System			

(3 marks)

Total = 6 marks

Question 6.

Refer to the following diagram to answer this question.



a. What does this diagram represent?

_____ (1 mark)

b. Name the processes represented by arrows

A. _____

B. _____

C. _____

D. _____ (2 marks)

c. Has the total amount of carbon in the diagram above changed in the last 500 years?
Explain your answer.

(2 marks)

A student conducted a survey of a local stream and gathered the following data on the organisms she found and their feeding relationships.

Organism	Size	Feeding Habits
Midge Larvae	8 mm (small)	Feed on decaying plant and animal matter
Dragonfly Nymphs	30 mm (large)	Feed on small and medium sized insects and snails
Mosquito Larvae	8 mm (small)	Feed on green plants and diatoms
Water Striders	20 mm (medium)	Feed on small insects
Water Snails	10 mm (small)	Feed on green plants
Diatoms	Microscopic <1mm	Microscopic cells that undergo photosynthesis.
Mosquito fish	30 mm (large)	Feed on small insects
Green Plants	Various	Producers

- d. In the space below, construct a food web that links all the organisms described in the above table. Include in your food web detritus which is dead plant and animal matter.
(4 marks)

Total = 9 marks

Question 7

In 1900, the population of the California condor (*Gymnogyps californianus*) was estimated to be around 5000 birds. In 1987, the sole remaining wild California condor was caught and taken into captivity. At the time, only 27 of these birds survived in captivity. Following a successful breeding program, there are now 127 California condors flying free in California, Arizona and Mexico.



These birds have a wing span of 3 metres.

California condors feed on carcasses, many of which have been shot by hunters. The ingestion of lead shot from the carcasses has led to 13 condors dying from lead poisoning and many others requiring treatment. A proposal has been made to stop hunters using lead shot in the condors' range.

- a. In a food chain, explain where a condor would be placed.

1 mark

- b. Name two human activities that could have led to the dramatic decline in the condor population between 1900 and 1987.

2 marks

On hot days, when Californian condors need to cool themselves, they frequently soar to several thousand feet up into the atmosphere. If they are on the ground, Californian condors are often seen urinating on their legs.

Explain how these two behaviours would help cool a Californian condor on a hot day.

1. Soaring to several thousand feet. _____

2. Urinating on their legs. _____

(2 marks)

Total = 5 marks

END OF TASK