



Province of the
EASTERN CAPE
EDUCATION

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

SEPTEMBER 2012

LIFE SCIENCES P2

MARKS: 150

TIME: 2½ hours

This question paper consists of 14 pages.

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. Answer ALL the questions.
2. Write ALL the answers in the ANSWER BOOK.
3. Start EACH question on a NEW PAGE.
4. Number the answers correctly according to the numbering system used in this question paper.
5. If answers are NOT presented according to the instructions of each question, candidates will lose marks.
6. All drawings should be done in pencil and labelled in blue or black ink.
7. Draw diagrams and flow charts ONLY when requested to do so.
8. The diagrams in this question paper may NOT necessarily be drawn to scale.
9. The use of graph paper is NOT permitted.
10. Non-programmable calculators, protractors and compasses may be used.
11. Write neatly and legibly.

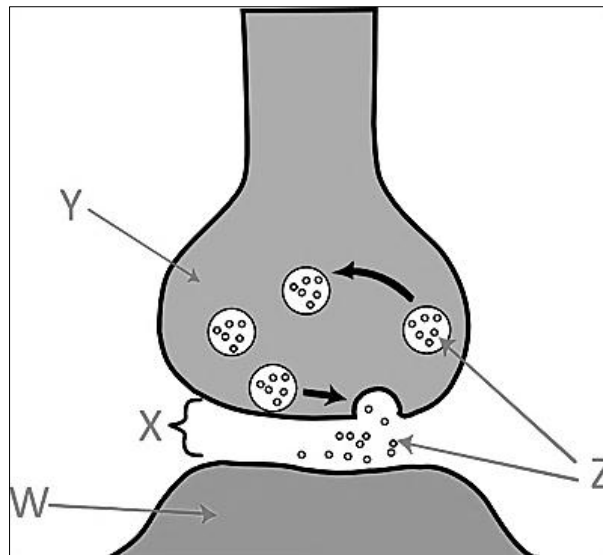
SECTION A**QUESTION 1**

1.1 Various options are provided as possible answers to the following questions. Choose the correct answer and write only the letter (A – D) next to the question number (1.1.1 – 1.1.9), for example 1.1.10 D.

1.1.1 An organism on or in which another organism lives and is provided with food.

- A Host
- B Prey
- C Predator
- D Producer

1.1.2 In the diagram below, the neurotransmitters are labelled ...

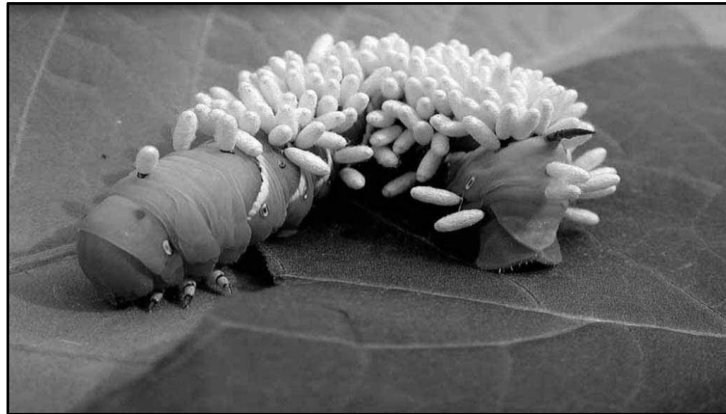


- A Z.
- B X.
- C W.
- D Y.

1.1.3 The advantage of a reflex arc in responding to a painful stimulus, is that it saves reaction time by bypassing the ...

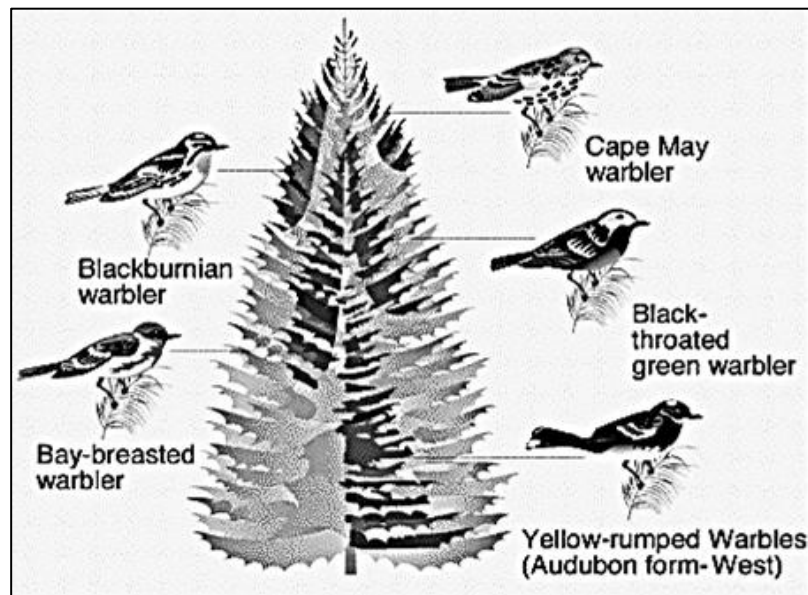
- A motor nerves.
- B brain.
- C sensory nerves.
- D spinal cord.

- 1.1.4 The caterpillar picture here has wasp pupae attached to its body that will hatch and then consume the caterpillar. The relationship is an example of ...



- A mutualism.
- B commensalism.
- C parasitism.
- D sexual selection.

- 1.1.5 This coexistence of a variety of warbler species is called ...



- A resource partitioning.
- B competitive exclusion.
- C predation.
- D mutualism.

- 1.1.6 The rate at which new individuals are added to a population through reproduction.

- A Natality
- B Mortality
- C Immigration
- D Emigration

1.1.7 The phase during a logistic growth form where the population grows slowly as it adapts to the place that it lives in.

- A Logarithmic
- B Equilibrium
- C Establishing
- D Death

1.1.8 To measure the population density of monarch butterflies occupying a particular park, 100 butterflies are captured, marked with a small dot on a wing, and then released. The next day, another 100 butterflies are captured, including the recapture of 20 marked butterflies. One would correctly estimate the population to be ...

- A 100
- B 200
- C 20
- D 500

1.1.9 Carrying capacity ...

- A differs among species, but does not vary within a given species.
- B is always eventually reached in any population.
- C remains constant in all environments.
- D is often determined by resource limitations. (9 x 2) (18)

1.2 Give the correct BIOLOGICAL TERM for each of the following descriptions. Write only the term next to the question number (1.2.1 – 1.2.9) in the answer book.

1.2.1 The glandular tissue that lines the inside of the uterus

1.2.2 An animal that eats plants

1.2.3 An animal that hunts, catches and kills other animals

1.2.4 The process that occurs when a female and a male gamete fuse to form a zygote

1.2.5 The relationship between two organisms such that one or both benefits

1.2.6 The number of individuals of the same species that occupy a specific area and that are able to interbreed

1.2.7 The method used for measuring the size of the human population

1.2.8 The bacteria and fungi that break down dead organic material and use the resulting inorganic nutrients as their food supply

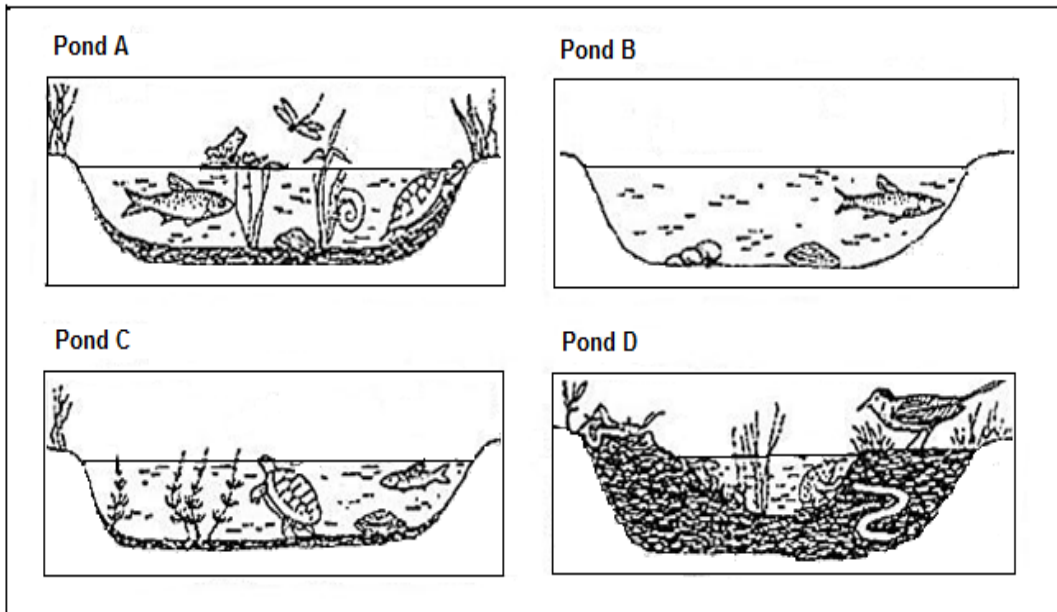
1.2.9 Competition between different species for the same resources (9)

1.3 Indicate whether each of the statements in COLUMN I, applies to A ONLY, B ONLY, BOTH A AND B, or NONE of the items in COLUMN II. Write A ONLY, B ONLY, BOTH A AND B, or NONE next to the question number in the ANSWER BOOK.

	COLUMN I	COLUMN II	
1.3.1	Responsible for cell elongation in young stems	A. B.	Gibberellins Auxins
1.3.2	The part of the nervous system that controls the involuntary activities of the body	A. B.	Sympathetic nervous system Parasympathetic nervous system
1.3.3	Outward movement of individuals from a defined area	A. B.	Emigration Migration
1.3.4	Area of the retina containing rods only	A. B.	Yellow spot Blind spot
1.3.5	Example of social organisation that increases the chances of survival	A. B.	Division of labour in bees A herd of zebras
1.3.6	Bryophytes differ from angiosperms because they have this type of spores	A. B.	Homospores Heterospores
1.3.7	The role of a species within the structure and functioning of an ecosystem	A. B.	Habitat Niche
1.3.8	A tick on the human skin	A. B.	Endoparasite Ectoparasite

(8 x 2) (16)

1.4 Succession is a series of environmental changes that occurs in all ecosystems. In the diagram below, an ecosystem had passed through four stages. Study the diagram and answer the questions that follow.



- 1.4.1 Write the letters of the ponds in order from the youngest (pioneer community), to the oldest (climax community). (4)
- 1.4.2 Some amphibians and crayfish can withstand periods of dryness by burying themselves in mud. In which pond(s) would they survive? (1)
- 1.4.3 Black bass and Bluegill (fish types) make their nests on sandy bottoms. In which pond would you find them? (1)
- 1.4.4 Do the above diagrams illustrate, primary or secondary succession? (1)

TOTAL SECTION A: 50

SECTION B

QUESTION 2

2.1 The diagram shows part of the human female reproductive system. Study the diagram and answer the questions that follow.

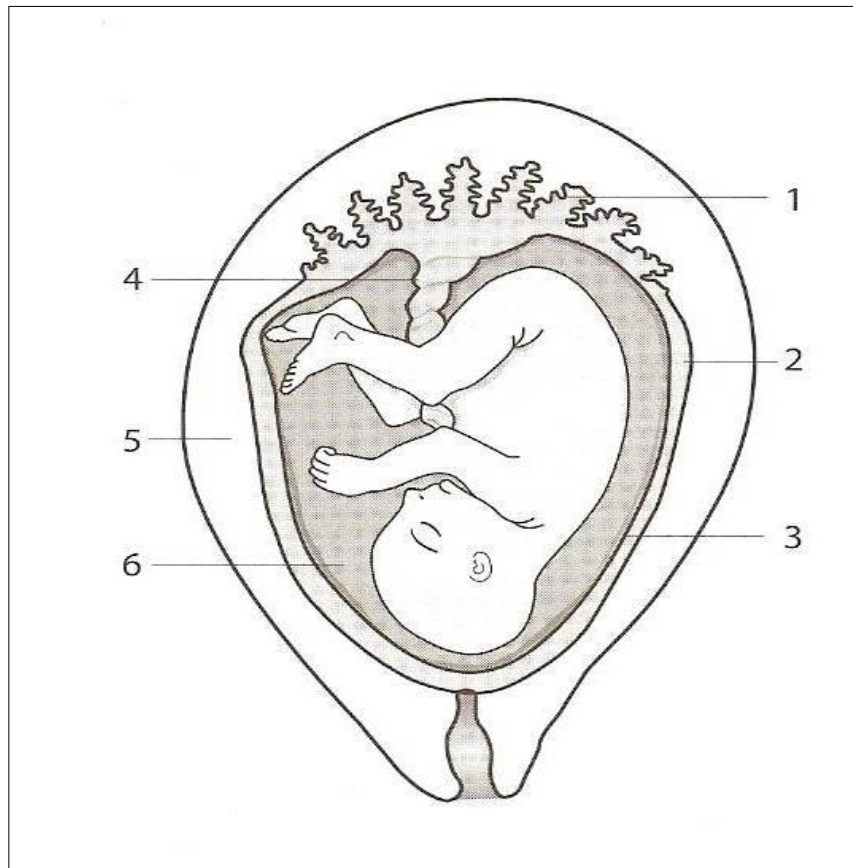
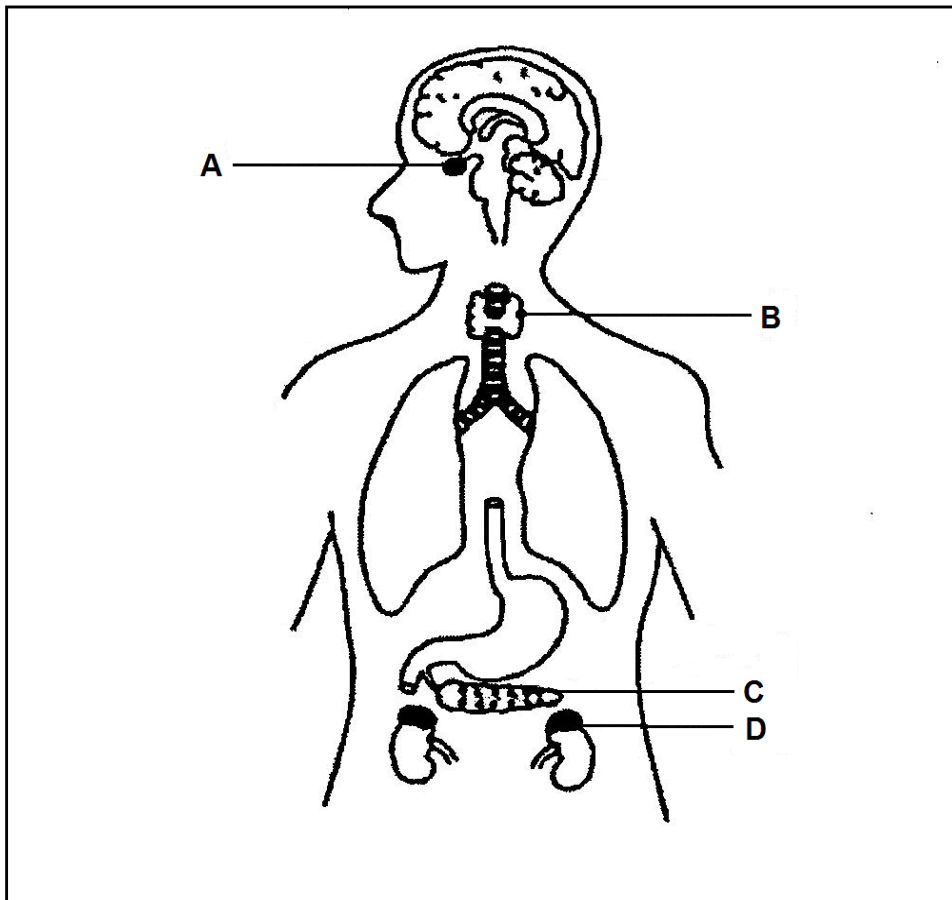


Diagram representing a foetus in the womb

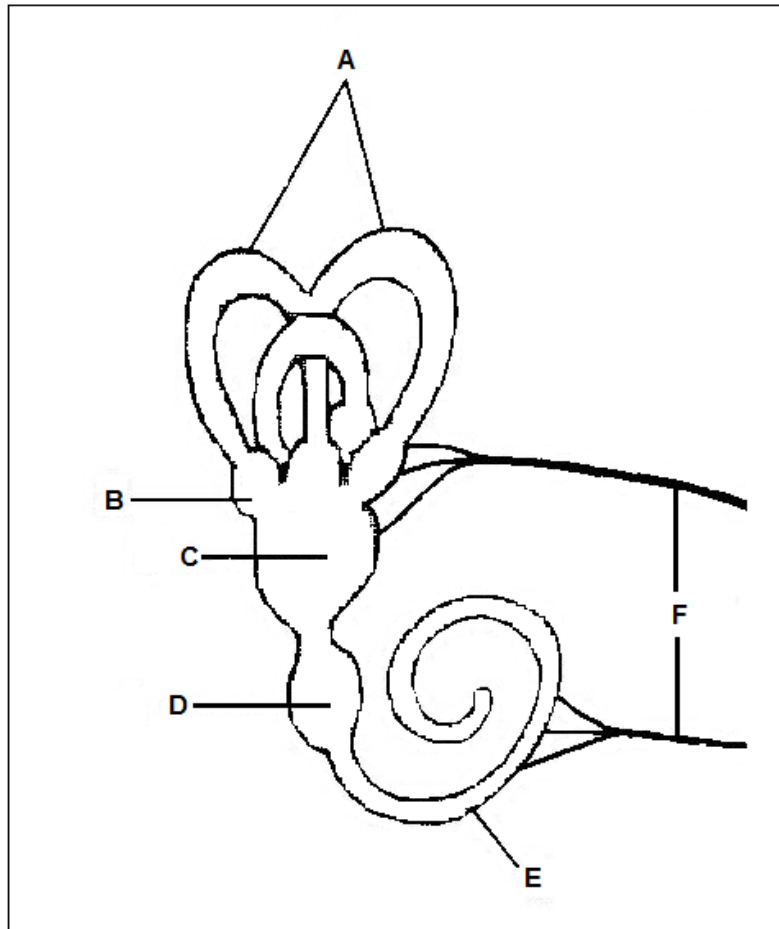
- 2.1.1 Write down the NUMBER of the part that represents:
- (a) the amnion (1)
- (b) the chorion (1)
- 2.1.2 Which substance is found in the space between the embryo and the part numbered 3? (1)
- 2.1.3 Give TWO functions of the substance referred to in QUESTION 2.1.2. (2)
- 2.1.4 Identify the part numbered 1. (1)
- 2.1.5 Give TWO functions of the part numbered 1. (2)
- 2.1.6 Identify the part numbered 4. (1)

2.2 The diagram below indicates the position of some human endocrine glands. Study and answers the questions that follow.



- 2.2.1 Identify the parts labelled **A**, **B** and **C**. (3)
- 2.2.2 Write down only the LETTER of the part that:
 - (a) requires iodine in order to function properly. (1)
 - (b) regulates the release and functioning of other endocrine glands. (1)
- 2.2.3 Describe the negative feedback mechanism in the interaction between parts **A** and **B**. (4)

- 2.3 The following diagram shows the membranous labyrinth of the inner ear. Study the diagram and answer the following questions.



- 2.3.1 Provide labels for parts **A** to **F**. (6)
- 2.3.2 Name the stimulus which is converted to an impulse by hair cells in each of the following:
- (a) part labelled **B**. (1)
 - (b) part labelled **C**. (1)
 - (c) part labelled **E**. (1)
- 2.3.3 How is part **F**, protected? (1)
- 2.3.4 Name the region of the brain that interprets impulses that arise from the:
- (a) part labelled **C**. (1)
 - (b) part labelled **E**. (1)

[30]

QUESTION 3

3.1 For each reproductive strategy listed below, describe how it maximises the reproductive success of the animal.

3.1.1 Peacocks strut with their tail feathers fanned out. (2)

3.1.2 Lizards laying amniotic eggs. (2)

3.1.3 A codfish lays 4 million eggs a year. (2)

3.1.4 Sea urchins in a colony release chemicals called pheromones into the surrounding water that causes other sea urchins to release sperm and eggs. (2)

3.1.5 Whales feed and protect their young for several months after they are born. (2)

3.2 The relationship between two species of mites, Species A and Species B was investigated in a laboratory experiment. One of the species is a herbivore and the other is a carnivore that feeds on the other species of mites. The herbivorous mites were placed in a container with plenty of food. A few days later, some carnivorous mites were added to the container. The number of mites of each species was estimated every week for eight weeks. The results of the experiment are given in the following table.

Time (weeks)	Population of Species A	Population of Species B
1	210	100
2	920	340
3	1 400	1 250
4	750	1 900
5	300	950
6	170	750
7	250	360
8	580	130

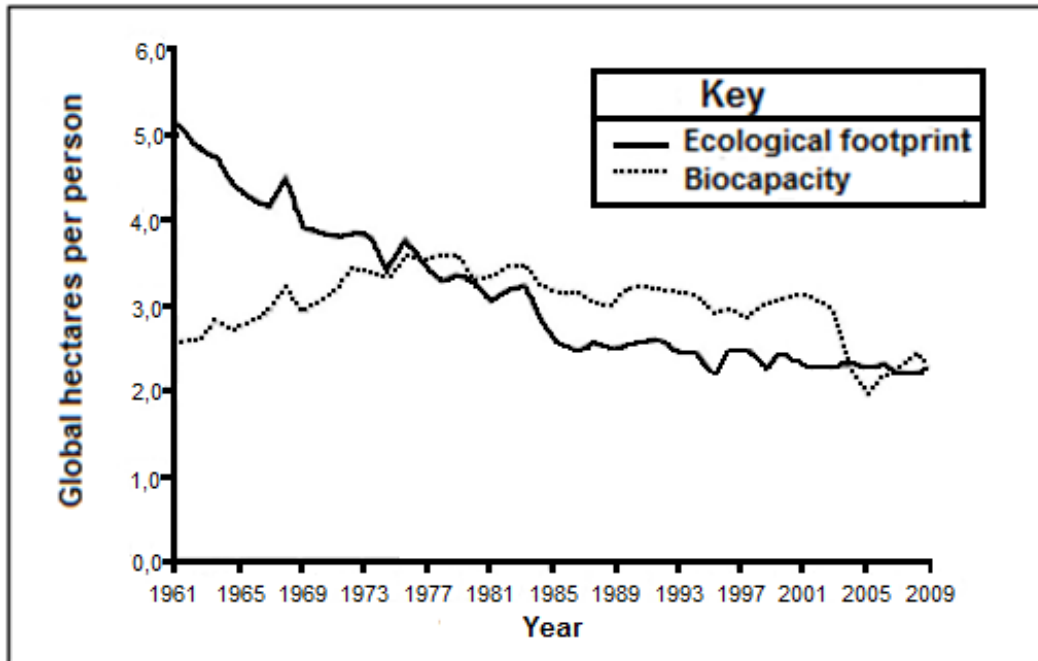
3.2.1 Draw a line graph of these results. Plot two lines on the same set of axes. (9)

3.2.2 Give ONE reason why Species A was most likely to have been the prey and Species B the predator. (1)

3.2.3 Predict what would happen to the numbers of both populations over the next two months. (2)

3.2.4 Predict what might happen to the number of Species A if Species B were to suddenly disappear. (2)

- 3.3 The graph below shows the ecological footprint (resource demand per person) and the biocapacity (resource supply per person) in South Africa since 1961. Study the graph and answer the questions that follow.



- 3.3.1 Why do you think the biocapacity for South Africa fluctuates over the years? (1)
- 3.3.2 Describe the trend of the ecological footprint for South Africa since 1961. (3)
- 3.3.3 What do you think could be a consequence of neighbouring countries having higher ecological footprints than their biocapacities? (1)
- 3.3.4 For how long until 1973 was the biocapacity higher than the ecological footprint? (1)

[30]

TOTAL SECTION B: 60

SECTION C

QUESTION 4

4.1 Read the article and answer the questions that follow.

'Extinct' damselfly makes a comeback.

A species of damselfly, thought to be extinct, has made a dramatic comeback after the removal of alien trees under the Working for Water programme. The Ceres stream damselfly, *Metacnemis angusta*, had not been spotted since 1920.

The removal of invasive alien plants in wetland systems has resulted in almost instant recovery of endemic species, including the Ceres stream damselfly. Once the invaders are removed, adequate sunlight can penetrate the systems, and streamside bushes recover.

[Source: *African Wildlife* Vol. 59 No.1 2005 – originally www.iol.co.za]

4.1.1 Define the words *extinct* and *endemic*. (2)

4.1.2 How did people intervene in the community in Ceres? (1)

4.1.3 Why is it important to conserve endemic species? (1)

4.2 The frequency of sound is measured in units called Hertz (Hz). James thinks that everyone has the same hearing. Sandra disagrees with James. She thinks that people have different hearing because James can hear things that she cannot hear. They decide to go to a special laboratory to have their hearing tested. The people at the laboratory measure the range of sounds that the two learners can hear. The results are recorded in the following table.

	Lowest frequency of sound heard	Highest frequency of sound heard
James	19 Hz	20 300 Hz
Sandra	18 Hz	20 100 Hz

4.2.1 Write a hypothesis for this experiment. (2)

4.2.2 Why did Sandra think that people have different hearing ability? (2)

4.2.3 What is the lowest frequency that James could hear? (1)

4.2.4 Who could hear the largest range of sounds? Explain your answer. (3)

4.2.5 What are the independent and dependent variables in the table? (2)

4.2.6 Bats produce sounds between 30 000 and 80 000 Hz. Can James hear bats? Explain your answer. (3)

4.2.7 Name the THREE structures in the middle ear that are responsible for the amplification of the sound. (3)

4.3 Explain the homeostatic control of body temperature of a human, under environmental conditions which cause the dilation of the blood vessels in the surface of the skin.

Content (17)
Synthesis (3)

NOTE: NO marks will be awarded for answers in the form of flow charts or diagrams.

TOTAL SECTION C: 40

GRAND TOTAL: 150