Name:.....

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Pymble Ladies' College

Year 11 – 2 Unit Biology

Semester 2, 2004

Time allowed 2 hours

Directions to Candidates:

All questions are compulsory.

This paper is in two parts, with a total of 76 marks.

Section A — 15 one-mark multiple choice questions. Select only one suggested answer. Indicate all answers on the Answer Sheet provided, using a pencil. Tear the Answer Sheet off the front of the paper.

Section B — Questions 16 to 32, representing written response questions worth a total of 61 marks. Answer all questions in the spaces provided.

Note: Section A constitutes 1/5 of the marks on this examination. Allocate your time accordingly.

Please write your name on this page, on the answer sheet and on **EACH** page of Section B.

Circle your teacher's name.

Name:.....

Section A

Questions 1 – 15 (1 mark each)

Answer ALL questions on the answer sheet provided.

1. The ecological relationship in order for each of the following examples is:

Example 1: Tropical acacia trees are hosts to a particular species of ants. The ants are provided with shelter and nutrients from the trees. The trees are protected from other predatory insects by the ants.
Example 2: The protozoan *Opalina ranarum* lives in the digestive tract of some frogs and obtains nutrients in this way without harming the frog.
Example 3: The protozoan *Plasmodium* is the cause of malaria. *Plasmodium* lives in the bloodstream of humans and reproduces inside red blood cells causing the red blood cells to burst.

	Example 1	**Example 2**	**Example 3**
A	Commensalism	Mutualism	Parasitism
B	Mutualism	Commensalism	Parasitism
C	Mutualism	Parasitism	Commensalism
D	Commensalism	Parasitism	Mutualism

2. An organism's environment can best be described as

   A. The ecosystem in which it lives

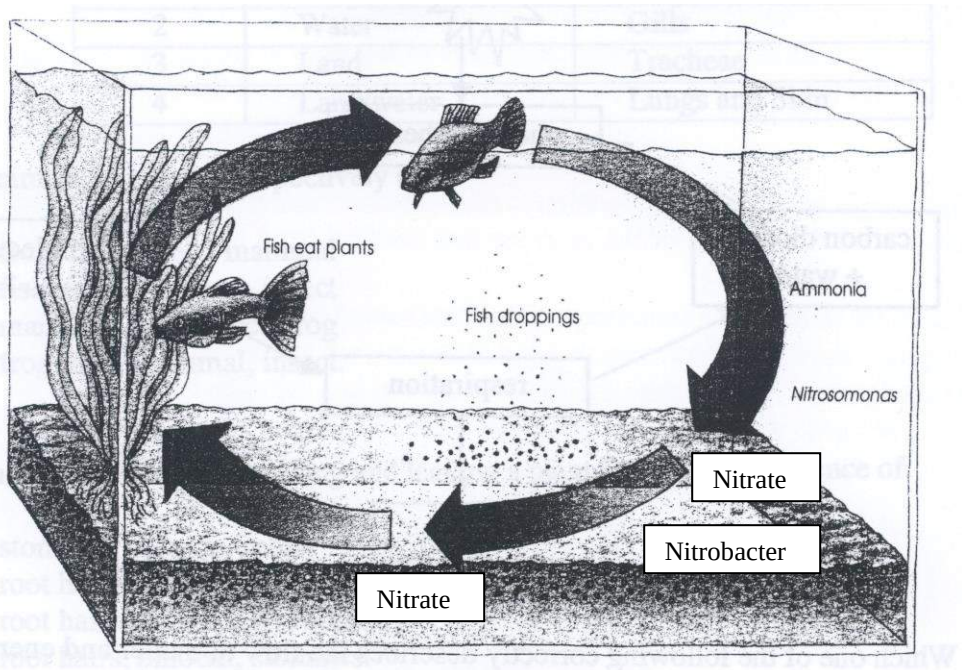
   B. The sum of all the living and non-living things that affect it

   C. The set of physical factors that influence its survival

   D. The place where it lives

Name:.....

3. Consider a simple ecosystem in an aquarium



A correct grouping of abiotic and biotic components for this ecosystem could be:

	Abiotic Components	**Biotic Components**
A	Fish, water plants, Nitrobacter (bacteria)	Water, gravel, temperature, light, nitrogen gases
B	Fish, water plants, water, gravel, nitrogen gases	Temperature, light
C	Water, gravel, temperature, light, nitrogen gases	Fish, water plants, Nitrobacter (bacteria)
D	Temperature, light	Water plants, Nitrobacter (bacteria), water, gravel, nitrogen gases

4. Which of the following compounds are made up of carbon, hydrogen and oxygen only?

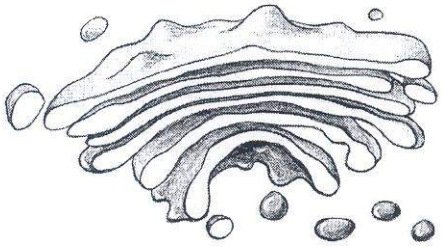
A. Carbohydrates and lipids

B. Lipids and enzymes

C. Carbohydrates and nucleic acids

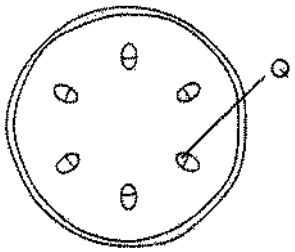
D. Proteins and glucose

5. The function of the organelle shown is



A. Photosynthesis
B. To act as the site of protein synthesis
C. To package cellular secretions
D. Respiration

6. Consider the following diagram of the tissue layout of a plant stem



The part labelled Q

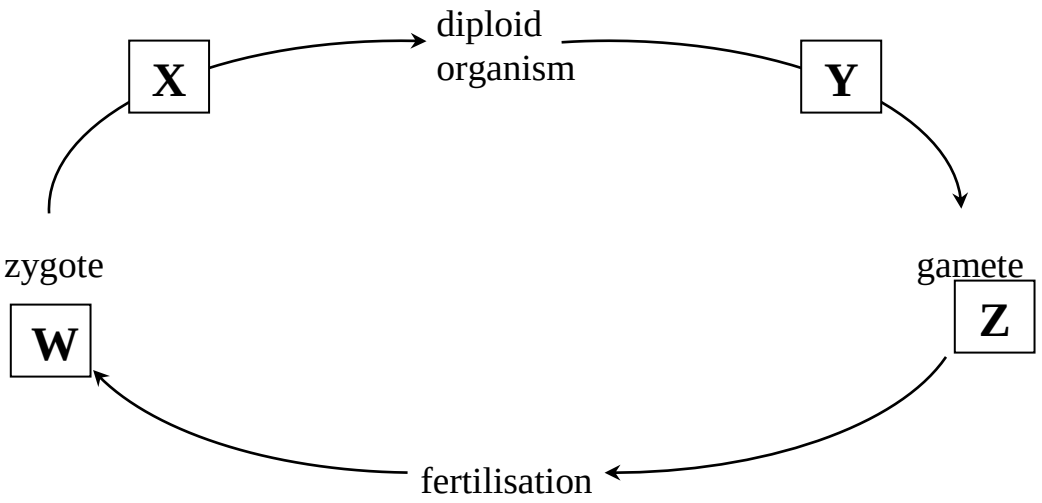
A. Transports water and mineral ions up and down the stem
B. Transports organic substances up and down the stem
C. Transports water and mineral ions upwards to the leaves
D. Transports organic substances downwards to the roots

7. During the process of osmosis in cells

A. Energy is expended
B. Substances such as salts move from an area of high concentration to an area of low concentration
C. Water move across the differentially permeable membrane from the more dilute solution to the more concentrated one
D. Carrier proteins are involved in the transport of substances across the cell membrane

Name:.....

8. Below is a diagram of the lifecycle of a mammal. Choose the answer which correctly labels the diagram of chromosomal condition.



	W	**X**	**Y**	**Z**
A	2n	Meiosis	Mitosis	n
B	2n	Mitosis	Meiosis	n
C	N	Meiosis	Mitosis	2n
D	N	Mitosis	Meiosis	2n

9. Which of the following pieces of evidence does **not** support the statement that "Australia was once part of a landmass called Gondwana"?

   A. Margins of the southern continents match up in a "jigsaw" fit.

   B. The lack of spreading zones between Gondwanan continental plates.

   C. The presence of similar flightless birds on Gondwanan continents.

   D. The rock that forms the ocean is increasingly older the further it is from mid-ocean ridges.

10. Two famous developers of the theory of evolution by natural selection are:

   A. Darwin and Wallace.

   B. Wallace and Lamarck.

   C. Darwin and Wilberforce.

   D. Huxley and Wilberforce

11. Both internal and external fertilisation have their strengths and weaknesses. Internal fertilisation

A. is more beneficial in adapting to the aquatic environment

B. is essential to the survival of species in dry continental areas

C. has no real benefit over external fertilisation in any environment

D. requires less specialised sex organs

12. The text below includes information of expected changes on the Australian continent

1. The Australian continent collides with Asia
2. Biodiversity increases
3. A decrease in the plant and animal gene pool
4. Increases in average temperature in the southern regions
5. Decrease in ocean water levels
6. Increase ice coverage at the poles
7. Spread of introduced species
8. Decrease in arable soil
9. An increase in the population of tall trees

Identify which of the statements would be most likely to occur over the next 100 years

A. 3, 1, 7, 6

B. 7, 8, 5, 9

C. 4, 7, 8, 2

D. 3, 4, 7, 8

13. The Tasmanian tiger or thylacine represents an example of the extinction of a species of an Australian mammal. The most likely cause of the extinction of the thylacine is

A. the activity of early Australians in managing areas of land with fire

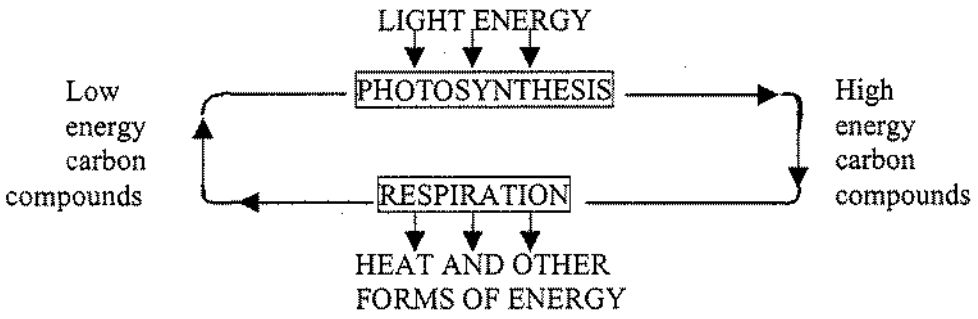
B. hunting since European settlement

C. competition with other species

D. the natural decline in global biodiversity

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14. The diagram illustrates the



A. Cyclic flow of matter and cyclic flow of energy through the ecosystem
B. Cyclic flow of matter and non-cyclic flow of energy through the ecosystem
C. Non-cyclic flow of matter and cyclic flow of energy through the ecosystem
D. Non-cyclic flow of matter and non-cyclic flow of energy through the ecosystem

Section B

Questions 16 – 32

Answer ALL questions in the spaces provided.

16. a) Outline the meaning of the term "trophic interactions". (1 mark)

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b) Describe **one** type of interaction using an example. (3 marks)

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17. The cane toad is an example of an introduced species that was imported to Australia as a means of biological control. Unfortunately is became a pest itself.

Name:.....

a) Outline **two** reasons why an introduced species became a pest, using an example you covered in class. (2 marks)

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b) Describe one effect that this pest species has had in Australia. (2 marks)

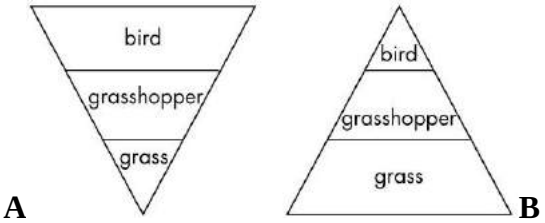
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Study the following two diagrams. Which diagram (A or B) best represents the feeding relationships in a field? Give **one** reasons for your choice. (2 marks)



A **B**

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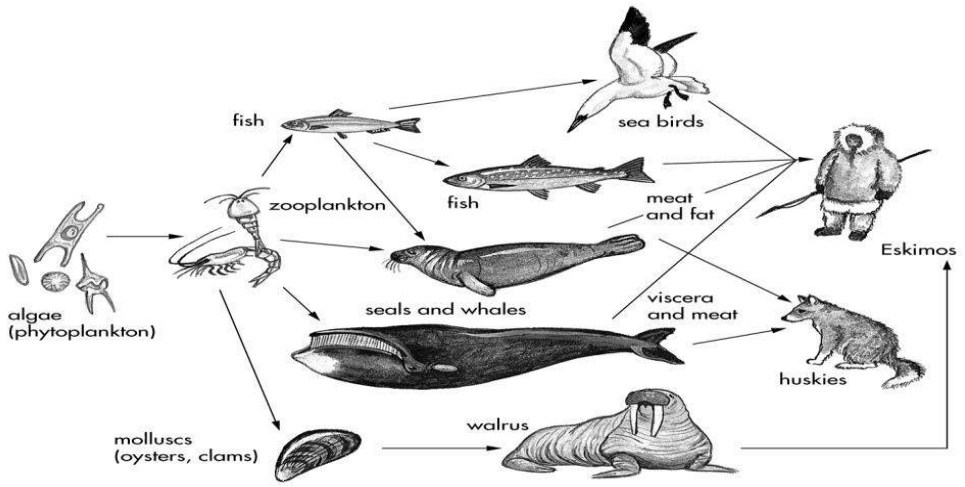
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18. Consider the following food web:

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a) Draw a food chain for this food web that shows a fish in the following positions. (2 marks)

1. Secondary consumer.

2. Tertiary consumer.

b) Use an example from the above food web to explain why complex food webs are more stable than food webs containing only one or two chains. (2 marks)

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19. Explain how transects, capture-mark-recapture or quadrats can be used to estimate the abundance of a population. Use a diagram in your answer. (2 marks)

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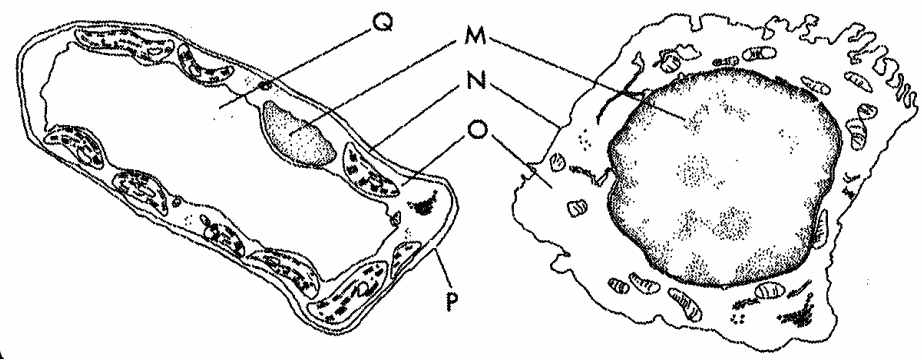
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Name:.....

20. The outline diagrams shown are taken from an electron micrograph of a plant cell and an animal cell.



A **B**

a) Identify the structures M, N, O, and Q. (2 marks)

M	
N	
O	
Q	

b) Which cell represents the animal cell? Explain your answer. (2 marks)

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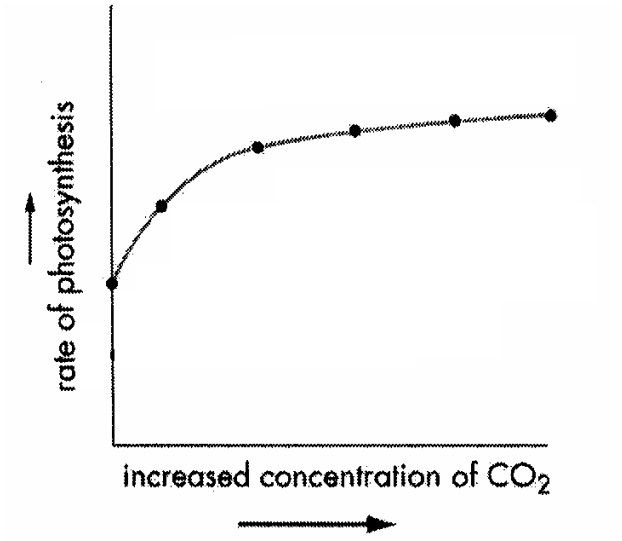
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21. The following graph shows the rate of photosynthesis in a sunflower leaf exposed to increasing carbon dioxide concentration.



a) Write out the general word equation for the process of photosynthesis. (1 mark)

b) Describe the effect of increasing the concentration of carbon dioxide on the rate photosynthesis. (2 marks)

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22. Transporting water to all parts of a plant is essential for a plants survival.

a) **Outline** a simple experiment you could set up, using celery and food dye to test the hypothesis that "water travels through xylem in an upward direction". Include a diagram in your answer. (3 marks)

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b) Describe the experimental results that would support the above hypothesis (1 mark)

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23. Gas exchange is a process that needs to be carried out by all living things.

a) Name the organs of gas exchange in: (2 marks)

I. Insects .....

II. Fish .....

III. Amphibians .....

IV. Mammals .....

b) The respiratory surfaces of animals must have particular features that allow efficient gas exchange. Complete the table that relates the structures of the respiratory surfaces to the function of gas exchange. (3 marks)

Feature	**Function**
Relatively large surface area	
Thin, moist walls	
Rich supply of blood	

Name:.....

24. Some Australian mammals have distinctive bands across their hindquarters. It is believed this patterning provides a natural advantage in the form of camouflage. Below is a key that helps classify these mammals.

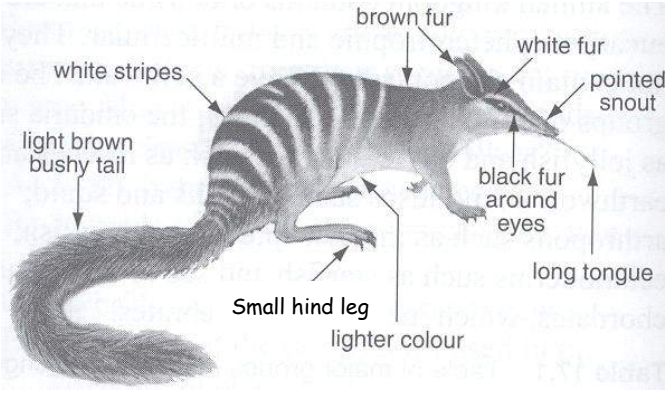
1	(a)	Four legs of similar length	Goto 2
	(b)	Large hind hopping legs	Goto 3
2	(a)	Brown fur with dark stripes across lower back and tail	*Thaylacinus cynoceohalus*
	(b)	Brown fur with white stripes, found in woodland and jarrah forests	*Myrmecobius fasciatus*
3	(a)	Grey or brown fur, up to 4 kg, small swift with slender build	*Lagostrophus fasciatus*
	(b)	Larger than 4 kg	Goto 4
4	(a)	Grey fur, able to travel at high speed and make unpredictable jumps	*Macropus greyi*
	(b)	Sandy-brown colour with white hip stripe and short ears	*Macropus agilis*

a) Explain the need for scientists to classify organisms (2 marks)

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b) The diagram shows details of the body and colouring of a numbat. What is the scientific name of the numbat? ..... (1 mark)



c) Identify 3 characteristics that could be used to identify the *Macropus agilis*. (3 marks)

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25. You have performed a first-hand investigation to gather information of examples of variation in at least two species of living organism. Outline **two** characteristics that showed variation.

(2 marks)

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26. a) Draw a **table** to show **two** differences between the processes of mitosis and meiosis.(3 marks)

b) Describe **one** way in which sexual reproduction increases variation within a species.

(2 marks)

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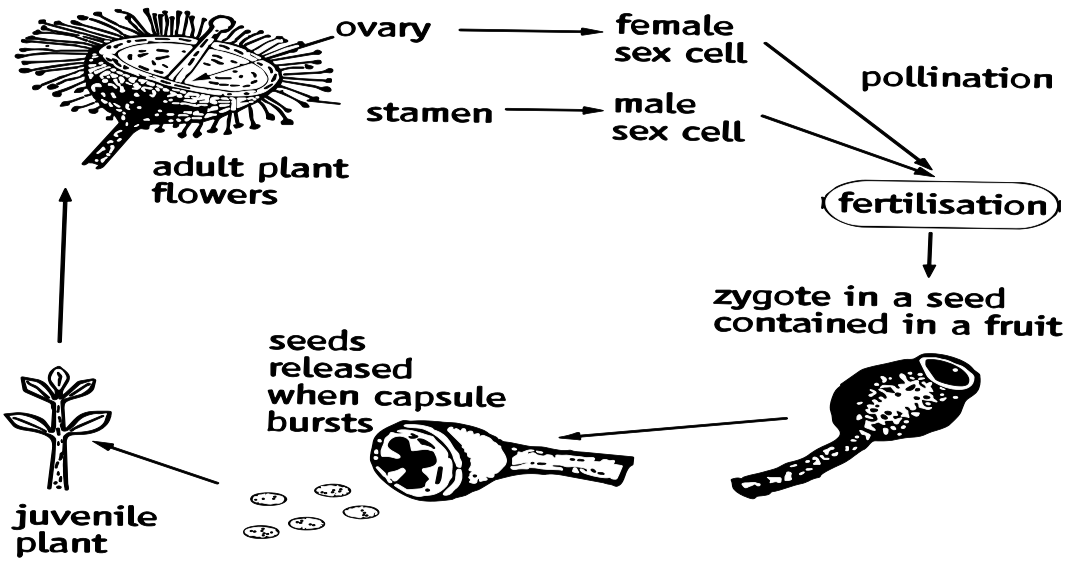
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27. The following is a diagram of the lifecycle of *Eucalyptus pillularis*



In some eucalypts the trigger to release seeds may be drought, fire or death of the plant.

a) Define **pollination** (1 mark)

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b) Explain how the release of seeds after fire may be an adaptation that contributes to the success of the *Eucalyptus pillularis* species. (2 marks)

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Name:.....

28. Many Australian animals have developed mechanisms to ensure the survival of the embryo and the young after birth.

a) Identify one Australian animal that has developed such a mechanism (1 mark)

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b) Describe a mechanism that it uses. (2 marks)

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c) Explain how this adaptation has improved the survival potential of the species in the Australian environment (2 marks)

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Name:.....

29. Define the term megafauna. (1 mark)

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30. Explain the two theories that could account for the disappearance of Australia's megafauna.

(4 marks)

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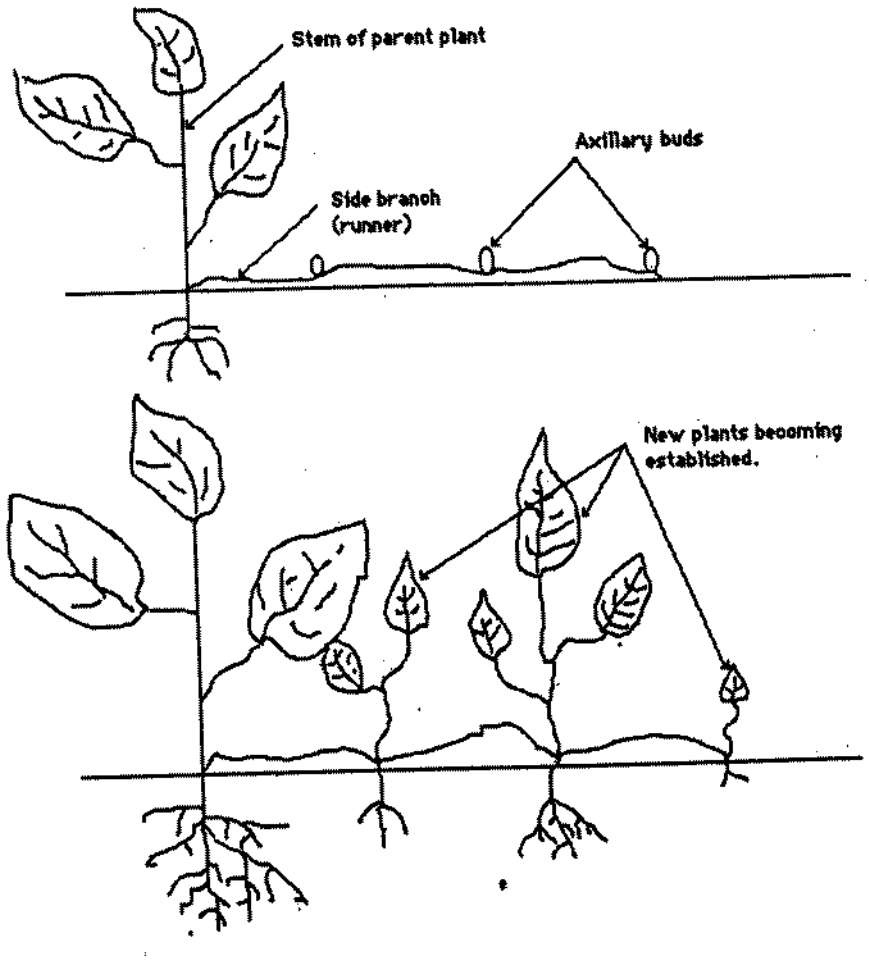
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31. The following diagram represents a form of reproduction carried out by numerous Australian plants.



a) Identify the reproductive process that is taking place. (1 mark)

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b) Explain one disadvantage of this reproductive process. (2 marks)

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---------- END OF EXAMINATION ----------