

Name: \_\_\_\_\_  
AB ABg CC PG AM SML

Miss A. Brownlee (AB)

Ms A Burgess (ABg)

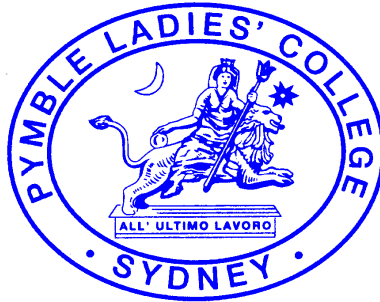
Mrs C. Chambers (CC)

Ms P Gallardo (PG)

Ms A Macdonald (AM)

Dr S Malaney (SML)

**Circle your teacher's name  
on each page**



Pymble Ladies' College

Year 11 Biology

Semester 2, 2005

Time allowed 2 ¼ hours

Directions to Candidates:

All questions are compulsory.

**This paper is in two parts, with a total of 80 marks.**

Section A                    16 one-mark multiple choice questions. Select only one suggested answer. Indicate all answers on the Answer Sheet provided, using a pencil.

Tear Answer Sheet off the back of the paper.

Section B                    Questions 17-29, representing written response questions worth a total of 60 marks.

Answer all questions in the spaces provided.

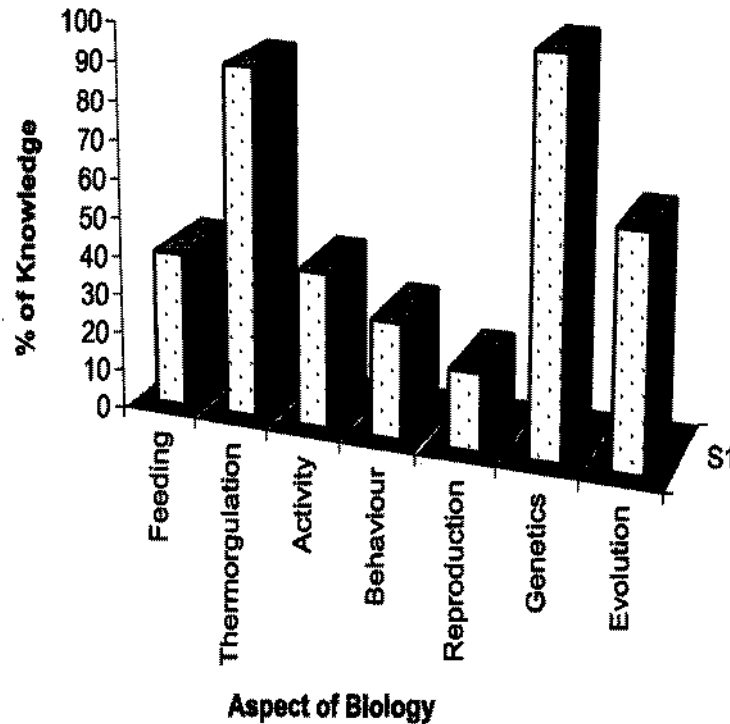
**Note: Section A constitutes 1/5 of the marks on this examination. Allocate your time accordingly.**

Please write your name on this page, on the answer sheet and on **EACH** page of Section B as well as circling your teacher's name



3. The change from an anoxic to an oxic atmosphere was significant in the evolution of living things as it allowed:
- (A) animals to move onto land as the Earth cooled
  - (B) the development of organisms
  - (C) the number of anaerobic organisms to increase
  - (D) the formation of a protective layer of ozone around the Earth.
4. The Murchison meteorite hit the Earth in 1969 in Victoria. It contained many amino acids. This find supports the theory that :
- (A) simple terrestrial life has been found in hostile environments
  - (B) violent conditions of early Earth could produce amino acids
  - (C) the chemicals for life on Earth may have come from outer space
  - (D) organic molecules can develop over time.
5. Darwin proposed his Theory of Natural Selection to account for the evolution of species on Earth. Which of the following statements DOES NOT represent a key point in this theory?
- (A) There is variation within a species.
  - (B) Organisms in a population that have favourable characteristics have a greater chance of survival and reproduction compared to those individuals without those characteristics.
  - (C) Individuals that develop favourable variations during their lifetime are more likely to survive and reproduce.
  - (D) Favourable characteristics gradually become more common in a population.
6. When studying rock formations it is found that the folded mountain ranges at the Cape of Good Hope, South Africa match rocks of the same age and type of mountain forming at Buenos Aires, Argentina. What does this show?
- (A) Africa and South America were joined when these rocks formed
  - (B) Rock formation processes are uniform worldwide
  - (C) Plate convergence
  - (D) Mid-ocean ridge splits continents

7. The graph below shows an estimate of the percentage of current knowledge of various aspects of the biology of the platypus **that resulted** from the use of technology.



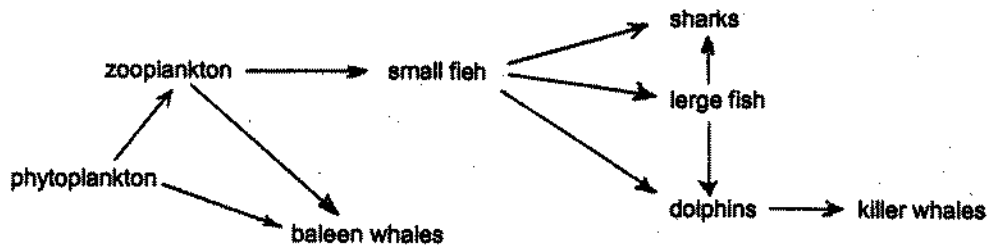
This graph suggests that:

- (A) before technological advances nothing was known about the biology of the platypus.
  - (B) the behaviour of the platypus was completely understood before the use of technology
  - (C) the genetics of the species was practically unknown until the technologies needed to study it were developed
  - (D) technological advances have shown that the genetics and thermoregulation of the platypus are much more important than other aspects of its biology.
8. The work of palaeobiologists (scientists which study fossils) in building a picture of the long-term changes that have occurred in Australian ecosystems is important because it:
- (A) Contributes to our understanding of the evolution of endemic (native) species of plants and animals.
  - (B) Enables us to predict the impact of human activity in our present-day environment.
  - (C) Helps us to plan appropriate management strategies to protect endangered species.
  - (D) All of the above

9. Which of the following only include abiotic factors?

- (A) light, population , temperature, rainfall
- (B) Light, salinity, pH, oxygen availability
- (C) Substrate, water movement, predation, pH
- (D) Predation, pathogens, grazing pressure

10. The diagram below shows a marine food web



Which of the following correctly identifies a first and second order consumer?

	First order consumer	Second order consumer
<b>A</b>	Phytoplankton	Zooplankton
<b>B</b>	Baleen whales	Small fish
<b>C</b>	Small fish	Large fish
<b>D</b>	Baleen whales	Killer whales

11. Some people think of bacteria as “an unnecessary evil”. However, in the functioning and maintenance of any ecosystem their ability to decompose organic material is very important because they-
- (A) Kill all the weak organisms thus helping to maintain healthy populations.
  - (B) Provide energy so that it may be recycled through the food web.
  - (C) Carry out the recycling of matter through the food web.
  - (D) Control the input and output of matter and energy in the ecosystem.
12. Which of the following statements best defines an ecosystem?
- (A) An area where there is a complex association of organisms and their environment.
  - (B) The interrelationships between plants and animals in an area.
  - (C) The environmental factors which affect the area.
  - (D) The biomass of all the organisms in a community.
13. The movement of water entering and leaving a plant follows the sequence of:
- (A) stomates, phloem, roots
  - (B) root hairs, xylem, stomates
  - (C) root hairs, xylem, chloroplasts
  - (D) root hairs, phloem, stomates
14. Which of the following is true about an open circulatory system compared to a closed circulatory system?
- (A) Only closed circulatory systems have a pumping heart.
  - (B) The fluid in a closed circulatory system is pumped at a higher pressure than an open circulatory system.
  - (C) In a closed circulatory system the intracellular fluid and the circulating fluid are identical
  - (D) An open circulatory system is more efficient than a closed circulatory system.

15. A biologist was studying a slide of unlabelled plant tissue. The tissue consisted of long tubes which had sieve plates on the side walls. Which tissue was the student most likely studying?

- (A) xylem vessel cells
- (B) guard cells
- (C) phloem sieve tubes
- (D) lenticels

16. Which method would be the most suitable to trace the movement of sugars in phloem?

- (A) radioactive tracers
- (B) eosin dye
- (C) observation under a light microscope
- (D) DNA sequencing

**Section B**

**Total marks 60**

**Attempt Questions 17 - 29**

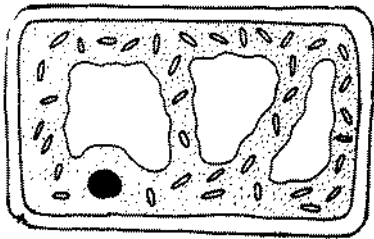
Answer all Questions in the spaces provided

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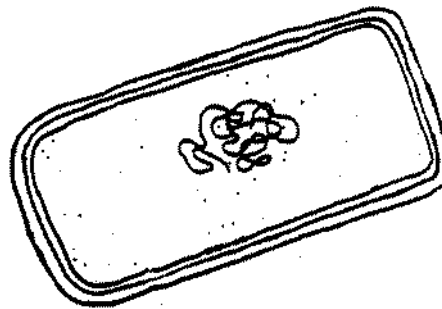
**Question 17 (6 marks)**

Below are two diagrams showing a bacterial cell and a plant cell.

**A**



**B**



a) Which diagram shows the bacterial cell? (1 mark)

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b) Outline ONE major difference between a procaryotic cell and a eucaryotic cell. (2 marks)

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c) Apart from the example given in the diagram, identify one other major group of organisms that has eucaryotic cells. (1 mark)

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d) Describe a technological advance which has increased our knowledge of procaryotic organisms. (2 marks)

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**Question 18 (4 marks)**

Describe TWO pieces of evidence that support the assertion that Australia was once part of a landmass called Gondwana. (4 marks)

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**Question 19 (5 marks)**

The fossil record suggests that primitive amphibians inhabited the swamps of Australia in the Devonian Period (408-360 million years ago). However, the first truly successful terrestrial vertebrates were the reptiles, documented by fossils from the Carboniferous (306-286 million years ago). This success was partly due to the evolution of structures which allowed internal fertilisation.

a) Outline the difference between internal and external fertilisation. (2 marks)

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b) State why internal fertilisation is an advantage in a terrestrial environment. (1 mark)

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c) Explain why external fertilisation requires the production of huge numbers of sperm and ova. (2 marks)

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**Question 20 (2 marks)**

“Biodiversity is the variety of all life forms: the different plants, animals and micro-organisms, their genes and the ecosystems of which they are a part.” (Environment Australia (2003) *Biodiversity Homepage*, at <http://www.ea.gov.au/biodiversity> Accessed on 4/8/2003).

Outline TWO reasons why we need to maintain biodiversity. (2 marks)

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**Question 21 (5 marks)**

During your study of Evolution of Australian Biota you carried out a first hand investigation on native species of flowering plants to identify features that may be adaptations for wind and insect/bird/mammal pollination.

For ONE of the Australian plants that you have studied -

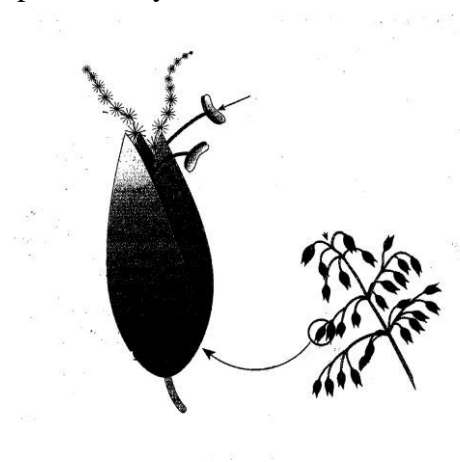
a) Name the plant species and identify its method of pollination. (2 marks)

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b) Use the diagram of the flower below to answer the next TWO questions.

i) On the diagram label ONE feature of this flower that aids in pollination. (1 mark)

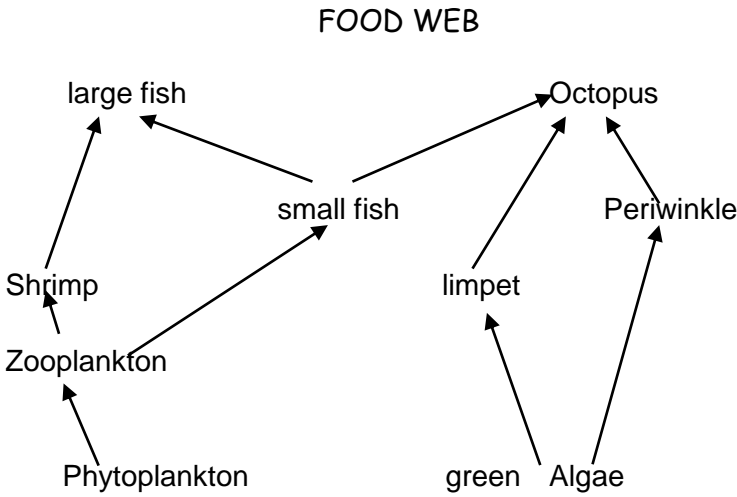
ii) Explain how your labelled feature aids in pollination. (2 marks)



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**Question 22 (7 marks)**

A study of a large saltwater pond by an ecologist produced the following data about the feeding relationships and relative abundance of organisms within the ecosystem.



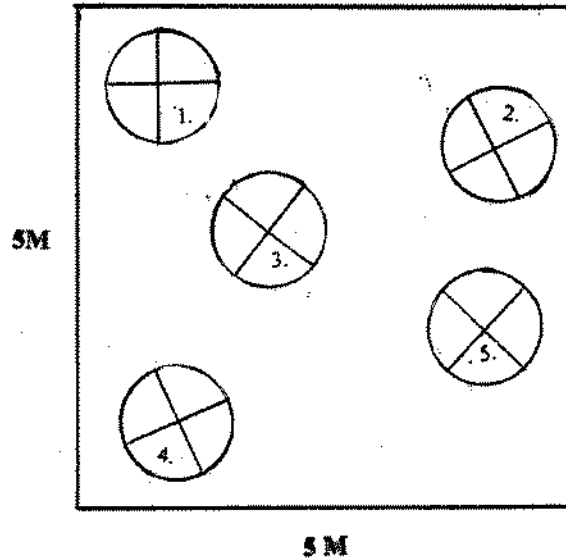
ABUNDANCE OF ORGANISMS	
Organism	Abundance (mass per m <sup>2</sup> of water)
Phytoplankton	.70 kg
Green algae	.25 kg
Zooplankton	.15 kg
Limpet	.05 kg
Periwinkle	.10 kg
Shrimp	.12 kg
Small fish	.03 kg
Large fish	.01 kg
Octopus	.04 kg

- a) What is the biomass of an ecosystem? (1 mark)
- .....
- .....
- b) A food chain can be represented as a biomass pyramid. Describe what is indicated by the pyramidal shape. (2 marks)
- .....
- .....
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- .....
- c) In the space below, draw a biomass pyramid for any one food chain (containing four different organisms) in the above food web, using the data supplied. (3 marks)

- d) Outline ONE consequence on the other members of the food web if the octopus population died out. (1 mark)
- .....
- .....

**Question 23 (6marks)**

Refer to the diagram to answer this question.



A plot of farming grassland (5m X 5m) was being examined by scientists for the distribution and abundance of cicadas, dung beetles, and birds. In the upper left of the plot is compost of gardening scraps and sheep manure and in the upper right corner is a large camphor laurel tree. The quadrats used were circular divided into quarters. The full circle (quadrat) covered 0.33m<sup>2</sup>.

The following table gives the results of their findings.

<i>Quadrat</i>	<i>Cicadas</i>	<i>Dung Beetles</i>	<i>Birds</i>
1	8	15	0
2	5	3	2
3	9	6	1
4	12	2	1
5	11	2	0

- a) Calculate the average number of cicadas per quadrat in this sample. Show working. (2 marks)

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*Question 23 continued on next page*

b) What is the estimated total population of cicadas in this plot of grassland? Show working. (2 marks)

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c) Why do the dung beetles have such a large population in the upper left corner? (1 mark)

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d) Why do both insects have a low population in the upper right corner? (1 mark)

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**Question 24 (3 marks)**

a) Define viscosity (1 mark)

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b) Explain why many aquatic animals have a more streamlined body shape than land animals. (2 marks)

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**Question 25 (7 marks)**

The rate of photosynthesis in a particular plant species was measured by the uptake of carbon dioxide at different temperatures. The following results were obtained.

TEMPERATURE (°C)	RELATIVE RATE OF CARBON DIOXIDE UPTAKE
15	15
20	20
25	25
30	30
35	35
40	35
45	25
50	10
55	0

a) Write the word equation for photosynthesis (1mark)

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b) Identify a factor that effects the rate of photosynthesis (1 marks)

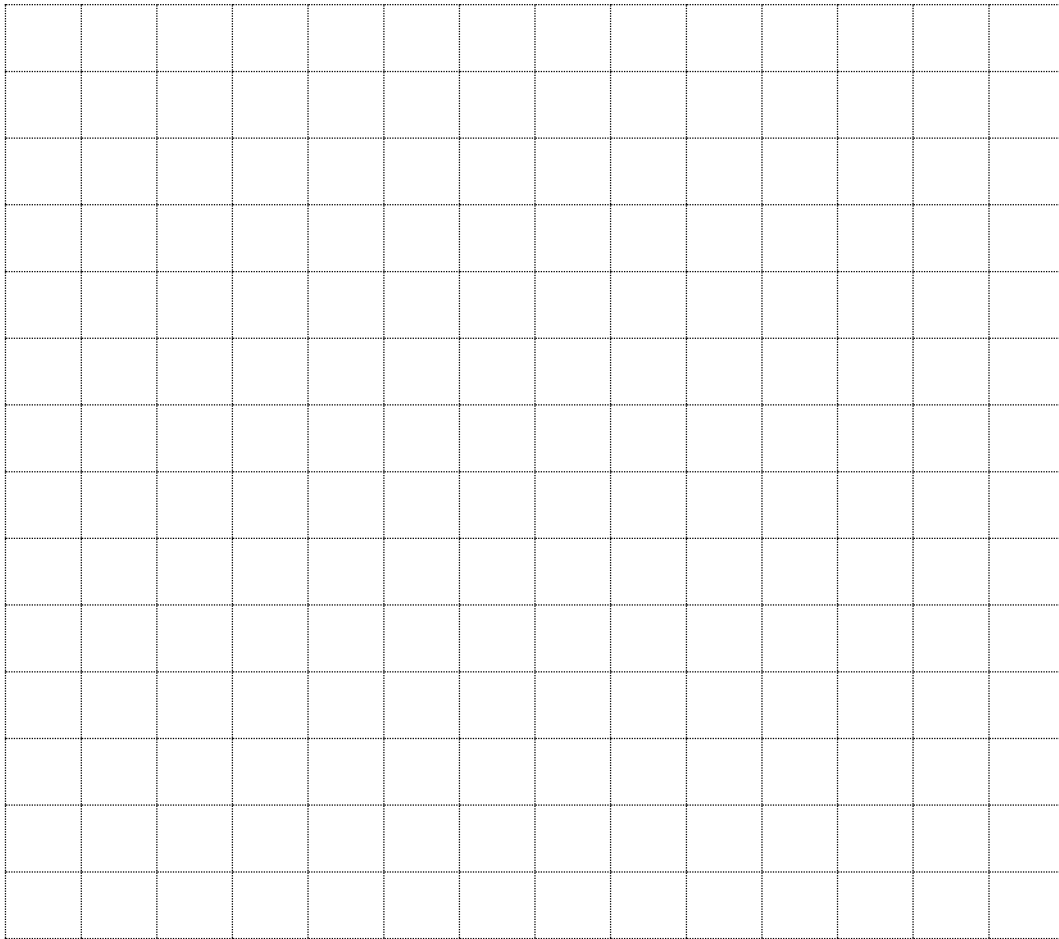
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c) Explain how this factor effects the rate of photosynthesis (2 marks)

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*Question 25 continues on the next page*

- d) Use the grid provided to draw a graph showing the relationship between carbon dioxide uptake and temperature. (3 marks)



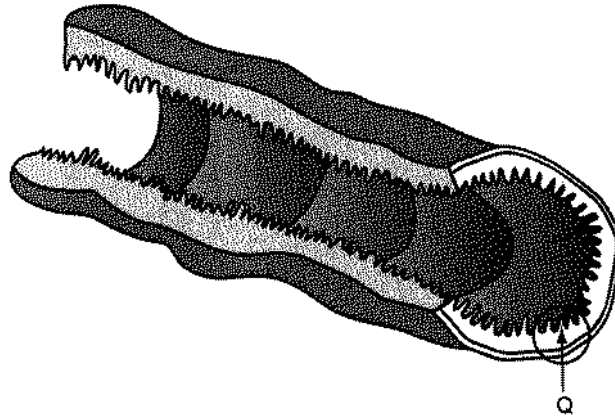
**Question 26 (4marks)**

Complete the following table by stating the different gas exchange surfaces in multicellular animals.

Name of organism	Gas exchange surfaces
<b>Insect</b>	
<b>Fish</b>	
<b>Frog</b>	
<b>Mammal</b>	

**Question 27 (5 marks)**

The diagram shows part of the small intestine.



a) Name the small projection labelled 'Q'? (1mark)

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b) State the function of structure 'Q'. (1 mark)

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c) The diet of the animal determines several features of their digestive tracts. Outline the differences in length between the digestive tract of a carnivore, nectar feeder and herbivore.

(3 marks)

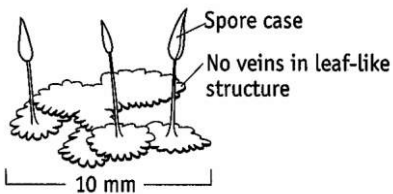
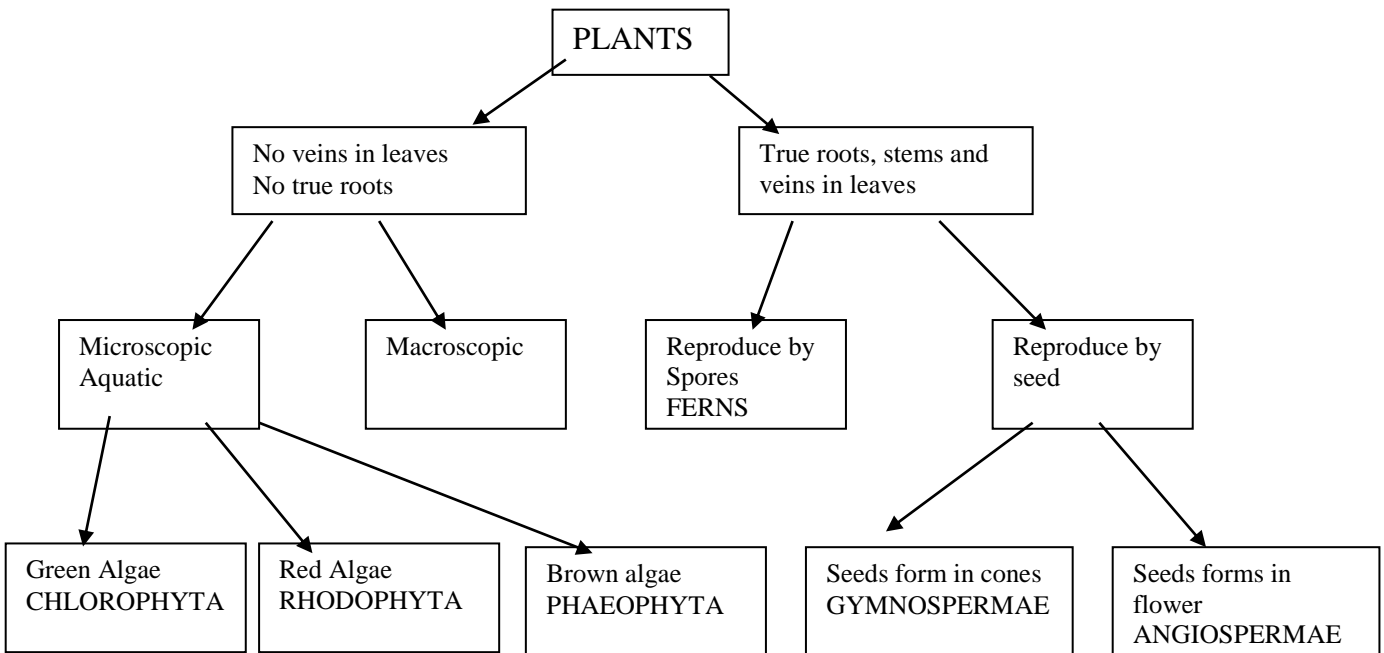
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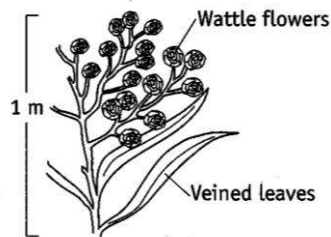
**Question 28 (6 marks)**

Identify Plant X and Plant Y using the key provided

(2 marks)



PLANT X



PLANT Y

Plant X - .....

Plant Y - .....

a) For each plant, write a list of the characteristics you used for identification (2 marks)

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*Question 28 continues on the next page*

b) The following table shows the classification of some Australian flowering plants.

	<b>Red Mahogany</b>	<b>Cabbage Tree palm</b>	<b>White box</b>
<b>Flowering plants</b>	Angiospermae	Angiospermae	Angiospermae
<b>Class</b>	Dicotyledon	Monocotyledon	Dicotyledon
<b>Family</b>	Myrtaceae	Palmae	Myrtaceae
<b>Genus</b>	<i>Eucalyptus</i>	<i>Livistona</i>	<i>Eucalyptus</i>
<b>Species</b>	<i>Resinifera</i>	<i>australis</i>	<i>Albens</i>

Of the plants listed in the table, which are most closely related? Explain your reasoning.

(2marks)

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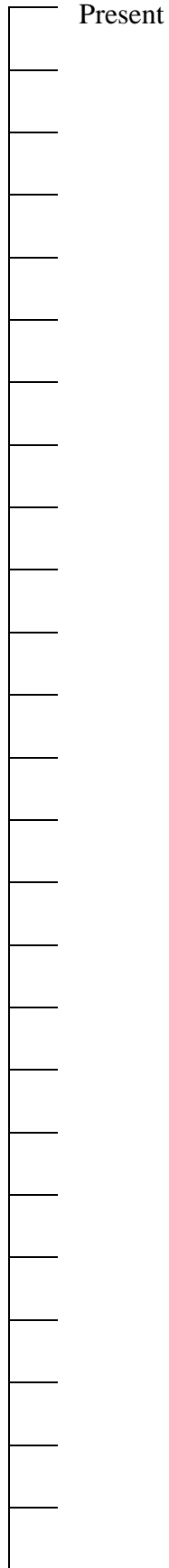
**Question 29 (4 marks)**

Using dates of known fossils, it is possible to construct a timeline to show how life on Earth has changed and the relative times at which this occurred. Use the following data to construct a **scaled** timeline for these events. (4 marks)

<b>Time (thousands of years ago)</b>	<b>Event</b>
<b>250</b>	Polar Bear (newest species of bear) evolves from an isolated high latitude population of Brown Bears.
<b>130</b>	<i>Homo neanderthalensis</i> (Neanderthal man) evolves from <i>Homo heidelbergensis</i> and lives in Europe and the Middle East.
<b>15</b>	The last Ice Age ends. Sea levels across the globe rise, flooding many coastal areas, and separating former mainland areas into islands.
<b>100</b>	The first anatomically modern humans ( <i>Homo sapiens</i> ) appear in Africa.

*Question 29 continued on next page*

# Timeline



(Use Centre line as a margin for your time line)

***END OF PAPER***