

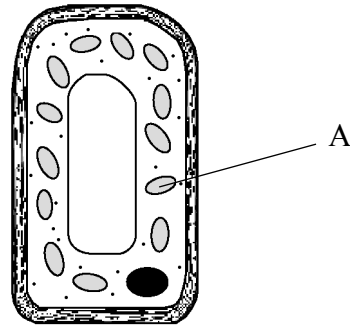
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mock papers 1-foundation

1. The diagram shows a plant cell.



(a) Put a cross (☒) in the correct box to complete the following sentence.

Part A is a

chloroplast

nucleus

vacuole

(1)

(b) Draw **one** straight line from each part of a plant cell to its function.
One has been completed for you.

part of plant cell

function

cell wall ●

● gives the cell strength and makes it rigid

cell membrane ●

● where most cell chemicals are made

nucleus ●

● controls what the cell does

cytoplasm ●

● controls what substances go into and out of the cell

(3)

Q1

(Total 4 marks)

2. David and Lorraine climbed to the top of a mountain and rested for an hour.



Use words from the box to complete the following sentences.

carbon dioxide	faster	white
oxygen	slower	red

Even though they had rested for an hour, David noticed that Lorraine's rate of breathing was still than usual.

This is because there is less in the air compared with the air at lower levels.

They decided to camp at the top of the mountain for a week.

During the week their bodies changed to help them cope with the high altitude. One change was that the number of their blood cells increased.

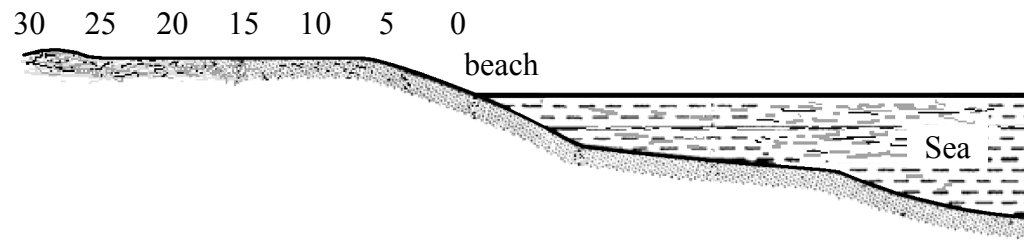
Q2

(Total 3 marks)

Turn over

3. Sandeep and Mollie are studying the plant species growing near the sea. They recorded the number of plant species per square metre at seven places on a sandy beach. Each place is five metres further away from the sea.

places and distance from the sea in metres



Here are their results

distance from sea (m)	0	5	10	15	20	25	30
number of plant species per square metre	0	3	7	11	18	17	18

- (a) Complete the sentence to describe the patterns shown in the data.

As the distance from the sea increases.....

.....

(2)

- (b) Suggest a reason to explain this pattern.

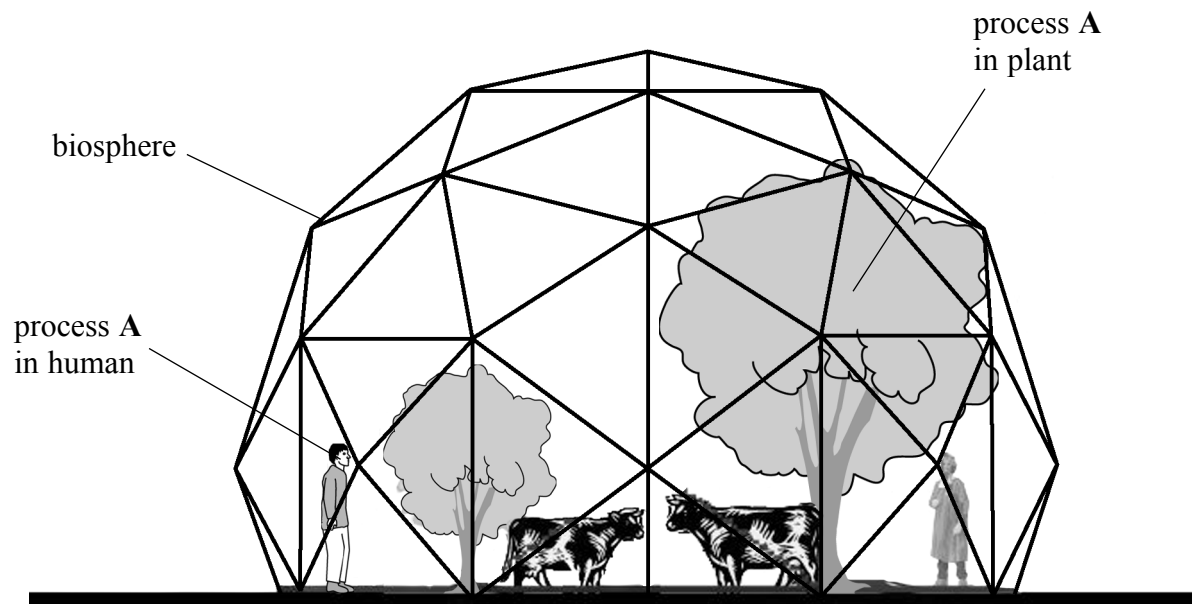
.....

(1)

Q3

(Total 3 marks)

4. A biosphere is an enclosed building that can be used to let humans live on a planet like Mars.
The diagram shows part of the carbon cycle in a biosphere.



- (a) Name process A which produces carbon dioxide.

..... (1)

- (b) The concentration of the different gases in the air in the biosphere is measured regularly.

Suggest **two** ways that the concentration of carbon dioxide could be reduced.

1

.....

2

..... (2)

- (c) When waste materials decay, carbon dioxide is released.

Name a type of organism that causes decay.

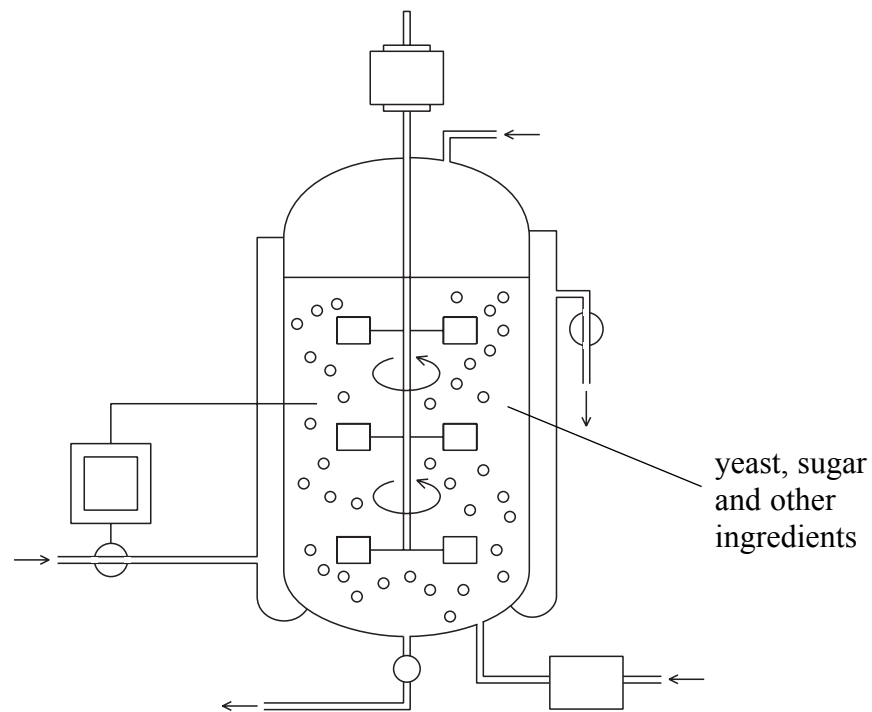
..... (1)

(Total 4 marks)

Q4

Turn over

5. A brewery uses the microorganism called yeast as part of the process to make beer.



(a) Name **one** ingredient, other than yeast or sugar, that would be added to the fermenter.

.....
(1)

(b) Microorganisms, like yeast, use an external food source to obtain energy. This changes some of the substances in the medium to useful products. Name this process.

.....
(1)

(c) State **two** advantages of using microorganisms for food production.

1

.....

2

.....

(2)



(d) At the end of the beer making process, waste yeast is collected and sold.
Yeast contains high levels of vitamin B.

(i) Why is yeast said to be a waste product at the end of the brewing process?

.....
.....

(1)

(ii) Suggest a way that the waste yeast may be used after it is sold.

.....
.....

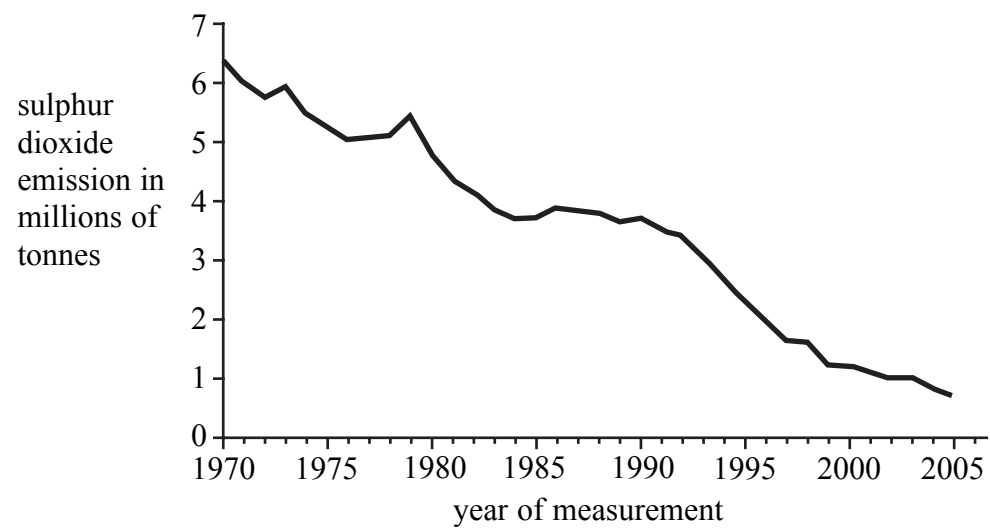
(1)

Q5

(Total 6 marks)

Turn over 

6. The graph shows how sulphur dioxide emissions by human activity have changed in the UK between 1970 and 2005.



(a) Describe the pattern in sulphur dioxide emissions between 1970 and 2005.

.....
.....
(1)

(b) How is sulphur dioxide produced by human activity?

.....
.....
(1)

(c) Describe how sulphur dioxide can become acid rain and how this affects the environment.

.....
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(3)

(Total 5 marks)

Q6

7. Richard has found lots of blanket weed in a local pond.
Blanket weed is a kind of algae.



- (a) Blanket weed grows when there is too much nitrate in the water.
Suggest a possible source of the nitrate.

.....
.....

(1)

- (b) The blanket weed grows at the surface of the water.
What effect might this have on the plants at the bottom of the pond?

.....
.....
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.....
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(2)



(c) Eventually the blanket weed will die, sink to the bottom and rot.
What effect will this have on the pond environment?

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(2)

Q7

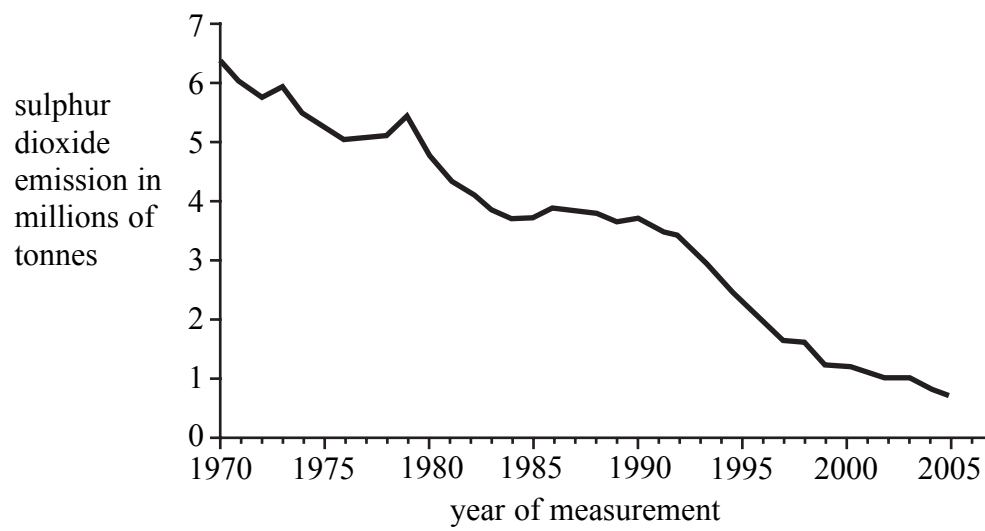
(Total 5 marks)

TOTAL FOR PAPER: 30 MARKS

END

mock papers 2-higher

1. The graph shows how sulphur dioxide emissions by human activity have changed in the UK between 1970 and 2005.



(a) Describe the pattern in sulphur dioxide emissions between 1970 and 2005.

.....
.....
(1)

(b) How is sulphur dioxide produced by human activity?

.....
.....
(1)

(c) Describe how sulphur dioxide can become acid rain and how this affects the environment.

.....
.....
.....
.....
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.....
.....
.....
.....
(3)

(Total 5 marks)

Q1

Turn over

2. Richard has found lots of blanket weed in a local pond.
Blanket weed is a kind of algae.



- (a) Blanket weed grows when there is too much nitrate in the water.
Suggest a possible source of the nitrate.

.....
.....

(1)

- (b) The blanket weed grows at the surface of the water.
What effect might this have on the plants at the bottom of the pond?

.....
.....
.....
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(2)

(c) Eventually the blanket weed will die, sink to the bottom and rot.
What effect will this have on the pond environment?

.....
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.....

(2)

Q2

(Total 5 marks)

Turn over 

3. The International Olympic Committee has banned athletes from using some chemicals, such as growth factors.

(a) (i) What effect do these growth factors have on the body?

.....
.....

(1)

(ii) Why might some athletes be tempted to take growth factors?

.....
.....

(1)

(b) Give **two** harmful side-effects that using growth factors can have on the body.

1

2

(2)

(c) Why do many people have ethical concerns about athletes using growth factors?

.....
.....

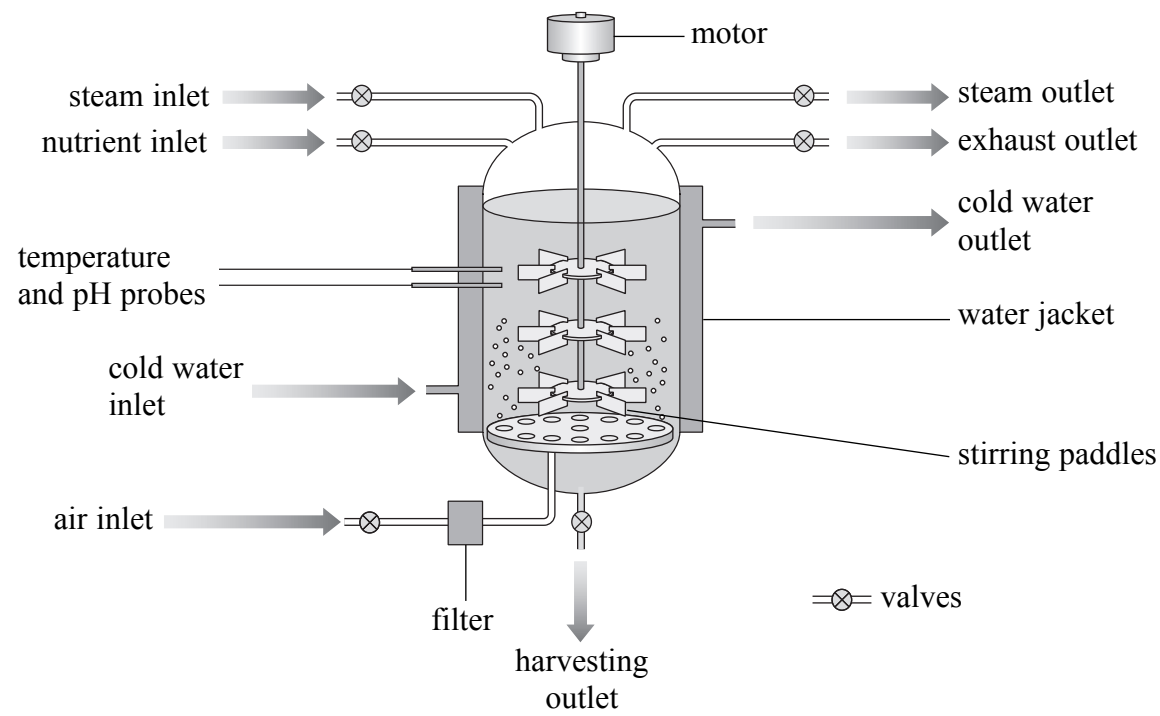
(1)

(Total 5 marks)

Q3

Turn over 

4. An industrial fermenter is designed to provide optimum conditions for the growth of microorganisms.



(a) The inside of the fermenter is sterilised before it is used.
Why are aseptic precautions necessary?

.....
.....
.....

(1)

(b) (i) Why is the air filtered before it is pumped into the fermenter?

.....
.....

(1)

(ii) Why would the fermenter be supplied with air?

.....
.....

(1)

(c) How are conditions inside the fermenter monitored?

.....

.....

(1)

(d) Why are the conditions inside the fermenter controlled?

.....

.....

(1)

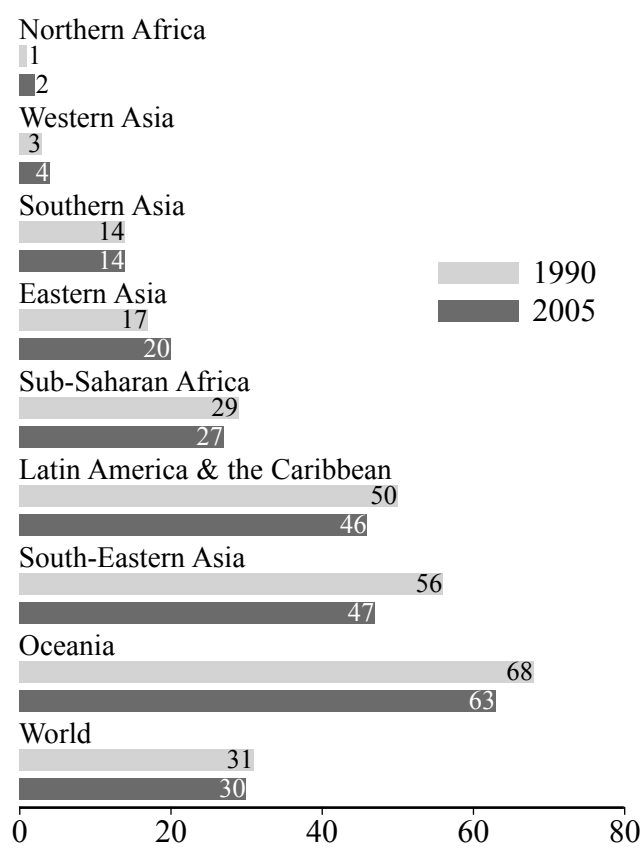
Q4

(Total 5 marks)

Turn over 

5. The human population of the world is increasing by about 3 people every second. One effect of this increasing population is more deforestation. The diagram shows how the amount of forest has changed between 1990 and 2005 in different parts of the world.

Percentage of land covered by forest



- (a) (i) In how many regions are forests increasing?

..... (1)

- (ii) In which region did the highest percentage of deforestation take place?

..... (1)

(b) Describe the impact of deforestation on the environment.

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(3)

Q5

(Total 5 marks)

Turn over 

6. Dolly the sheep was a cloned mammal.
There are several stages in the cloning process.

(a) The first stage is the removal of an unfertilised egg from a sheep.
What happens to this unfertilised egg in the next stage of cloning?

.....
.....

(1)

(b) Describe the remaining stages in the process of cloning.

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(4)

Q6

(Total 5 marks)

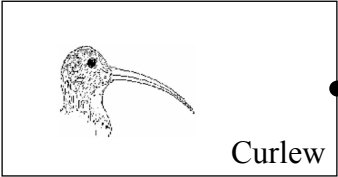
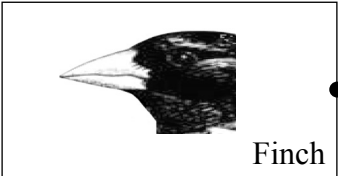
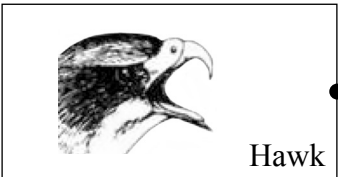
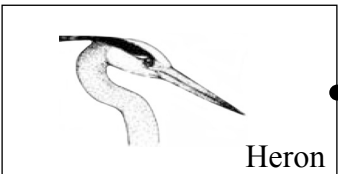
TOTAL FOR PAPER: 30 MARKS

END

mock papers 3-foundation

1. The shape of a bird's beak is linked to the food that the bird eats.

(a) Draw **one** straight line from each bird to the food that is most likely to be eaten. One has been done for you.

bird	food eaten
 Curlew	<input type="checkbox"/> tear strips of meat from a dead animal
 Finch	<input type="checkbox"/> search for shellfish deep in soft mud
 Hawk	<input type="checkbox"/> crack open seeds
 Heron	<input checked="" type="checkbox"/> catch fish

(2)

(b) The picture shows a heron that has caught a fish.



Describe one way, other than beak shape, that the heron is adapted to catch fish.

.....
.....

(1)

Q1

(Total 3 marks)

2. Use words from the box to complete the following sentences about the growth of grass.

carbon dioxide	light	limiting
oxygen	photosynthesis	
respiration	temperature	

In Britain, grass grows more slowly in winter than in summer.

Grass makes glucose by In winter, less glucose is made.

This is because the levels of and

..... are lower than they are in the summer.

When these two conditions reduce the amount of glucose made, they are called

..... factors.

Q2

(Total 4 marks)

Turn over

3. Some glass bottles are washed and reused.
Other glass bottles are recycled.



- (a) What is meant by **recycling**?

.....
.....

(1)

- (b) Suggest how recycling helps the environment.

.....
.....
.....
.....

(2)

- (c) Suggest **one** reason why not all paper can be recycled.

.....
.....

(1)

(Total 4 marks)

Q3

4. In one African country there is a food shortage.
The country next to it has plenty of food.

(a) Suggest **one** reason why food cannot be simply transported from the country with plenty of food to the country with a food shortage.

.....
.....
(1)

(b) It has been suggested that richer countries should give fertilisers to countries with food shortages.

How will supplying fertilisers help people in the countries with food shortages?

.....
.....
(1)

(c) Suggest **one** way that the environment may become polluted if fertilisers are supplied to countries with food shortages.

.....
.....
(1)

(d) It has been suggested that GM crops could help reduce food shortages.

What is the meaning of 'GM'?

.....
.....
(1)

- (e) One problem with food shortages is a lack of vitamin A in the diet. The following table shows the amount of vitamin A in two types of banana and how much vitamin A we need in our diet each day.

	average mass of vitamin A per banana (μg)
GM banana	40
non-GM banana	8
amount needed per day	800

Work out how many GM bananas are needed to supply a person with the amount of vitamin A they need for a day.
Show your working.

..... GM bananas
(2)

- (f) Harry and Emma were discussing GM crops.



State **one** way in which GM crops could damage the environment.

.....
.....

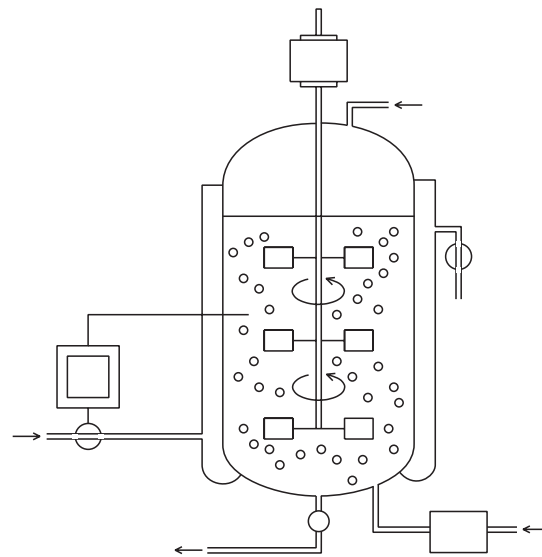
(1)

Q4

(Total 7 marks)

Turn over

5. An industrial fermenter is designed to produce the best conditions for the growth of microorganisms.



Some microorganisms grown in fermenters can be used for food.
Describe the advantages of using microorganisms to produce food, rather than using traditional methods like farming cattle.

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.....

(Total 3 marks)

Q5

6. These athletes are long distance runners.



(a) Explain why their heart rates increase as they run.

.....
.....
.....
.....

(2)

(b) Complete the following word equations for respiration in athletes.

(i) aerobic respiration

glucose + oxygen →

(1)

(ii) anaerobic respiration

glucose →

(1)

(Total 4 marks)

Q6

Turn over

7. A recent news report stated that scientists had taken skin cells from patients and turned the skin cells into stem cells. The report suggests that it will only be a few years before embryonic stem cells will not be needed for treatments.

(a) Explain why embryonic stem cells are useful to scientists.

.....
.....
.....

(1)

(b) Give **two** medical benefits that could result from stem cell research.

1

.....

2

.....

(2)

(c) Explain why some people think that it is wrong to use embryonic stem cells for research.

.....
.....
.....
.....

(2)

Q7

(Total 5 marks)

TOTAL FOR PAPER: 30 MARKS

END

mock papers 4-higher

1. These athletes are long distance runners.



(a) Explain why their heart rates increase as they run.

.....
.....
.....
.....

(2)

(b) Complete the following word equations for respiration in athletes.

(i) aerobic respiration

glucose + oxygen →

(1)

(ii) anaerobic respiration

glucose →

(1)

Q1

(Total 4 marks)

2. A recent news report stated that scientists had taken skin cells from patients and turned the skin cells into stem cells. The report suggests that it will only be a few years before embryonic stem cells will not be needed for treatments.

(a) Explain why embryonic stem cells are useful to scientists.

.....
.....
.....

(1)

(b) Give **two** medical benefits that could result from stem cell research.

1

.....

2

.....

(2)

(c) Explain why some people think that it is wrong to use embryonic stem cells for research.

.....
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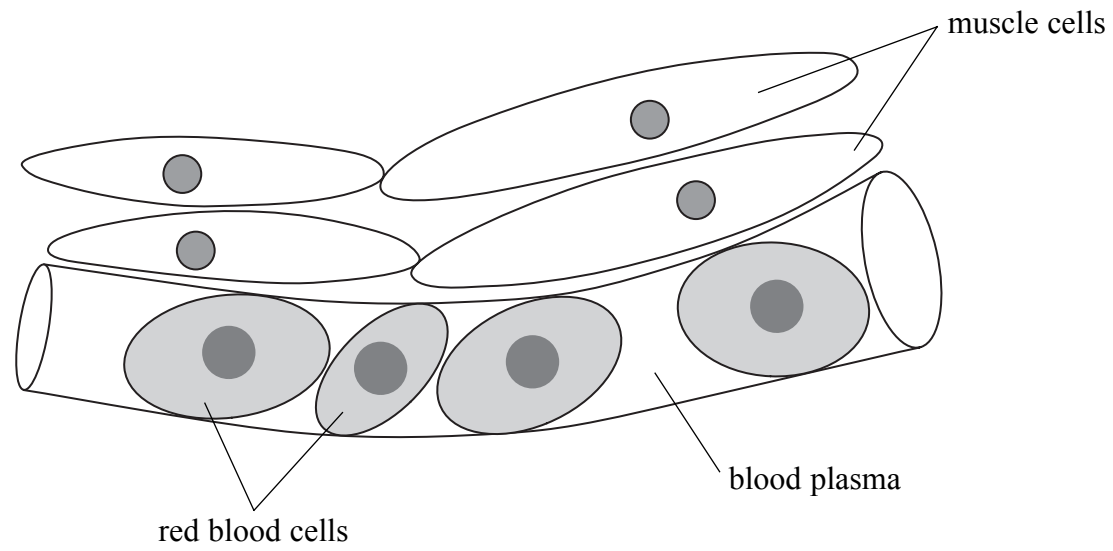
(2)

Q2

(Total 5 marks)

Turn over

3. The diagram shows muscle cells and a blood capillary.



(a) Name the gas that leaves the muscle cell and enters the blood.

..... (1)

(b) Explain how glucose moves from the blood plasma into a muscle cell.

.....
.....
.....
.....
..... (2)

(Total 3 marks)

Q3

4. The photograph shows two different varieties of wheat.
The dwarf wheat plants on the left have been produced by selective breeding.



- (a) Describe the process of selective breeding to produce dwarf wheat plants from normal size wheat plants.

.....
.....
.....
.....
.....

(2)

- (b) Dwarf wheat plants produce a higher yield of wheat grains than plants with longer stems, even when grown under identical conditions.

Suggest **one** reason why the dwarf wheat plants produce a higher yield of wheat grains per plant.

.....
.....
.....

(1)

(c) The dwarf wheat plants have higher tolerance to disease and drought than the normal size wheat plants.

Suggest **two** benefits to the farmer, apart from higher yield, of growing dwarf wheat plants.

.....
.....
.....
.....
.....
.....

(2)

Q4

(Total 5 marks)

Turn over 

5. Root hair cells absorb mineral ions from the soil.



(a) Explain how mineral ions from the soil are absorbed into root hair cells.

.....
.....
.....
.....

(2)

(b) Complete the table.

mineral ion absorbed by the roots	how it is used by the plant
potassium	
	to make chlorophyll
phosphorus	

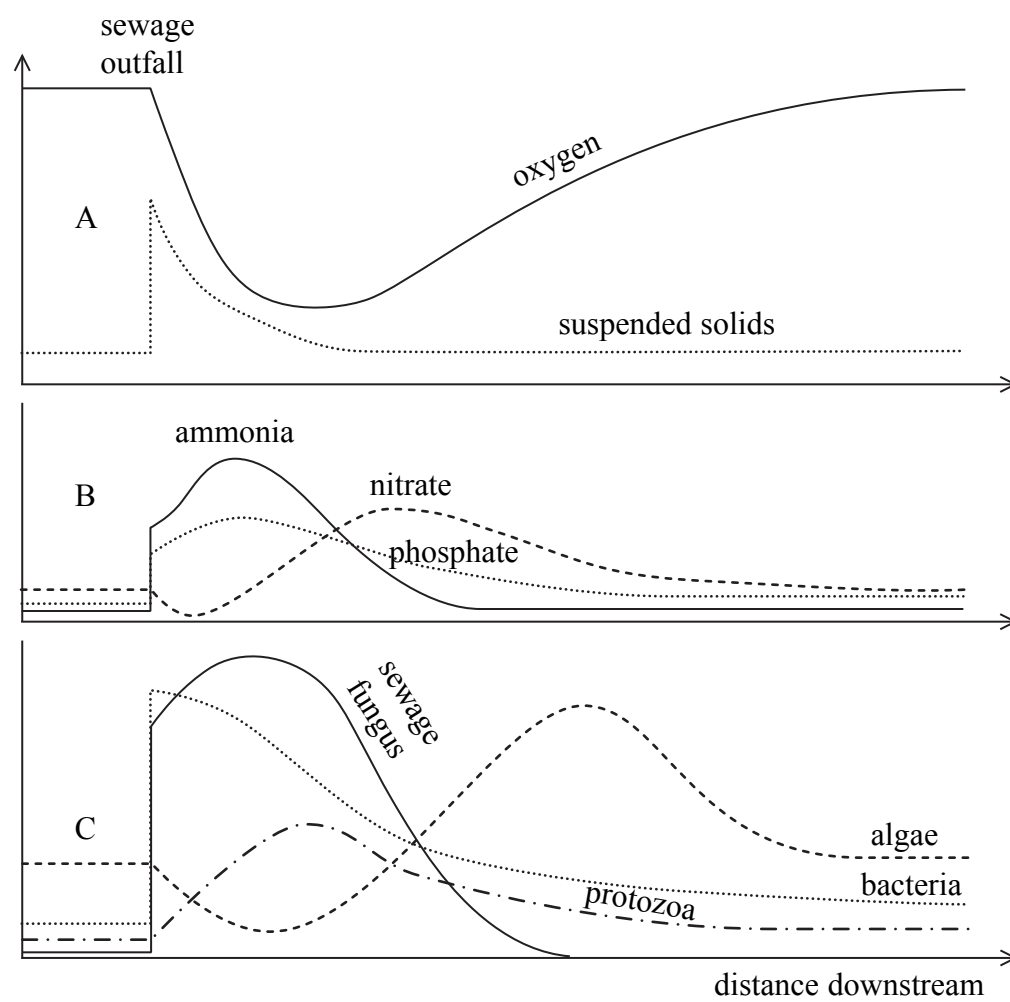
(3)

Q5

(Total 5 marks)

6. A sewage outfall allowed untreated sewage to flow into an unpolluted river. Water quality was measured just above the sewage outfall into the river and then downstream for several hundred metres.

Graph A shows amounts of oxygen and suspended solids in the river water.
Graph B shows amounts of ammonia, nitrate and phosphate in the river water.
Graph C shows numbers of different living organisms in the river water.



The ammonia in the sewage is converted into other substances in a similar way to the action of nitrifying bacteria.

Use the graphs to help you explain what happens to the ammonia in the water and the consequences of this for the organisms living in the water.

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(Total 4 marks)

Q6

Turn over 

7. Human sperm are produced by cell division in the testes.



(a) Name the type of cell division used to produce sperm.

..... (1)

(b) Describe how this type of cell division to produce sperm is different from the cell division to produce normal body cells.

.....
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..... (3)

(Total 4 marks)

Q7

TOTAL FOR PAPER: 30 MARKS

END

1. Tigers are predators.



(a) Describe how the named structures help tigers survive.

(i) Pointed teeth

.....
.....
(1)

(ii) Large muscular back legs

.....
.....
(1)

(iii) Striped coat

.....
.....
(1)

(b) A species of tiger used to be found on Java, a large island near Australia.
Suggest **two** reasons why this tiger is now extinct.

.....

.....

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.....

.....

.....

(2)

Q1

(Total 5 marks)

2. When certain substances are in excess, they can become pollutants and cause environmental problems.

Draw one straight line from each pollutant to the environmental problem it causes.

pollutant

environmental problem

carbon dioxide ●

sulphur dioxide ●

CFCs ●

● acid rain

● global warming

● ozone depletion

● eutrophication

(Total 3 marks)

Q2

3. Willow trees grow faster than most other trees and can grow in waterlogged soil. Waterlogged soil stops air getting to their roots.



- (a) Use words in the box to complete the sentences.

carbon dioxide	diffusion	leaves	
oxygen	respiration	photosynthesis	roots

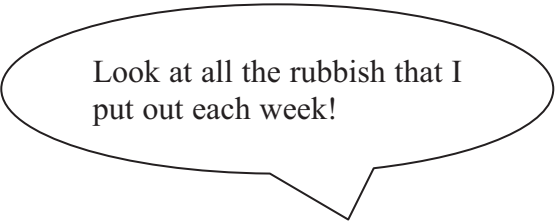
Willow trees absorb light for

They absorb most water through their

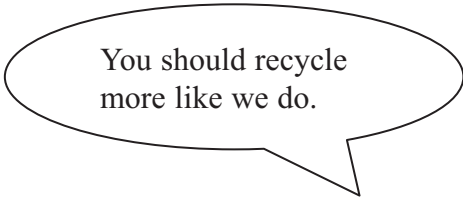
Oak trees do not grow very well in waterlogged soils because their roots cannot absorb enough

(3)

(b) Bob has three willow trees in his garden.
He trims the trees often because they grow quickly.
Bob meets his neighbour when he is putting his rubbish out to be collected.



Bob



Neighbour

(i) Bob decides to compost his willow cuttings at home.
Suggest how composting waste helps the environment.

.....
.....

(1)

(ii) Bob's neighbour recycles paper.
State one reason why **all** paper cannot be recycled.

.....
.....

(1)

(Total 5 marks)

Q3

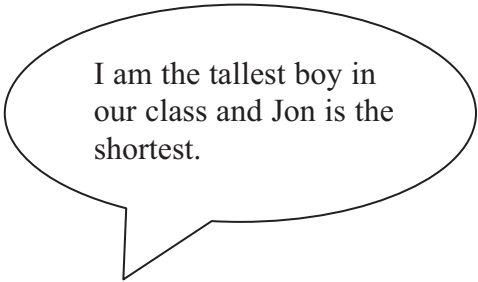
4. Write either **yes** or **no** in each box to complete the table.
The first row has been done for you.

	aerobic respiration	anaerobic respiration
	yes	yes
(a) uses oxygen		
(b) uses glucose		
(c) produces lactic acid		

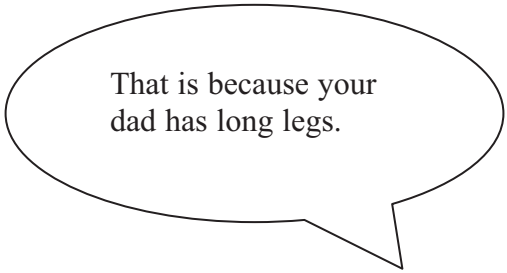
(Total 3 marks)

Q4

5. Colin and Freddie were discussing the height of boys in their class.



Colin



Freddie

They measured the heights of the boys in their class to the nearest centimetre. The table shows their results.

152	165	187	157
166	174	196	166
175	179	184	163

(a) What is the range of boys height in this class?

answer = cm
(1)

(b) Height is influenced by a number of factors. State **two** factors that influence height.

1

2
(2)

(c) Name the type of cell division that takes place in humans for growth to occur.

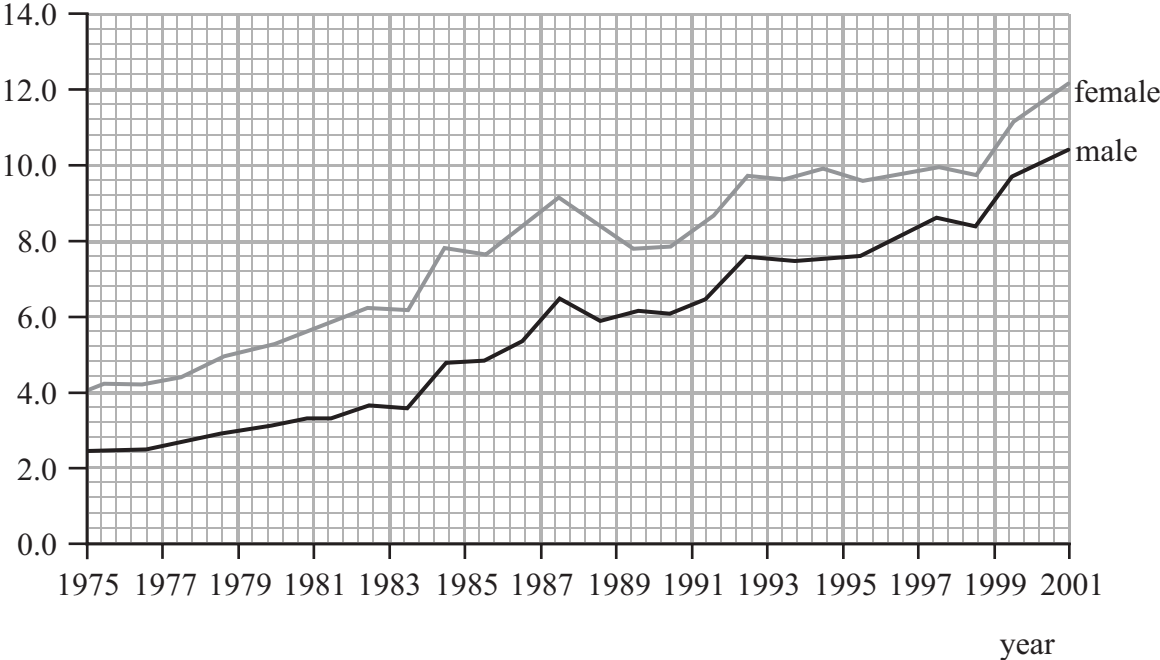
.....
(1)

(Total 4 marks)

Q5

6. The graph shows changes in the number of cases of skin cancer in males and females from 1975 to 2001.

skin cancer cases per 100 000 population



(a) Compare the pattern of skin cancer cases in males and females from 1975 to 2001.

.....

.....

.....

.....

(2)

(b) The occurrence of skin cancer is a living indicator. State another example of a living indicator that could be used to monitor air pollution.

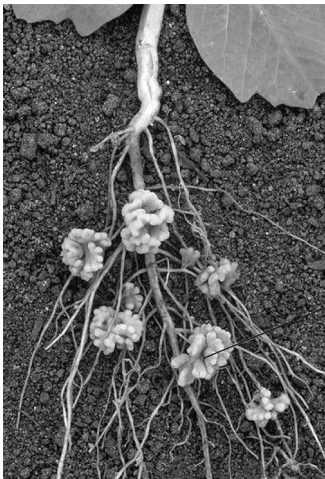
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(1)

(Total 3 marks)

Q6

7. Pea plants have root nodules that contain bacteria.



root nodules

Wally Eberhart, Visuals Unlimited/Science Photo Library

(a) Explain how the root nodules help the pea plant to grow.

.....
.....
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.....

(2)

(b) When the pea plant dies, compounds containing nitrogen are released into the soil. Explain how these compounds containing nitrogen are cycled through the environment.

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(2)

(c) Farmers use compounds containing nitrogen as fertilisers.
Describe the effects of overuse of these fertilisers on rivers.

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(3)

Q7

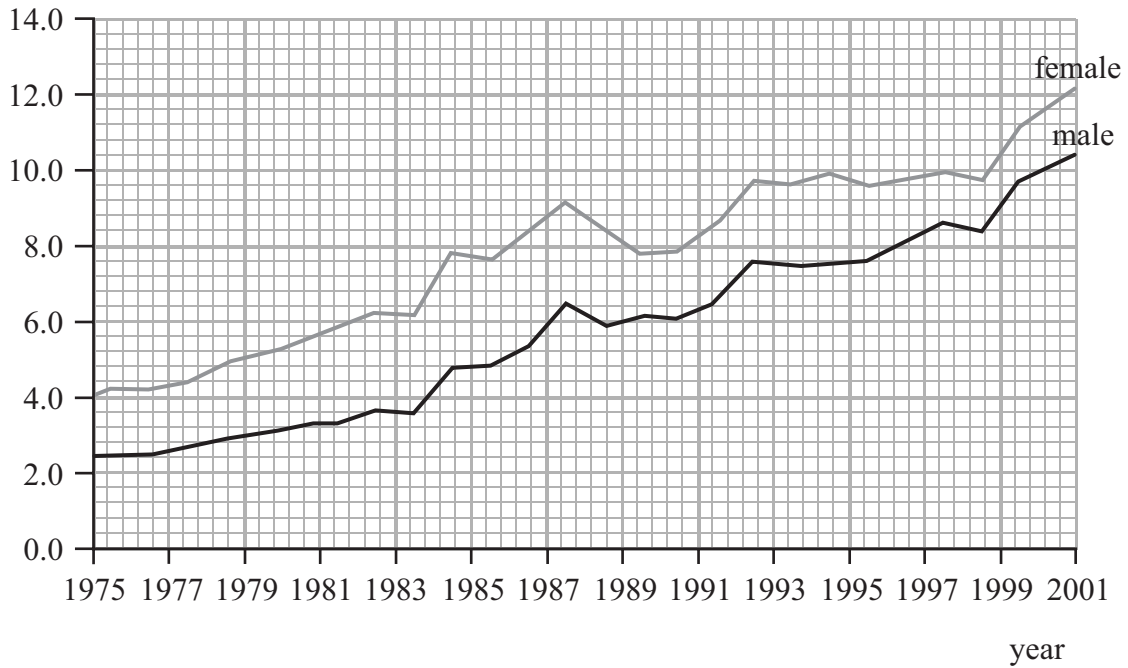
(Total 7 marks)

TOTAL FOR PAPER: 30 MARKS

END

1. The graph shows changes in the number of cases of skin cancer in males and females from 1975 to 2001.

skin cancer
cases per
100 000
population



(a) Compare the pattern of skin cancer cases in males and females from 1975 to 2001.

.....
.....
.....
.....
(2)

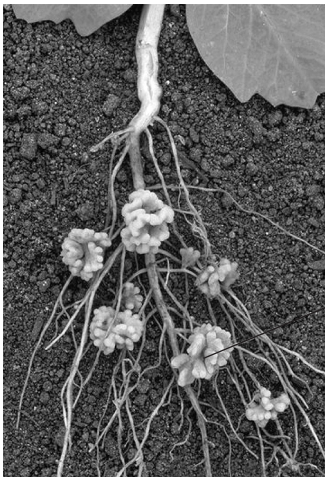
(b) The occurrence of skin cancer is a living indicator.
State another example of a living indicator that could be used to monitor air pollution.

.....
(1)

(Total 3 marks)

Q1

2. Pea plants have root nodules that contain bacteria.



root nodules

Wally Eberhart, Visuals Unlimited/Science Photo Library

(a) Explain how the root nodules help the pea plant to grow.

.....
.....
.....
.....
.....
.....

(2)

(b) When the pea plant dies, compounds containing nitrogen are released into the soil. Explain how these compounds containing nitrogen are cycled through the environment.

.....
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.....
.....
.....
.....

(2)

(c) Farmers use compounds containing nitrogen as fertilisers.
Describe the effects of overuse of these fertilisers on rivers.

.....

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.....

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(3)

Q2

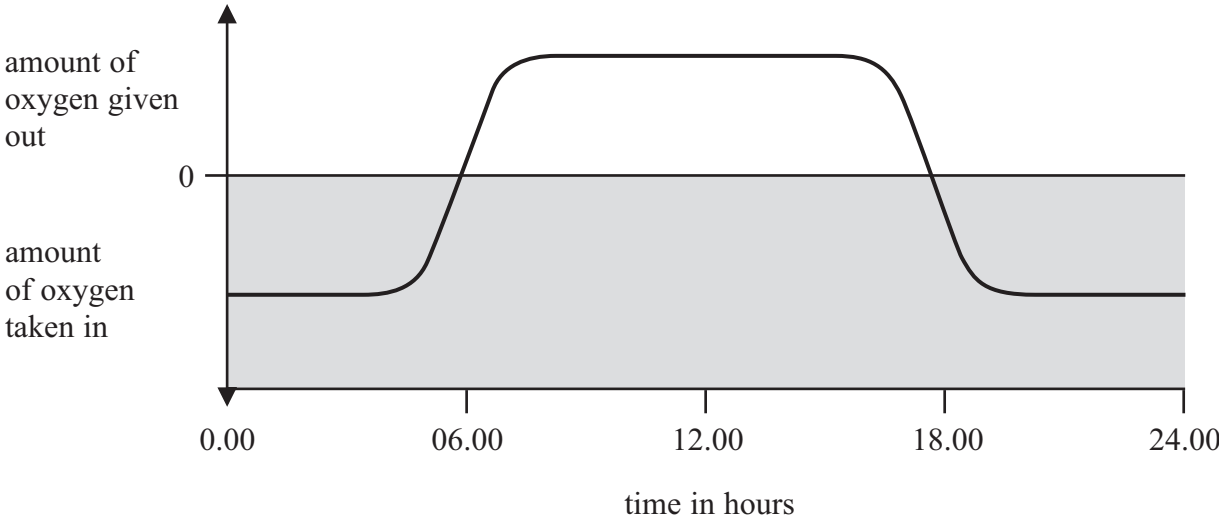
(Total 7 marks)

3. Plants carry out both photosynthesis and respiration in the daytime.

(a) Write the word equation for photosynthesis.

..... (2)

The line on the graph shows the changes in the amount of oxygen given out and taken in by a plant in one day.



(b) For how many hours does the amount of oxygen given out exceed the amount of oxygen taken in?

..... (1)

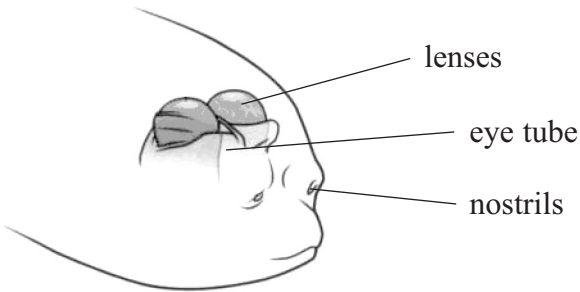
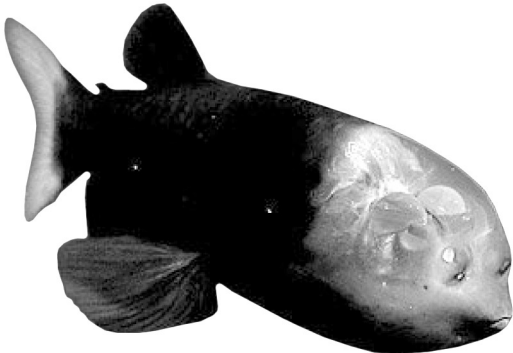
(c) State one limiting factor affecting oxygen production at 06.00 hours.

..... (1)

(Total 4 marks)

Q3

4. The barreleye fish lives in the deep ocean.
It has a transparent head with tube shaped eyes which face upwards.



(a) State **two** conditions in very deep seas that make it difficult for some organisms to survive.

- 1
-
- 2
-

(2)

(b) Most of the time, the barreleye fish remains motionless in the water.
Its eyes always look upward.

Suggest how these adaptations help the barreleye to survive at extreme depths in the deep seas.

-
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-
-

(2)

(Total 4 marks)

Q4

5. A mammal has 38 chromosomes in each of its body cells.

(a) How many chromosomes would each daughter cell have after one of these body cells has divided by

(i) mitosis (1)

(ii) meiosis (1)

(b) State the purpose of mitosis and meiosis in a mammal.

Mitosis

.....

.....

Meiosis

.....

..... (2)

(Total 4 marks)

Q5

6. Some runners take deep breaths before the start of a sprint race but do not breathe while running.



(a) Describe how ventilation moves air into the lungs.

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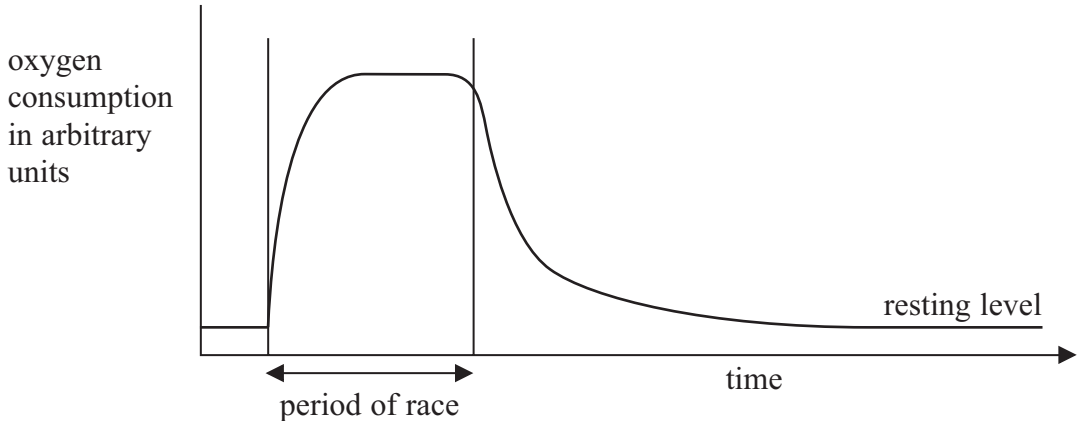
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(3)

(b) The graph shows how oxygen consumption changes before, during and after the sprint race.



Use scientific principles to explain the changes in oxygen consumption shown in the graph.

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(5)

Q6

(Total 8 marks)

TOTAL FOR PAPER: 30 MARKS

END