Q1. Brown trout are fish that kill and eat other animals.

(a) Choose a word from this list to complete the sentence below.

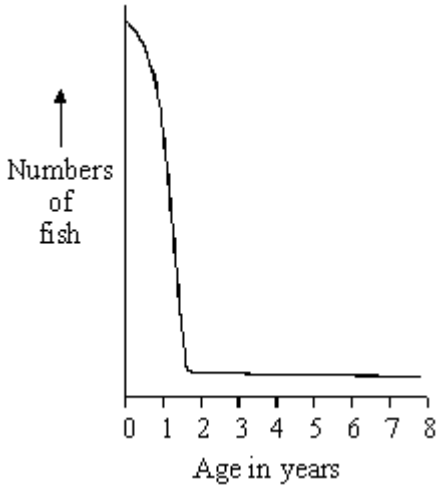
competitors **consumers** **prey** **producers**

Trout are predators, the animals they eat are their ..... .

(1)

(b) The graph shows the ages of the brown trout found in the river Tees.

There was no serious pollution in the river during this time.



Suggest **three** reasons why few brown trout live to be over two years old.

1 .....

2 .....

3 .....

(3)
(Total 4 marks)

Q2. Kangaroo rats live in the hot, dry deserts of North America.

Their only water comes from the food they eat.
In these regions daytime temperatures are around 45°C.
At night temperatures can fall to below 30°C.

Explain how each of the following features makes these animals well adapted to survive in deserts.

(a) They are a sandy colour.

.....

(b) They are active at night and stay in burrows underground by day.

.....

(c) They produce dry droppings and very little urine. They do not sweat.

.....

(d) Their large ears, feet and tail give their bodies a large surface area.

.....

.....

(4)
(Total 4 marks)

Q3. In compost heaps, dead plants are broken down by microbes.
This breakdown is much slower:

- when the weather is cold
- when the weather is dry
- when the heap is squashed down so that no air can circulate.

(a) What **three** conditions inside compost heaps are needed for microbes to work **quickly?**

1 .....

2 .....

3 .....

(3)

(b) Why is the breakdown of dead plants important for living plants?

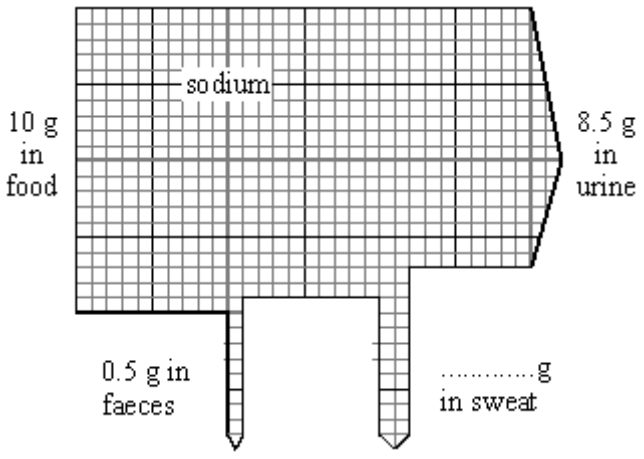
.....

.....

(1)
(Total 4 marks)

Q4. To stay healthy, the amount of sodium in your body must not change very much.

On average, a girl takes in 10 grams of sodium a day in the food she eats.
The diagram shows what happens to this sodium.



(a) Add the missing figure to the diagram.

(1)

(b) Choose words from this list to complete the sentences below.

bladder **kidneys** **lungs** **skin**

Sweat is produced by the girl's .....

Urine is produced by the girl's .....

(2)

(c) The girl goes on holiday to a very hot place.
Her diet stays the same but she now loses 12 g of sodium each day in sweat.

(i) How will this affect the amount of sodium she loses each day in her urine?

.....

(1)

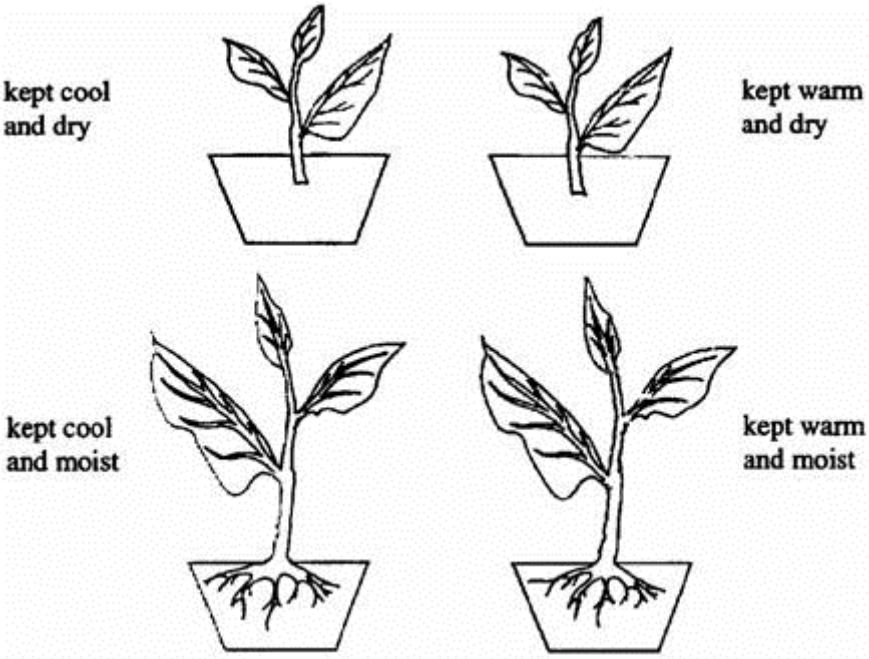
(ii) What should the girl do to make sure that her body still contains enough sodium?

.....

(1)

(Total 5 marks)

Q5. A gardener took four cuttings from the same plant and put them in compost.
He kept them in different conditions.
The diagrams show each cutting some time later.



(a) Use information from the diagrams to answer this part.

(i) The most important condition needed for cuttings to develop is that

they should be kept .....

(1)

(ii) Explain why you chose this condition.

.....

(2)

(b) Gardeners often grow new plants from cuttings instead of from seeds.
Give a reason for this.

.....

(1)

(Total 4 marks)

##

The table shows how much water is lost from a boy's body on a cold day and on a hot day.

WATER LOST (cm^3)	COLD DAY	HOT DAY
in sweat	50	300
in breath	100	100
in urine	1000	750

(a) How do the figures for the hot day compare with those for the cold day? Answer in as much detail as you can.

.....

.....

.....

.....

.....

(2)

(b) The boy does the same things for the same amount of time on both days.

Explain why the amounts of water lost in sweat and urine change.

Sweat .....

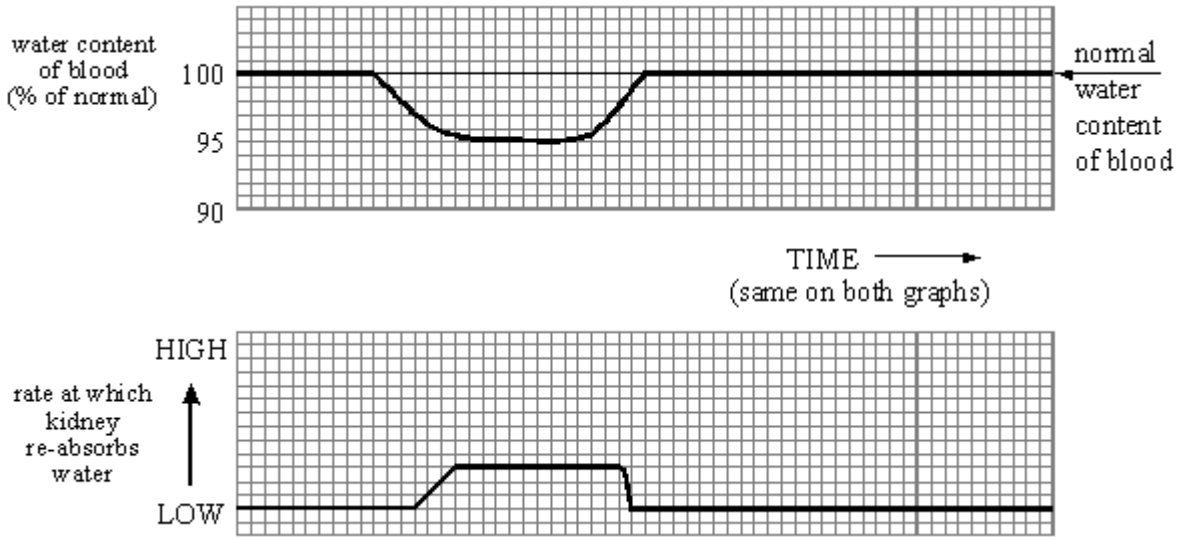
.....

Urine .....

.....

(2)

(c) The rate at which the kidney re-absorbs water depends on the percentage of water in the blood.



Describe, as fully as you can, what the graphs tell you.

.....

.....

.....

.....

(4)

(d) How does your body control the rate at which your kidney re-absorbs water?

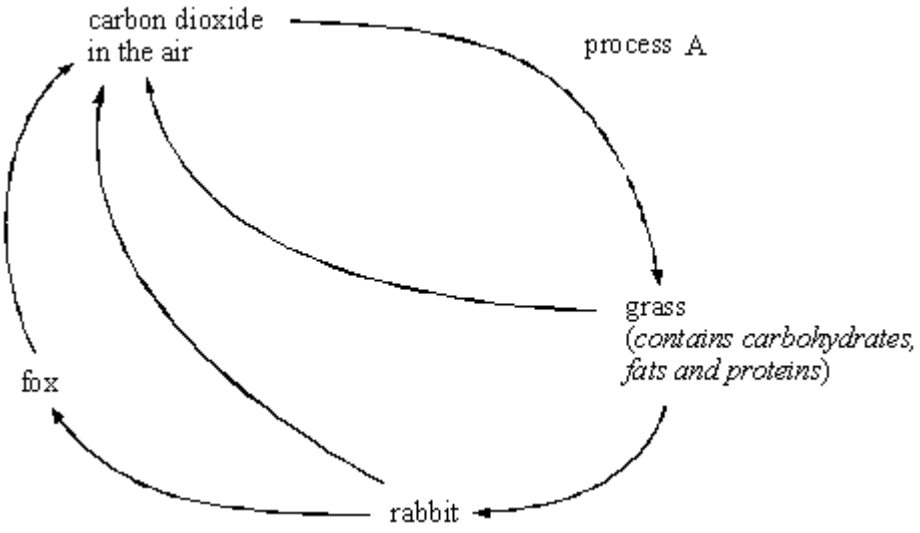
.....

.....

(2)

(Total 10 marks)

Q7. The diagram shows part of the carbon cycle.



(a) Write down the name given to process A.

.....

(1)

(b) Explain, as fully as you can, how some of the carbon in the grass becomes part of the fox's body.

.....

.....

.....

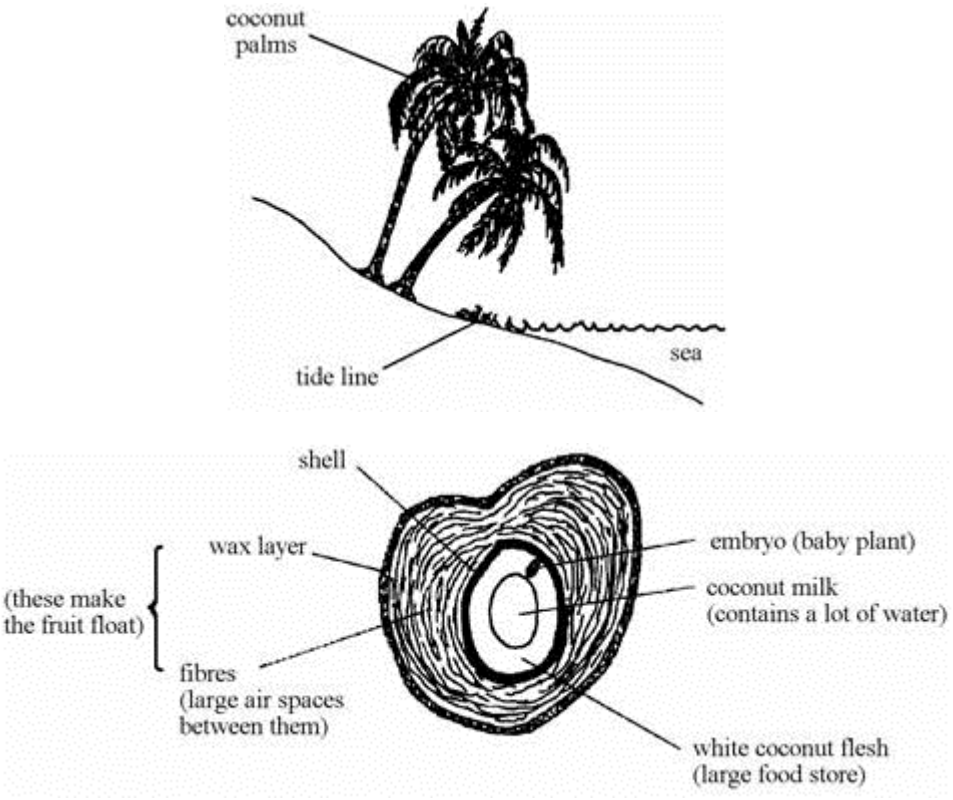
.....

.....

(3)

(Total 4 marks)

Q8. Coconut palms grow just above the tide line on beaches of tropical islands.



Section through a coconut fruit

The sea carries the fruit to new parts of the beach.
The embryo then puts out its first root.
Fresh water and nutrients are very deep down under the sandy beach.

Explain **three** ways in which the coconut palm is adapted so that its embryo plants can spread and survive.

1 .....

.....

2 .....

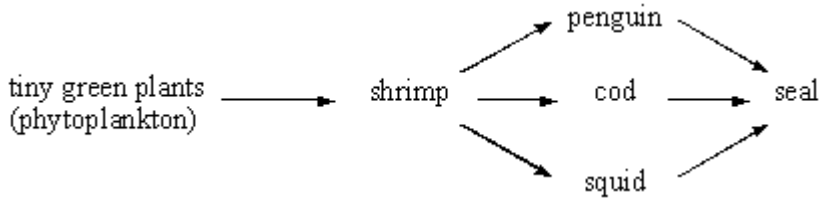
.....

3 .....

.....

(Total 3 marks)

Q9. Scientists have found the following food web in the Antarctic Ocean.



(a) (i) Write down the name of the producer in this web.

.....

(ii) Write down the names of **two** organisms which are prey in this web.

.....

.....

(3)

(b) Humans are removing large numbers of the cod.
Some scientists argue that this could lead to a decrease in the numbers of squid and penguins.
Others argue that the numbers of squid and penguins will stay the same.

Carefully explain each argument.

Why they might decrease.

.....

.....

.....

Why they might stay the same.

.....

.....

.....

(2)

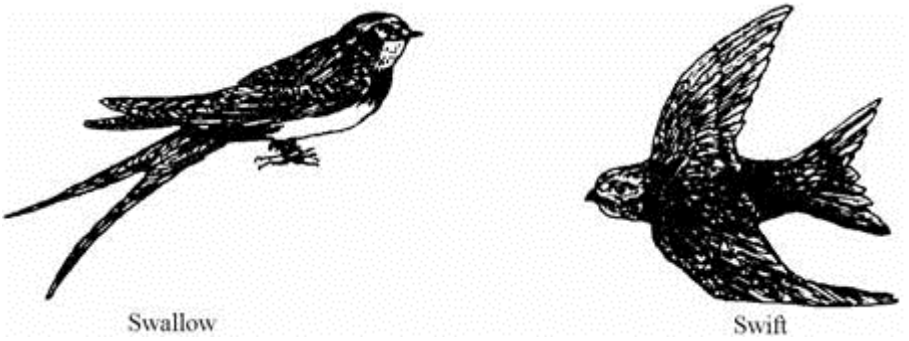
(c) The following information is about the biomass of the organisms in one of the food chains in the web.

tiny green plants	→	shrimp	→	cod	→	seal
1000 tonnes		100 tonnes		10 tonnes		0.5 tonne

Draw and label a pyramid of biomass for this chain.

(2)
(Total 7 marks)

Q10. Study the following information, then answer the questions.



- Swallows and swifts spend the summer in Britain and the winter in Africa.
- Swallows feed on insects near the ground.
- Swifts feed on insects high in the air.
- Swallows come back to Britain in spring before swifts.
- In spring the ground starts to warm up. When it is warm it makes the air rise. Insects are carried up in this air.

(a) Suggest two reasons why swifts and swallows fly to Africa for the winter.

1 .....

2 .....

(2)

(b) How do swifts and swallows avoid competing for food?

.....

.....

(1)

(c) Suggest why swifts come back to Britain later than swallows.

.....

.....

.....

(2)

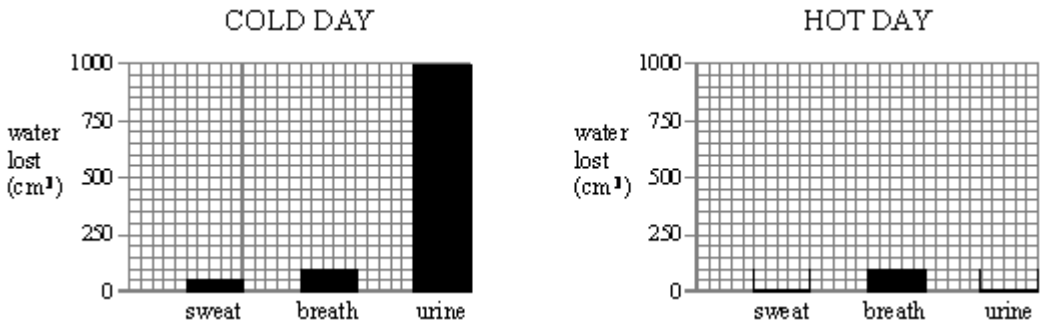
(Total 5 marks)

##

The table shows how much water is lost from a boy's body on a cold day and on a hot day.

WATER LOST (cm^3)	COLD DAY	HOT DAY
in sweat	50	300
in breath	100	100
in urine	1000	750

(a) Use the figures in the table to complete the bar-chart for a hot day.



(2)

(b) How do the figures for the hot day compare with those for the cold day?
Answer in as much detail as you can.

.....

.....

.....

.....

(4)

(c) The boy does the same things for the same amount of time on both days.
Explain why the amounts of water lost in sweat and urine change.

Sweat .....

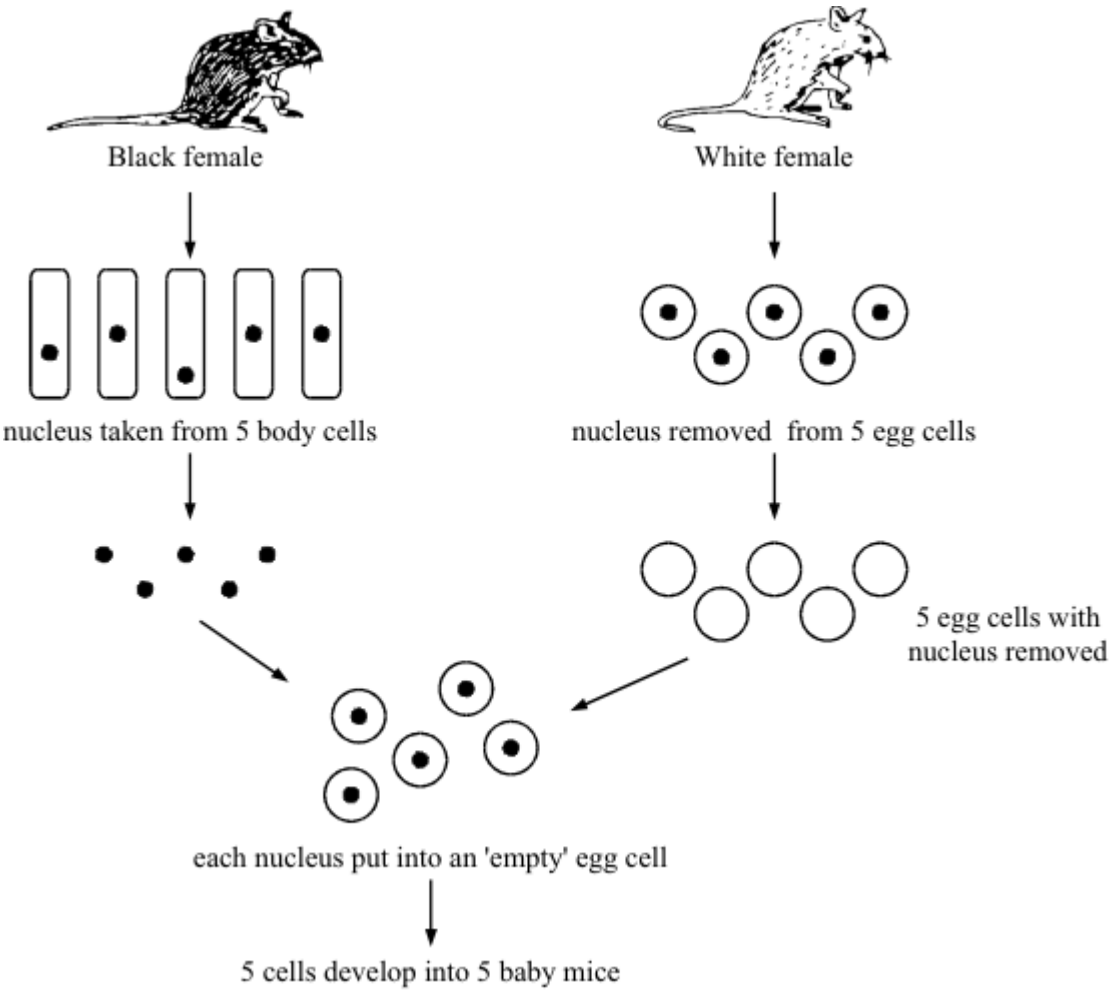
.....

Urine .....

.....

(2)
(Total 8 marks)

Q12. The diagram shows how you can breed mice without using male sex cells.



(a) (i) What type of reproduction is shown above?

.....

(1)

(ii) Which part of the nucleus carries the information to make a mouse black or white?

.....

(1)

(iii) Carefully describe how the baby mice

(A) compare with each other, ...

.....

(B) compare with the parent mice .....

.....

(3)

(b) Mice normally reproduce in a similar way to humans.

(i) Which organs in the white mouse released the five egg cells?

.....

(1)

(ii) What treatment could you give the white mouse to make her release more eggs?

.....

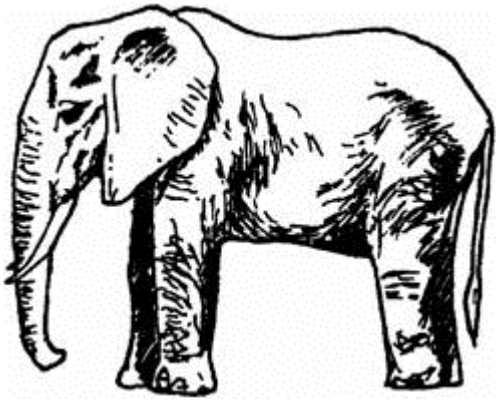
.....

(1)

(Total 7 marks)

Q13. The elephant is likely to become extinct in parts of Africa.

Use the information below to explain **three** reasons why.



* The African elephant eats lots of trees and other plants for food.
* In Africa the human population is increasing and more food is needed to feed the extra people.
* More trees are cut down for fuel and to clear land for growing crops.
* Elephants are killed by poachers who want the ivory from their tusks.
* A herd of elephants needs a large area in which to live and feed.

1 .....

.....

2 .....

.....

3 .....

.....

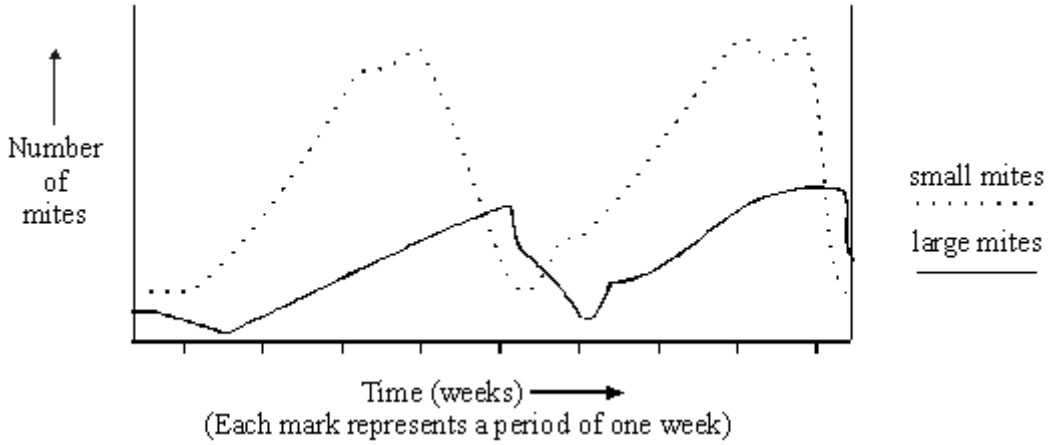
(Total 3 marks)

Q14. Some small mites feed on the leaves of orange plants. Larger mites feed on the smaller mites.

(a) What do we call animals, like the large mite, which eat other animals, like the small mite?

.....

(1)



The graph shows how the number of these mites changes over a period of time.

(b) (i) What happens to the number of large mites one week after the number of small mites decreases?

.....

Suggest a reason for this.

.....

.....

.....

(3)

(ii) What happens to the number of small mites as the number of large mites increases?

.....

Suggest a reason for this.

.....

.....

.....

(2)

(Total 6 marks)

Q15. (a) $1m^2$ of a field gets about 1050MJ of light energy per year.

Only 21 500kJ of energy is stored in the new grass.

(i) How is the energy stored in the new grass?

.....

(1)

(ii) What is the % of light energy stored in the grass?

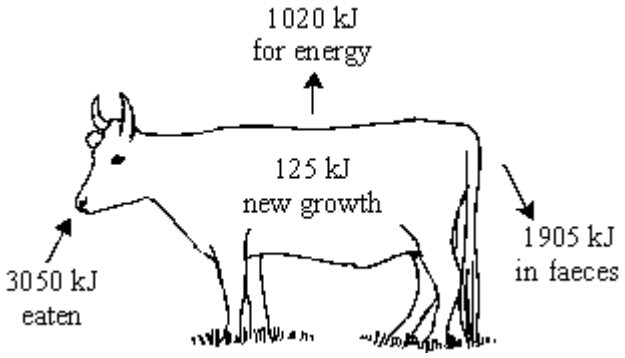
.....

.....

.....

(1)

(b)



The diagram shows what happens to the energy from grass in part of a field which is grazed by a bullock.

Using information in the diagram suggest why food chains are usually short.

.....

.....

.....

.....

.....

(3)

(c) Many of the animals which from part of our diet are herbivores rather than carnivores. Explain why as fully as you can.

.....

.....

.....

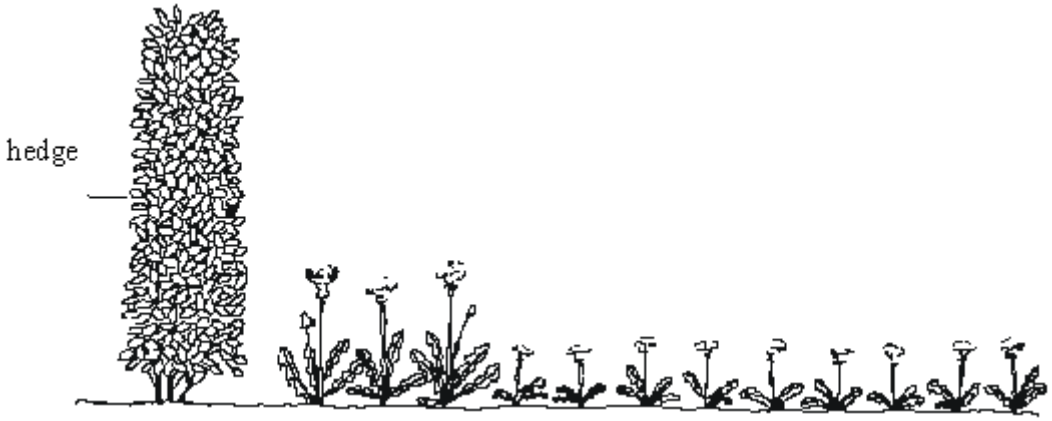
.....

.....

.....

(3)
(Total 8 marks)

Q16.



Two students were surveying dandelions in a field. They noticed that the dandelions by the hedge were taller than the others.

One student suggested that the differences in height could have been caused by the different conditions in the field.

(a) (i) Was he correct? .....

Give reasons for your answer.

.....

.....

.....

(2)

(ii) Explain how you could test to see if his answer was correct.

.....

.....

.....

.....

(2)

(b) The hedge was cut down and removed.

What would happen to the height of the dandelions after some time?

.....

Explain your answer. .....

.....

.....

(2)
(Total 6 marks)

Q17. Complete the sentences below.

Genes pass on ..... from parents to children.

The genes are passed on by the parents' reproductive cells.

The mothers' sex-cells are called ..... .

The fathers' sex-cells are called ..... .

Children are similar to their parents because .....

..... .

(Total 4 marks)

##

(a) Use words from the box to complete the sentences about the water cycle.

boils	**condenses**	**evaporates**	**freezes**	
melts	**rain**	**sea**	**Sun**	**wind**

Water ..... from the surface of the ..... . Heat from the

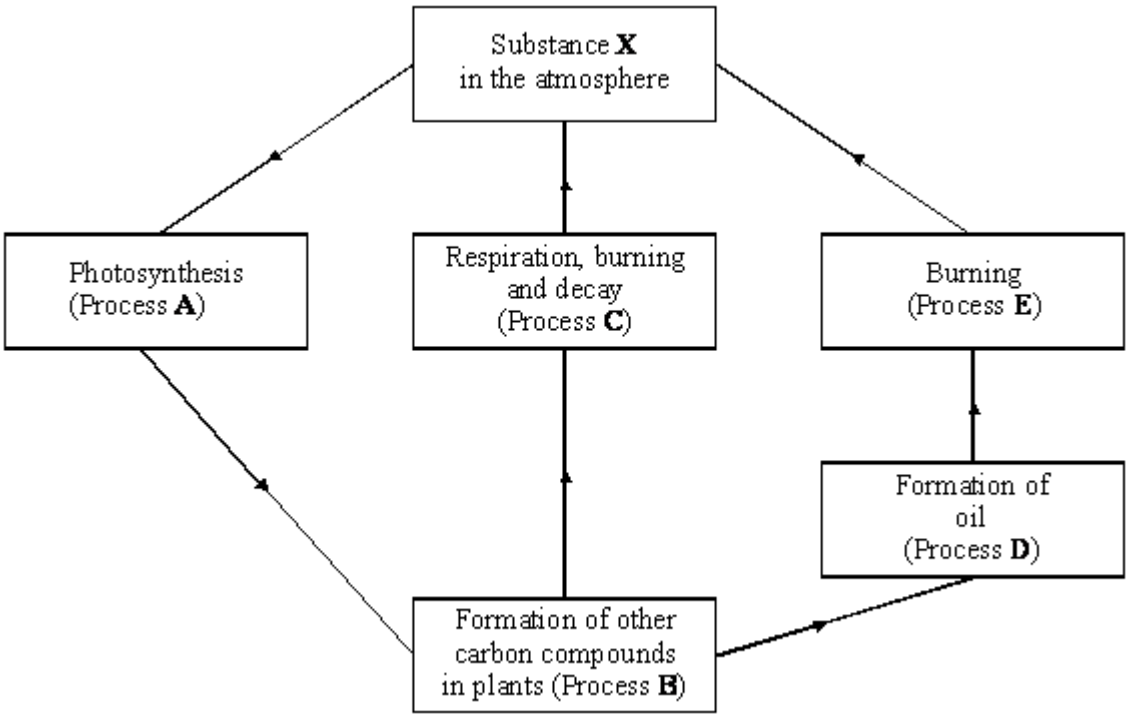
..... speeds up this process and so does the ..... .

Water vapour in the atmosphere cools down and ..... to form billions of

tiny water droplets. Some of the droplets join together and fall as ..... .

(6)

(b) The diagram shows some processes in the carbon cycle.



(i) What is the name of substance **X**?

.....

(1)

(ii) Which process, **A**, **B, C**, **D** or **E**, takes the **longest** and approximately how long does it take?

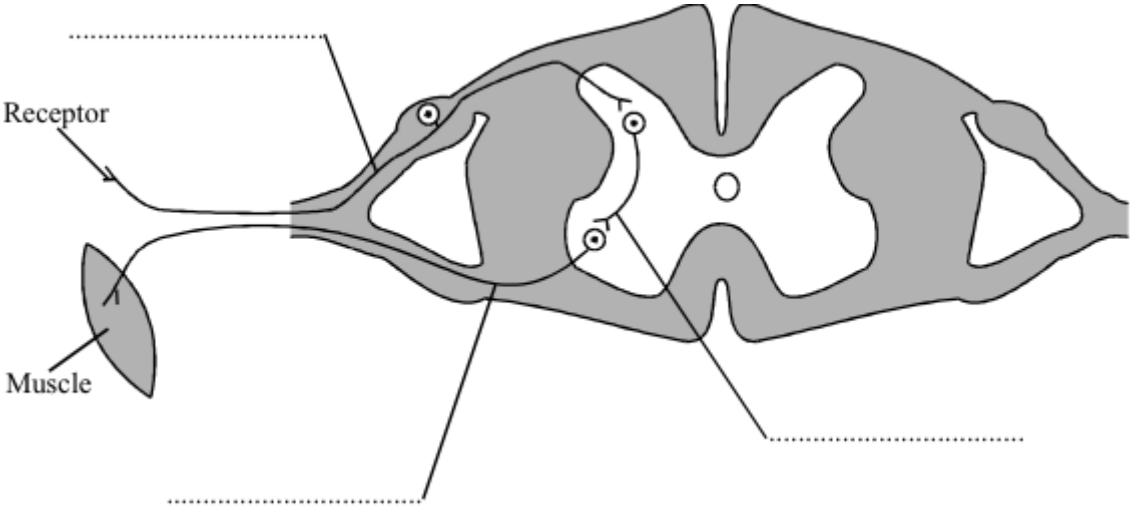
.....

(2)

(Total 9 marks)

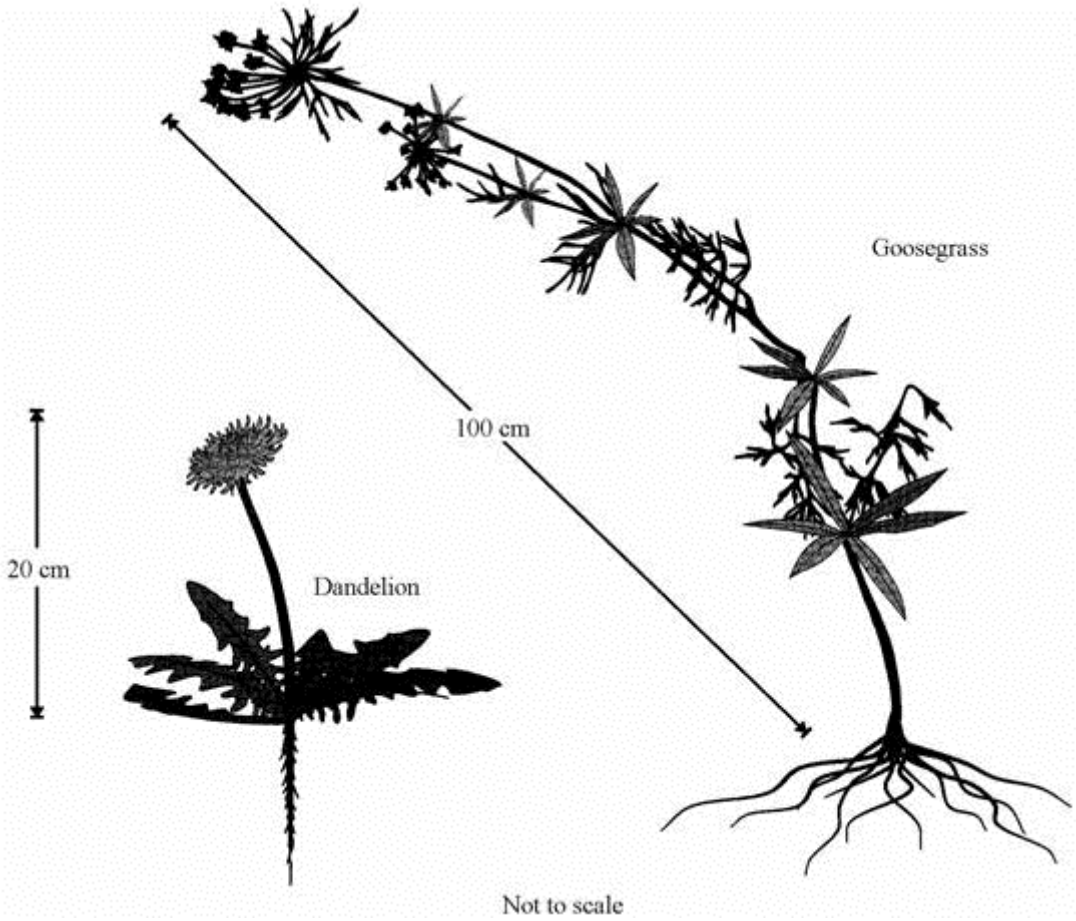
Q19. Information is also passed by impulses in the nervous system. Neurones carry impulses very rapidly. The diagram shows a reflex arc.

Label the diagram by adding the names of the neurones.



(Total 3 marks)

Q20. Dandelions have become adapted to live in lawns and grass areas where animals graze. Goosegrass, however, has become adapted to live alongside hedgerows and cannot survive being mown.



(a) Use the information in the drawings to suggest **one** advantage of each of the following adaptations.

(i) Dandelion leaves lie flat on the ground.

.....

.....

(1)

(ii) A dandelion has a thick tapered root.

.....

.....

(1)

(iii) Goosegrass stems are long.

.....

.....

(1)

(iv) Goosegrass roots are thin and very long.

.....

.....

(1)

(b) Dandelions and goosegrass are different species of plants.

(i) What name is given to the unit of inheritance which controls one particular characteristic of a plant or animal?

.....

(1)

(ii) Why would you be unlikely to succeed if you tried to breed a new species of plant by crossing a dandelion with goosegrass?

.....

.....

(1)

(c) Animals as well as plants have become adapted to live in different environments.

State **one** way a polar bear has become adapted to living in the Arctic, and the reason for the adaptation.

.....

.....

.....

.....

(2)

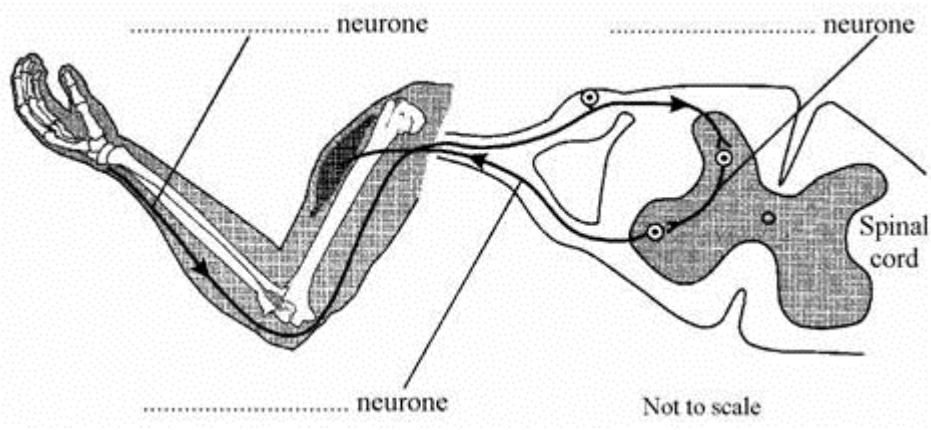
(Total 8 marks)

Q21. (a) What is the name of the organ which controls the nervous system?

.....

(1)

(b) The diagram shows a reflex arc. Label the **three** neurones.



(3)

(c) Snatching your hand from a hot object is an example of a reflex action. Give **one** other example of a reflex action.

.....

(1)

(d) Describe the stages that happen in a reflex action.

.....

.....

.....

.....

(3)

(Total 8 marks)

Q22. Describe how the brain is informed of the image detected by the retina.

.....

.....

.....

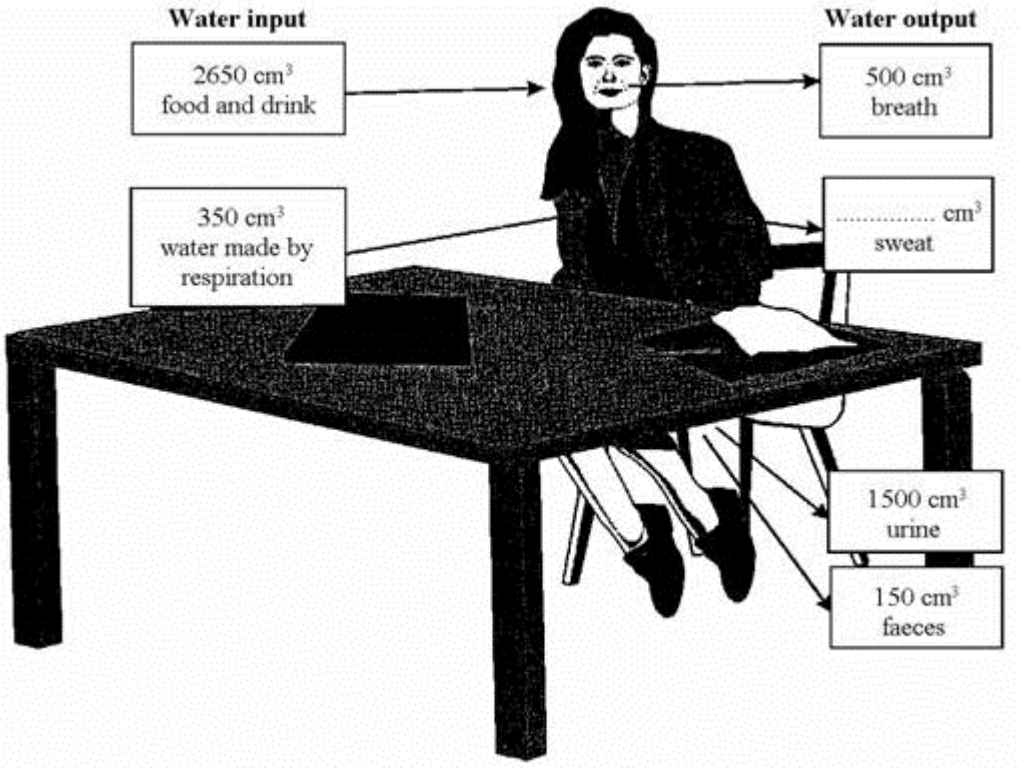
.....

.....

(Total 3 marks)

Q23. The diagram shows a water balance for a girl who spends most of the day working at a desk. It is not complete.

(a) Complete the diagram by writing in the volume of sweat produced.



(1)

(b) The next day she spent much of the day training, doing many different types of exercise.

State how **each** of the following would change and why it would be different from the previous day.

(i) The amount of water given off as sweat.

.....

.....

.....

(2)

(ii) The amount of water breathed out.

.....

.....

.....

(2)

(iii) The amount of urine passed, if she had the same water intake as on the previous day.

.....

.....

.....

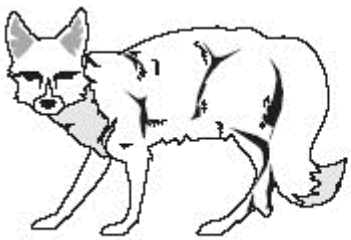
(2)

(c) Which organ controls the amount of water in the body?

.....

(1)
(Total 8 marks)

Q24. The drawings show an arctic fox and a fennec fox.



Arctic fox

Fennec fox

(a) The arctic fox lives in cold, snowy conditions.

Explain how each of the following helps the arctic fox to survive in these conditions.

1 Long, thick fur

.....

.....

2 A white coat

.....

.....

(2)

(b) The fennec fox lives in hot deserts.

Explain how each of the following helps it to survive in hot conditions.

1 Very large ear flaps

.....

.....

2 Hairs on the soles of its feet

.....

.....

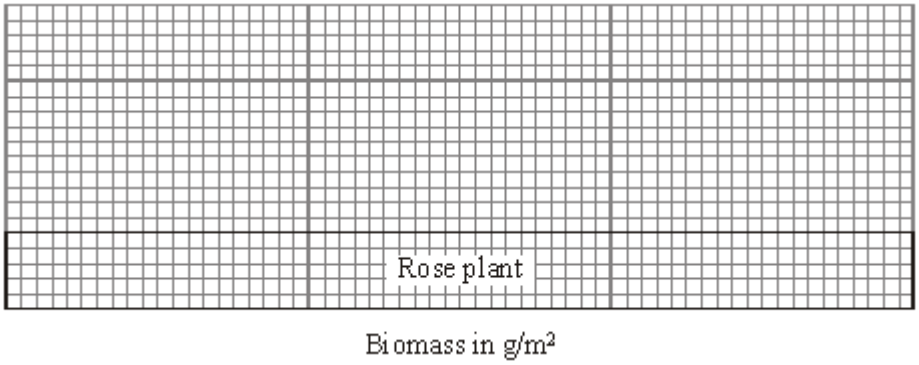
(2)
(Total 4 marks)

Q25. Energy is stored in the materials that make up organisms. These materials are called biomass.

Organisms in food chain	Rose plant	→	Greenfly	→	Ladybird	→	Blackbird

Biomass in g/m²	600		50		10		1

(a) Complete the pyramid of biomass for this food chain. The rose plant has been done for you. You should draw the rest of the pyramid to the same scale. (5 small squares = 50 g/m².)



(3)

(b) What proportion of the energy in a rose plant is transferred to greenfly?

.....

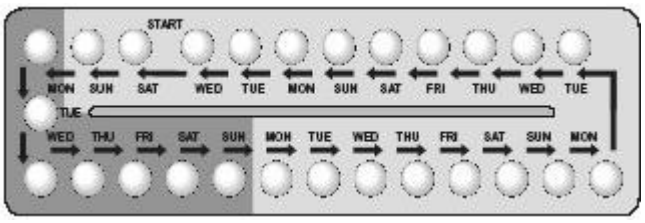
.....

.....

Proportion = ...

(2)
(Total 5 marks)

Q26. The picture shows some birth control (contraceptive) pills for women.



These are some facts about using the birth control pills:

- birth control pills are 99 per cent effective in preventing pregnancy
- the hormones in the pills have some rare but serious side effects
- this method of birth control gives no protection against sexually transmitted diseases
- the hormones in the pills give protection against some women's diseases
- the woman has to remember to take the pill every day
- the woman's monthly periods become more regular.

Use the information above to answer these questions.

(a) Give **two** advantages of using birth control pills.

1 .....

.....

2 .....

.....

(2)

(b) Give **two** disadvantages of using birth control pills.

1 .....

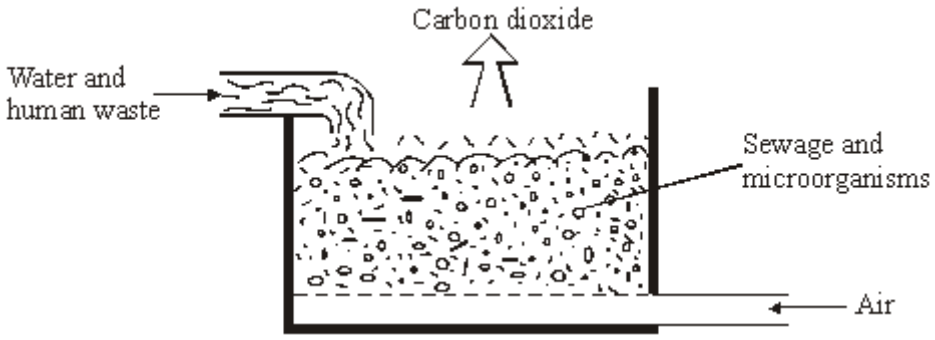
.....

2 .....

.....

(2)
(Total 4 marks)

Q27. In a sewage works, human waste is broken down by microorganisms.
Air is blown through this sewage.



To gain full marks in this question you should write your ideas in good English. Put them into a sensible order and use the correct scientific words.

Carbon dioxide is formed from the mixture of sewage, microorganisms and air. Explain how.

.....

.....

.....

.....

.....

.....

(3)
(Total 3 marks)

Q28. In some methods of reproduction, clones are made.

(a) Explain what is meant by a clone.

.....

.....

.....

.....

(2)

(b) *To gain full marks for this question you should write your ideas in good English. Put them into a sensible order and use the correct scientific words.*

Describe, in as much detail as you can, **one** way in which an embryo can be cloned.

.....

.....

.....

.....

.....

.....

(3)
(Total 5 marks)

Q29. This question is about the hormones that control the monthly cycle in women.

Complete the sentences.

Hormones control the monthly release of an egg from a woman's ..... .

They also control the thickness of the lining of her ..... .

Hormones that are given to women to stimulate the release of eggs are called

..... drugs.

Hormones that are given to women to prevent the release of eggs are called

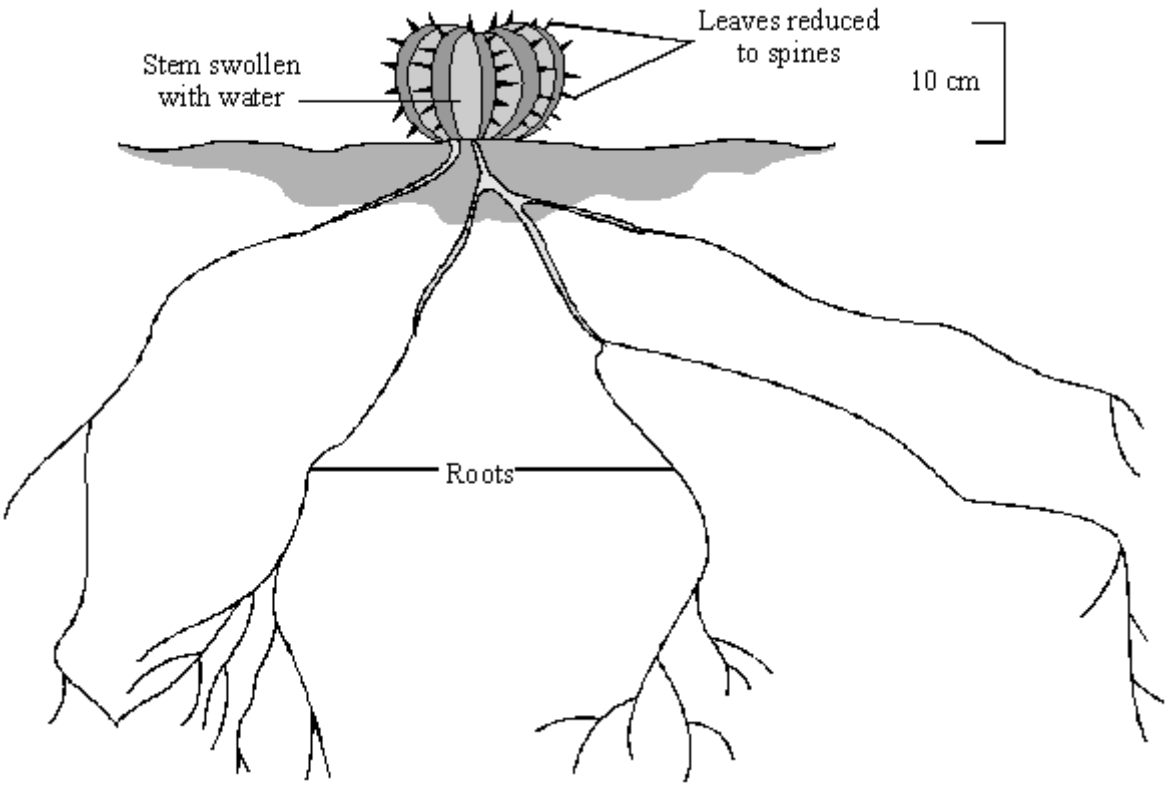
oral ..... .

(Total 4 marks)

Q30. The concentration of carbon dioxide in the Earth's atmosphere is rising.

The rise in carbon dioxide concentration may cause more of the Earth's surface to become desert.

The drawing shows a plant that is adapted to life in a hot, dry desert.



Suggest **two** ways in which the structure of the plant helps it to survive in a hot, dry desert.

1 .....

.....

2 .....

.....

(Total 2 marks)

Q31. Read the passage about antibiotics.

People do not always agree about the use of antibiotics in food production.

If we put low doses of antibiotics in feed for animals such as cattle and sheep, it helps to produce high-quality, low-cost food. Antibiotics help to keep animals disease-free. They also help animals to grow. Animals get fatter quicker because they do not waste energy trying to overcome illness.

The use of antibiotics in livestock feed means that there is a higher risk of antibiotic-resistant bacteria developing. The rapid reproduction of bacteria means there is always a chance that a population of bacteria will develop which is antibiotic-resistant. These could be dangerous to human health.

(a) *To gain full marks for this question you should write your ideas in good English. Put them into a sensible order and use the correct scientific words.*

Explain how a population of antibiotic-resistant bacteria might develop from non-resistant bacteria.

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.....

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.....

.....

(3)

(b) Do you think that farmers should be allowed to put low doses of antibiotics in animal feed? Explain the reasons for your answer.

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.....

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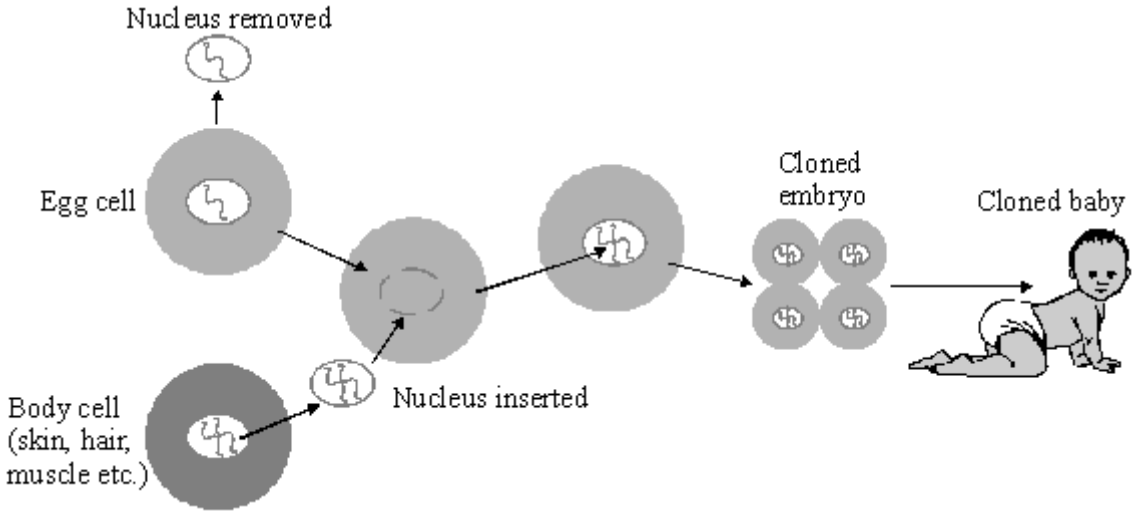
(2)
(Total 5 marks)

Q32. It is now possible to clone humans. The diagram shows one way in which this can be done.



(a) What type of reproduction is this?

.....

(1)

(b) Will the baby have the characteristics of the egg cell or the body cell?

.....

Explain the reason for your answer.

.....

.....

.....

.....

(2)

(c) The procedure in the diagram could be used to produce several cloned embryos.

Suggest how this might be done.

.....

.....

(1)

(Total 4 marks)

Q33. The monthly cycle of women is controlled by hormones.

(a) Name the **two** glands that secrete these hormones.

1 .....

2 .....

(2)

(b) Describe **two** ways in which fertility in women can be controlled by giving hormones.

1 .....

.....

2 .....

.....

(2)
(Total 4 marks)

##

(a) Fill in the table about receptors. The first answer has been done for you.

RECEPTORS IN THE	SENSITIVE TO
Eyes	Light
Skin	
	Sound
Tongue	

(3)

(b) Describe, in as much detail as you can, how information is transmitted from light

receptors in the retina to the brain.

.....

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.....

.....

(3)
(Total 6 marks)

##

(a) Fill in the table about receptors. The first answer has been done for you.

RECEPTORS IN THE	SENSITIVE TO
Eyes	Light
Skin	
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Tongue	

(3)

(b) Describe, in as much detail as you can, how information is transmitted from light receptors in the retina to the brain.

.....

.....

.....

.....

(3)
(Total 6 marks)