

Answer ALL the questions. Write your answers in the spaces provided.

1. For each question (a) to (j), choose the correct answer. Put a cross (⊗) in the correct box.

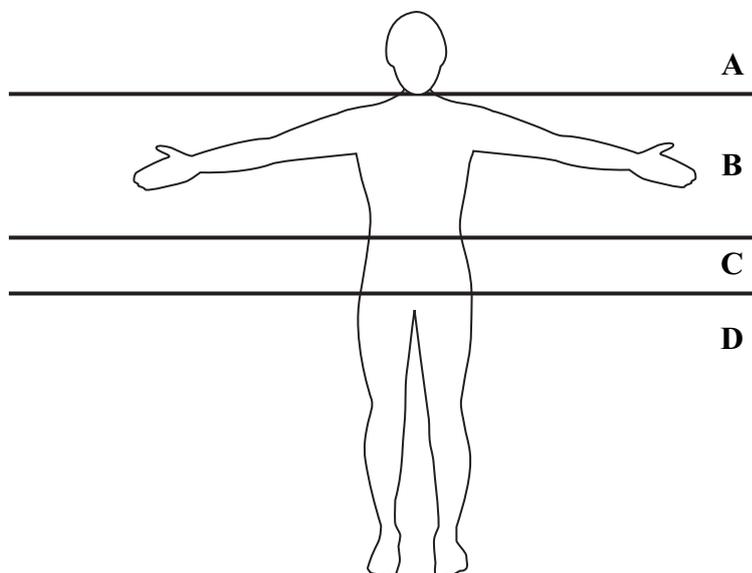
(a) The diagram shows a housefly. A housefly is



- A an animal
- B a bacterium
- C a fungus
- D a virus

(1)

(b) The diagram shows the outline of a human. In which part is the brain found?
Put a cross (⊗) in the correct box.



- A
- B
- C
- D

(1)



(c) The list names cells involved in plant or animal reproduction.

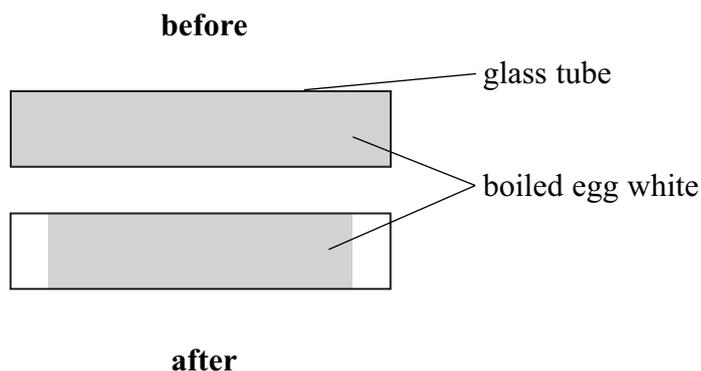
eggs
ovules
pollen
sperm

How many of these cells are only involved in plant reproduction? Put a cross (⊗) in the correct box.

- A 1
- B 2
- C 3
- D 4

(1)

(d) The diagram shows a glass tube containing boiled egg white protein **before** and **after** it was put into a dish containing an enzyme solution.



How much of the egg white has been digested? Put a cross (⊗) in the correct box.

- A 0.0 cm
- B 0.5 cm
- C 1.0 cm
- D 5.0 cm

(1)

(e) Selective breeding means that

- A nature selects the best suited organisms to breed
- B nature selects the least suited organisms to breed
- C humans select the best suited organisms to breed
- D humans select the least suited organisms to breed

(1)

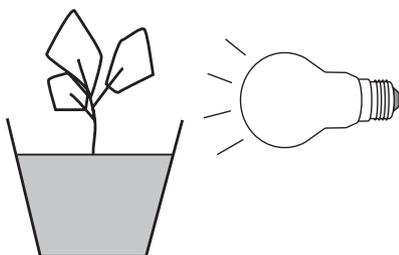


(f) The organism used to make yoghurt is a

- A bacterium
- B fungus
- C plant
- D virus

(1)

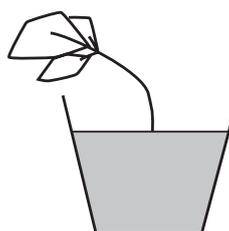
(g) The diagram shows light shining towards a plant shoot.



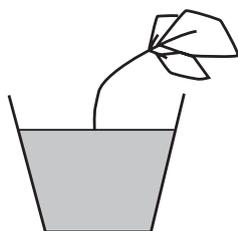
Which diagram shows the position of the shoot after a period of time? Put a cross (X) in the correct box.



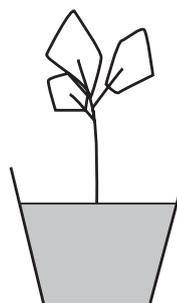
A



B



C



D

- A
- B
- C
- D

(1)



(h) The retina in the human eye is

- A an effector
- B a receptor
- C a response
- D a stimulus

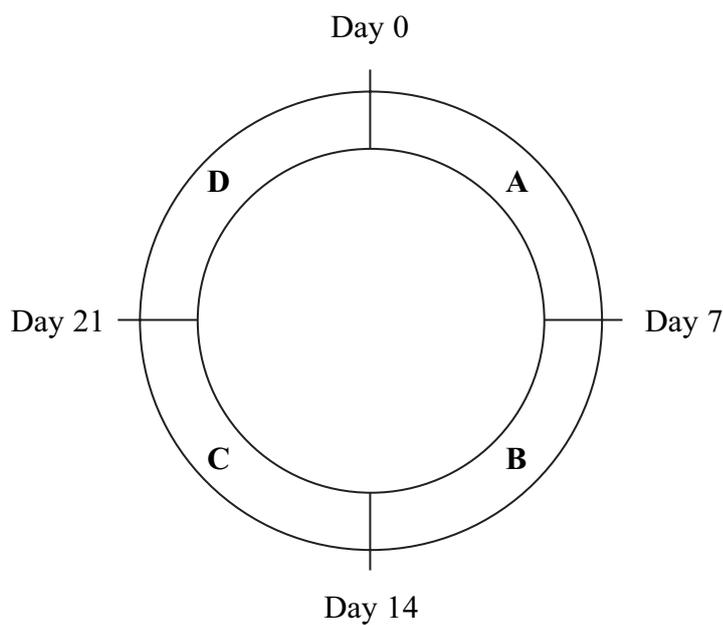
(1)

(i) The human heart rate is increased by

- A adrenaline
- B insulin
- C oestrogen
- D progesterone

(1)

(j) The diagram shows a 28-day menstrual cycle divided into four parts. The egg is released on day 14.



In which part does menstruation occur?

- A
- B
- C
- D

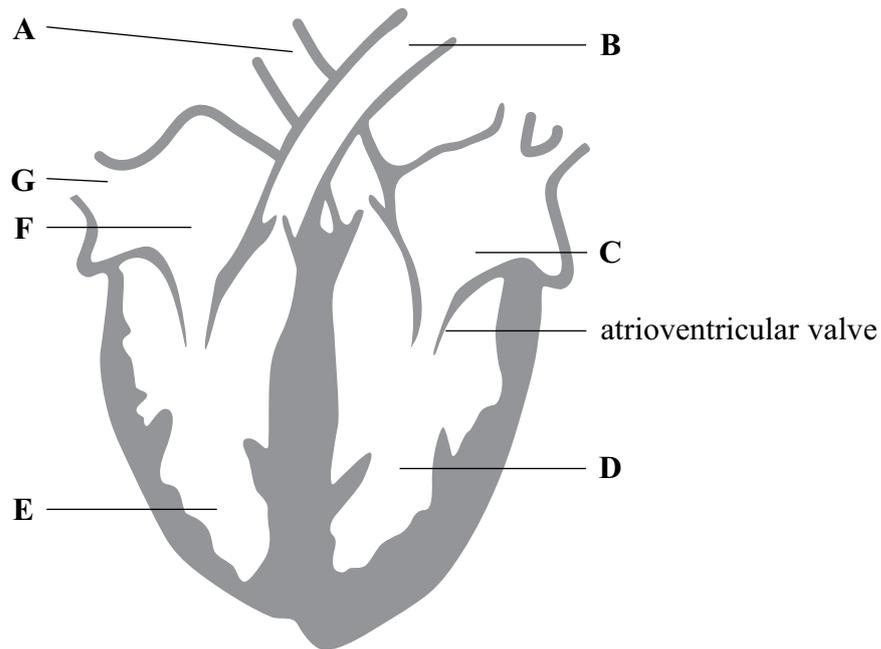
(1)

Q1

(Total 10 marks)



2. The diagram shows a section through a human heart.



(a) (i) Which letter shows the blood vessel that takes blood into the heart from the body?

..... (1)

(ii) Which letter shows the blood vessel that takes blood to the lungs?

..... (1)

(iii) Which letter shows the aorta?

..... (1)

(iv) Which letter shows the left ventricle?

..... (1)

(b) Give **one** reason why the valves are important.

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

(Total 5 marks)

Q2

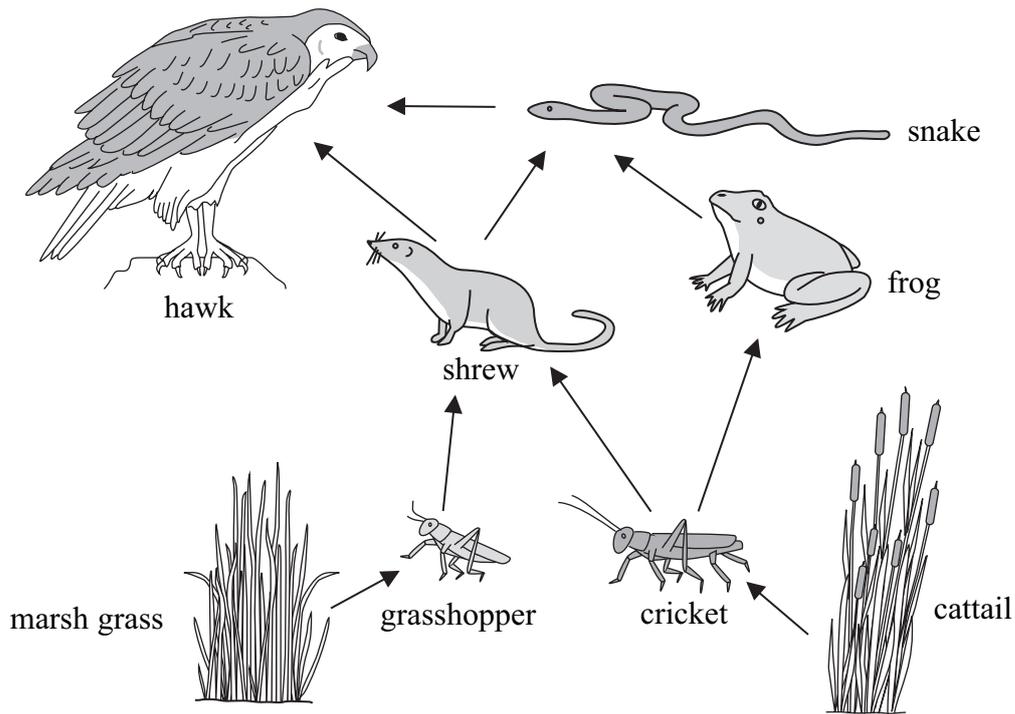


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Turn over for Question 3



3. The diagram shows a food web from an area of wet land.



(a) Use the information in the food web to complete each sentence in the table below with a number. The first one has been done for you.

| Sentence | Number |
|--|--------|
| The number of organisms is | 8 |
| The number of plants is | |
| The number of animals is | |
| The number of primary consumers is | |
| The number of different food chains is | |

(4)



(b) A disease killed the grasshoppers in the food web.
Explain what would happen to the number of shrews in the food web.

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

(2)

(c) The plants in this food web are called producers. Explain why producers are important in a food web.

.....
.....

(1)

(Total 7 marks)

Q3



4. It is important that the volume of water in the human body stays the same. To achieve this the human body must lose and gain the same volume of water.

The tables show the volume of water lost and gained in different ways during one day.

| Water loss | |
|-------------|---------------------------|
| Way | Volume in cm ³ |
| exhaled air | 400 |
| sweat | 600 |
| urine | 1500 |
| faeces | 100 |

| Water gain | |
|-------------|---------------------------|
| Way | Volume in cm ³ |
| food | 800 |
| drink | 1400 |
| respiration | 400 |

- (a) (i) What is the total volume of water lost in one day?

..... (1)

- (ii) In which way is most water lost?

..... (1)

- (iii) How much more water is lost in a day by sweating compared to the volume lost in exhaled air?

..... (1)

- (iv) Give **one** reason why it is important to produce sweat.

..... (1)

- (v) Name the organ in the body that produces urine.

..... (1)



(b) There are 365 days in a year.
Calculate how much water is gained by respiration in one year.
Show your working.

Answer cm³
(2)

(c) Water is one product of respiration. Name the other product.

.....
(1)

(d) Keeping the volume of water in the body the same is an example of homeostasis.
Give **two** other examples of homeostasis in the human body.

1

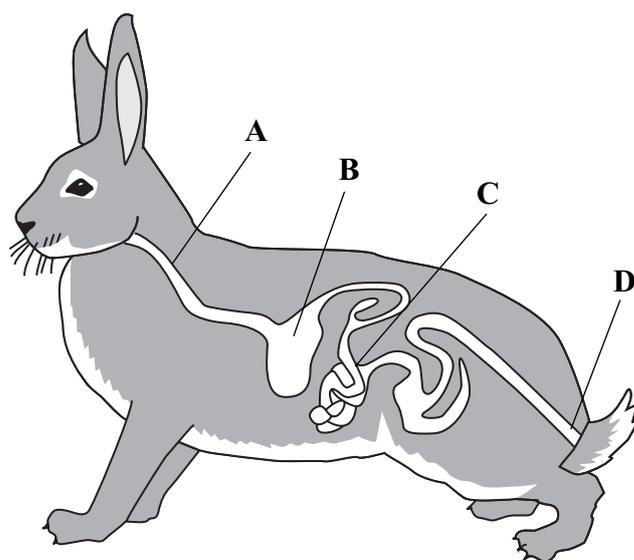
2
(2)

(Total 10 marks)

Q4



5. The diagram shows the gut of a rabbit with parts labelled A, B, C and D.



(a) Use the diagram to complete the table to show the part in which each event takes place. The first one has been done for you.

| Event | Part |
|--|----------|
| digestion of protein by stomach enzyme | B |
| swallowing | |
| absorption by villi in small intestine | |
| release of hydrochloric acid | |
| egestion | |

(4)

(b) The list gives the names of molecules released when different foods are digested.

amino acids maltose fatty acids glycerol

From the list, choose the name of the molecules made when protein is digested.

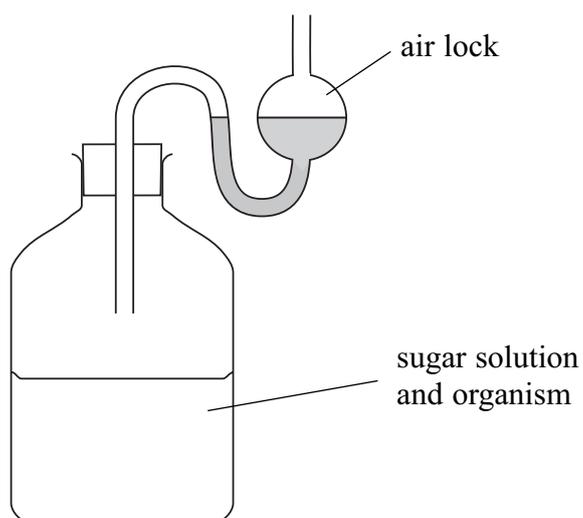
..... (1)

(Total 5 marks)

Q5



6. The diagram shows a fermentation flask that can be used to make wine (alcohol).



(a) (i) Name the organism that uses the sugar solution to make the wine.

..... (1)

(ii) Name the gas produced during fermentation.

..... (1)

(iii) Suggest **two** reasons why the air lock is important.

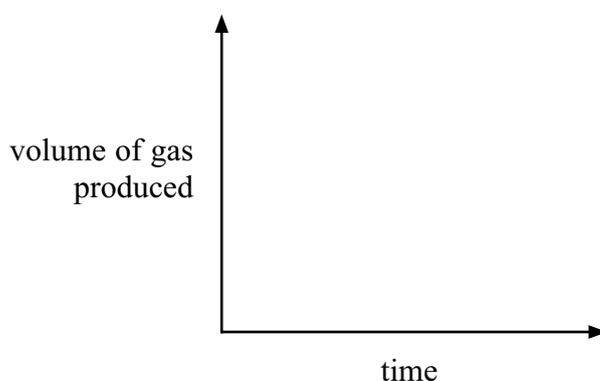
1

2

(2)

(b) The volume of gas produced changes with time.

Draw a line using the axes below to show the change you would expect to see.



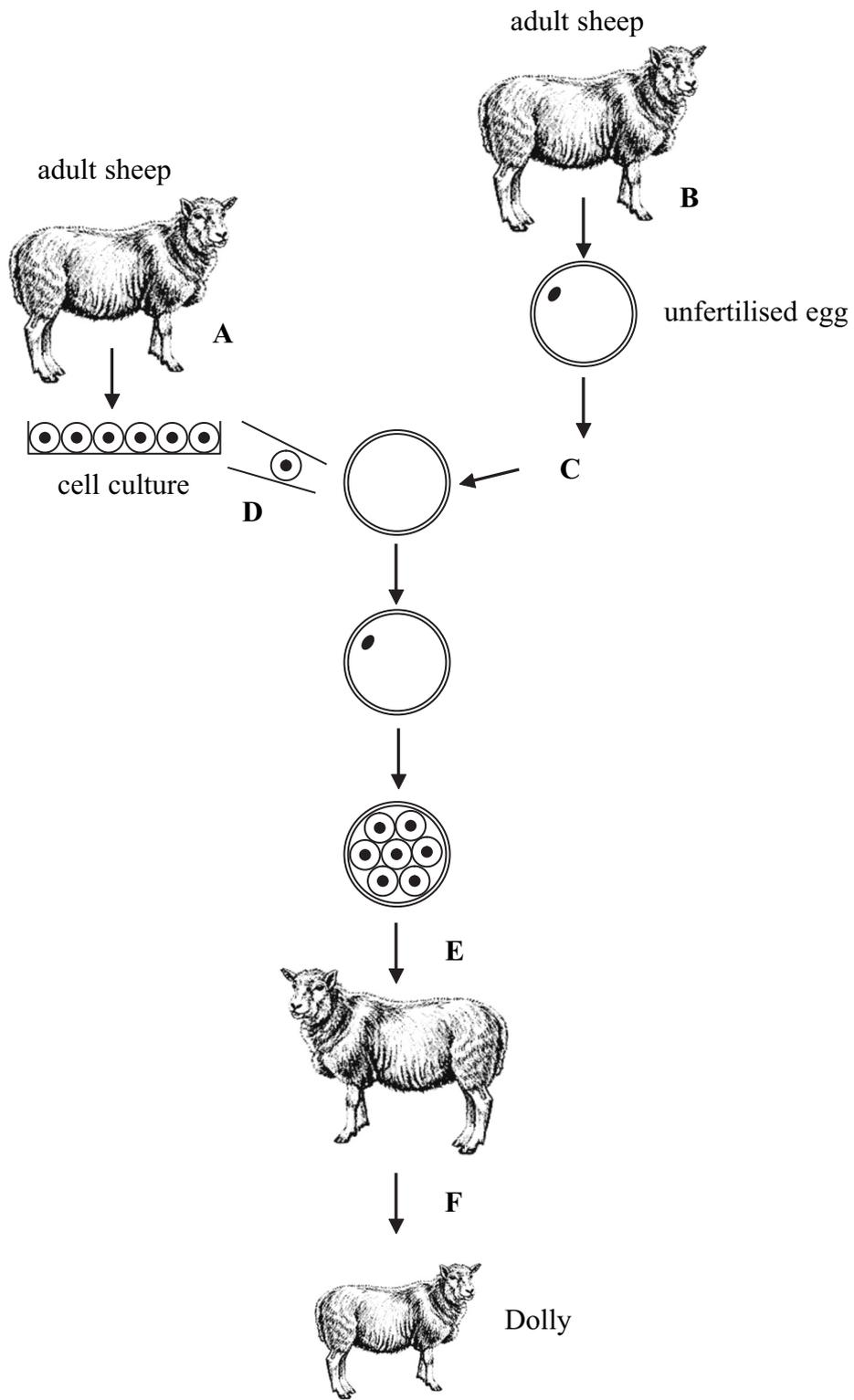
(2)

Q6

(Total 6 marks)



7. The diagram shows the stages used to produce Dolly the sheep.



(a) Use the diagram to complete the table to show the letter of the stage at which each event takes place. The first one has been done for you.

| Event | Stage letter |
|---|--------------|
| udder cells are removed and cultured | A |
| an embryo is put into a surrogate mother | |
| a nucleus is removed from an unfertilised egg | |
| an udder cell nucleus is put into an empty egg cell | |
| an unfertilised egg is removed from an adult sheep | |

(4)

(b) How many different sheep were involved in producing Dolly?

.....

(1)

(c) Dolly was a clone of the original parent sheep. What does the term clone mean?

.....

.....

.....

(2)

(Total 7 marks)

Q7



8. (a) A student was asked to write a list of the characteristics shared by all living organisms. The list is shown below but it is not complete. Complete the list by writing the names of the missing characteristics in the empty boxes.

| Characteristic |
|----------------|
| excretion |
| growth |
| movement |
| |
| |
| respiration |
| sensitivity |

(2)

- (b) Suggest why excretion is important to living organisms.

.....

.....

.....

.....

(2)

(Total 4 marks)

Q8

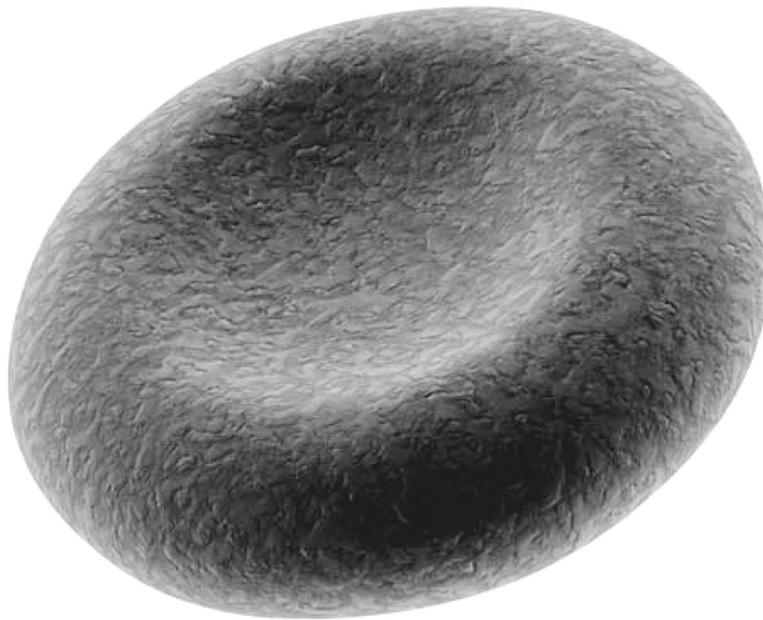


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9. The diagram shows a red blood cell.



(a) (i) What is the name of the pigment in the cell that helps it to absorb oxygen?

..... (1)

(ii) Explain how the shape of the cell helps it to absorb oxygen.

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



(b) There are two types of white blood cell. One type is called a lymphocyte and produces antibodies. The other type is called a phagocyte.

(i) In the space below, draw and label a phagocyte.

(3)

(ii) Describe how a phagocyte helps to destroy pathogens.

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

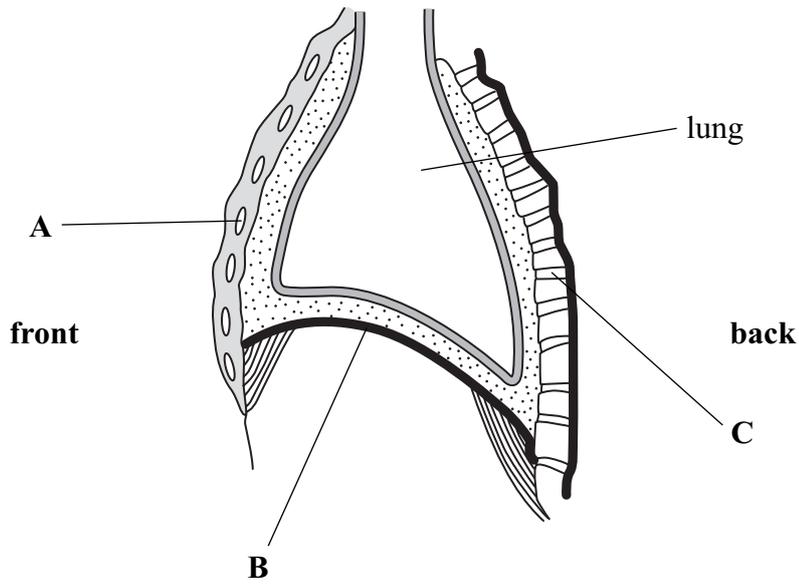
(2)

(Total 8 marks)

Q9



10. The diagram shows a section through a human thorax viewed from the side.



(a) Name the parts **A**, **B** and **C**.

A

B

C

(3)

(b) Describe what happens to **B** to help a person breathe in.

.....

.....

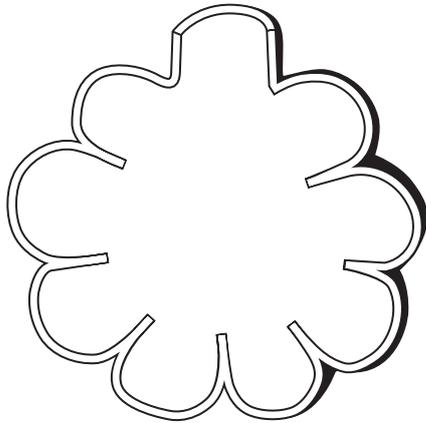
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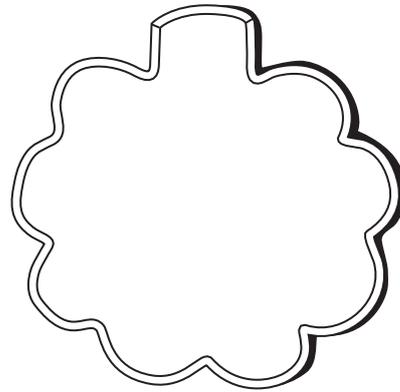
(2)



(c) Emphysema is a condition that affects alveoli. The diagram below shows an alveolus from a normal person and from a person who has emphysema.



normal person



person with emphysema

Suggest why the person with emphysema would find it difficult to walk upstairs.

.....

.....

.....

.....

.....

.....

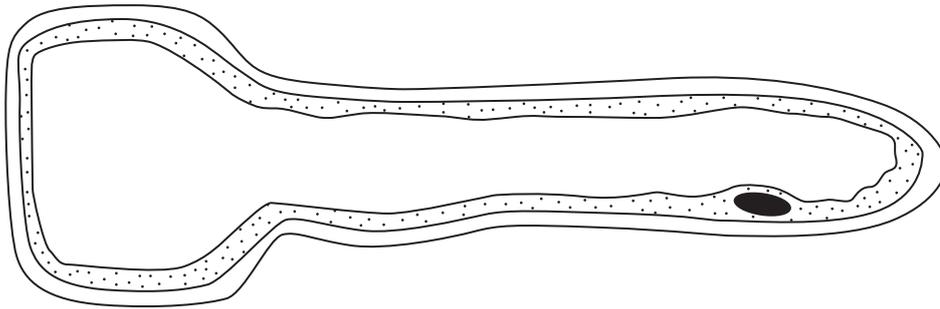
(3)

(Total 8 marks)

Q10



11. The diagram shows a root hair cell.



(a) Draw a line to the part that contains DNA. Label this part **P**. **(1)**

(b) Draw a line to the part that controls what enters the cell. Label this part **Q**. **(1)**

(c) Root hair cells absorb water and mineral ions.

(i) Name the process by which root hair cells absorb water.
..... **(1)**

(ii) Mineral ions enter root hair cells by active transport.
Explain why they enter by this method.
.....
.....
.....
..... **(2)**



(iii) Plants need mineral ions to make useful molecules.
 The table names two mineral ions.
 Complete the table by naming a molecule each mineral ion is used to make.

| Mineral ion | Molecule made using the mineral ion |
|-------------|-------------------------------------|
| magnesium | |
| nitrate | |

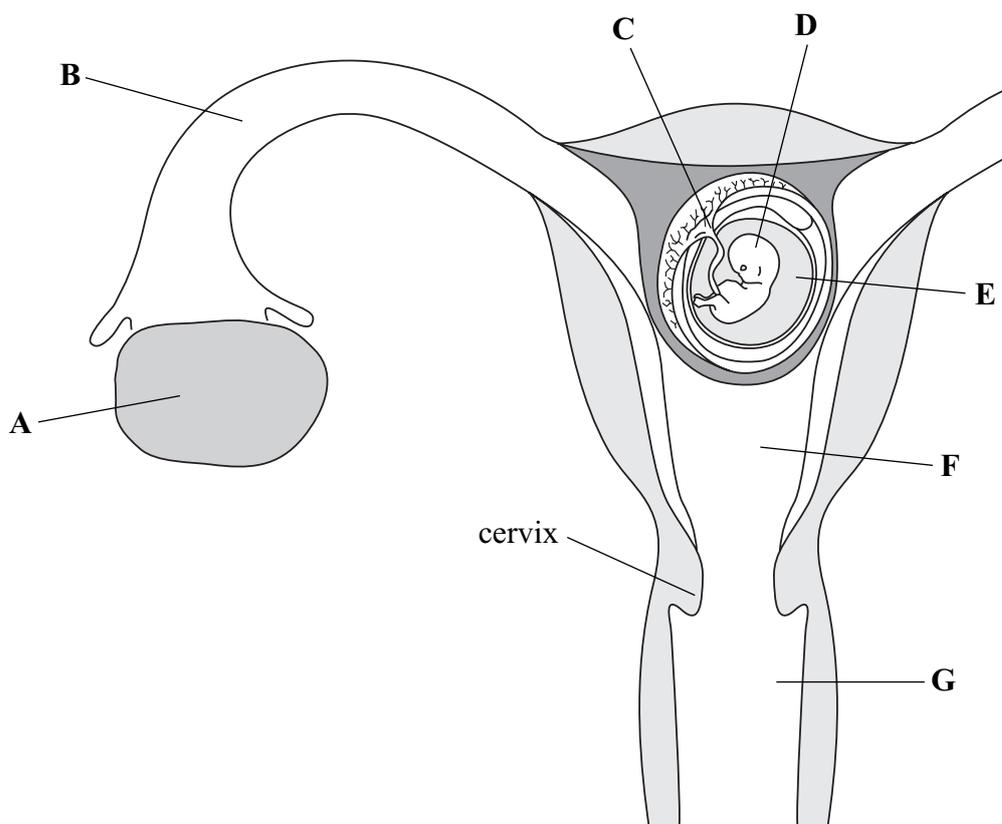
(2)

Q11

(Total 7 marks)



12. The diagram shows part of the reproductive system of a pregnant woman.



(a) Name the parts labelled **A** and **B**.

A

B

(2)

(b) (i) Which letter shows a part that releases progesterone?

.....

(1)

(ii) Why is it important that progesterone is released during pregnancy?

.....

.....

(1)



(c) (i) Which letter shows the placenta?

..... (1)

(ii) Give **two** functions of the placenta.

1
2 (2)

(iii) Cells can be removed from the placenta to test for abnormalities.
How many chromosomes would you expect to find in a cell from the placenta?

..... (1)

(Total 8 marks)

Q12



13. Carbon on Earth is found in four main sources. The table shows the amount of carbon, in relative units, in these sources.

| Source | Relative units of carbon |
|--|--------------------------|
| air | 1 |
| plant vegetation | 4 |
| fossil fuels | 14 |
| limestone (fossil shells of sea animals) | 100 000 |

(a) (i) Name **two** molecules in plants that contain carbon.

1

2

(2)

(ii) The carbon in plants can be released into the air as carbon dioxide. Give **two** ways by which this can happen.

1

2

(2)

(iii) Increasing the amount of carbon dioxide in the air can lead to global warming. Give **three** different harmful consequences of global warming.

1

2

3

(3)



(b) Burning some fossil fuels releases sulphur dioxide.
Explain the biological consequences of pollution of air by sulphur dioxide.

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

(3)

Q13

(Total 10 marks)

14. Describe how glasshouses can be used to increase the yield of a named crop.

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Q14

(Total 5 marks)

TOTAL FOR PAPER: 100 MARKS

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