

| | | |
|-------------|---------------|------------------|
| Surname | Centre Number | Candidate Number |
| Other Names | | 0 |



GCSE

4483/01

BIOLOGY

**BIOLOGY 3
FOUNDATION TIER**

A.M. TUESDAY, 13 May 2014

1 hour

| For Examiner's use only | | |
|-------------------------|--------------|--------------|
| Question | Maximum Mark | Mark Awarded |
| 1. | 9 | |
| 2. | 6 | |
| 3. | 5 | |
| 4. | 8 | |
| 5. | 8 | |
| 6. | 6 | |
| 7. | 9 | |
| 8. | 9 | |
| Total | 60 | |

ADDITIONAL MATERIALS

In addition to this paper you may require a calculator and a ruler.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet.

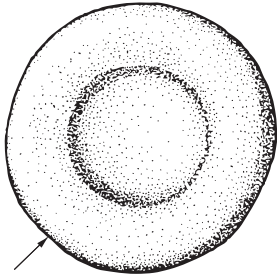
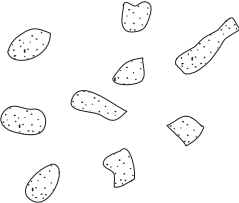
INFORMATION FOR CANDIDATES

The number of marks is given in brackets at the end of each question or part-question.

You are reminded that assessment will take into account the quality of written communication used in your answer to question **8(b)**.

Answer **all** questions.

1. (a) The table below has information on some of the parts of blood.

| part of blood | structure | function |
|------------------|---|-------------------------|
| red blood cell |  | <p>.....</p> |
| white blood cell | | defence against disease |
| platelets |  | <p>.....</p> |

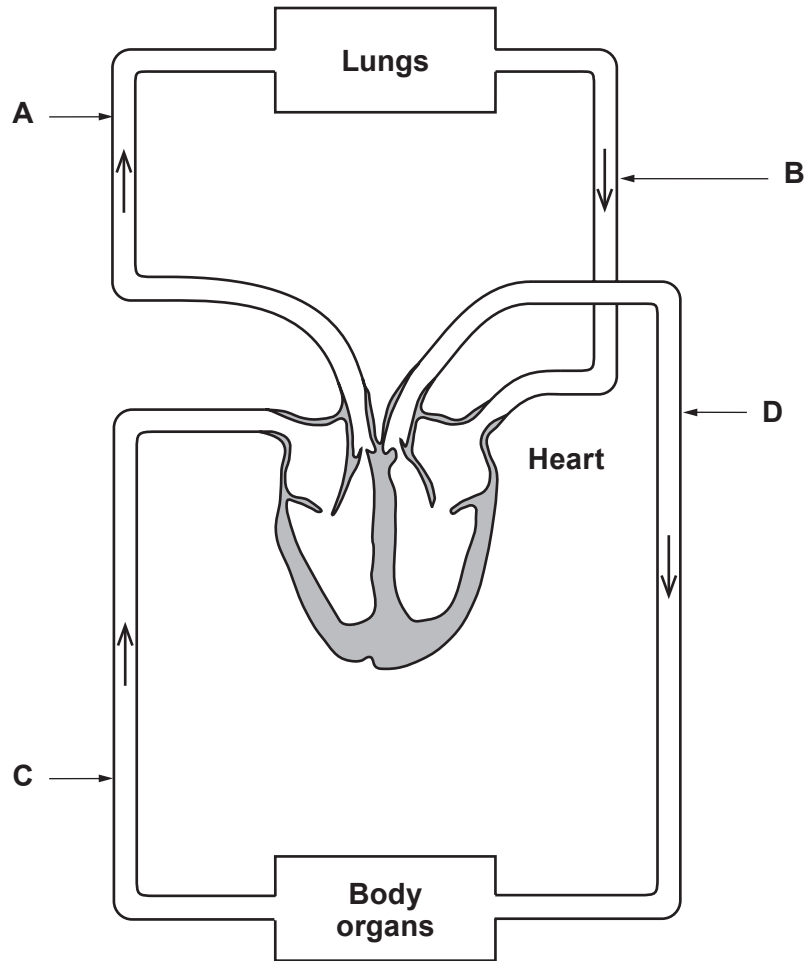
Complete the table above by

- (i) drawing a diagram of a white blood cell and labelling the cell membrane and nucleus; [2]
- (ii) giving the functions of a red blood cell and platelets. [2]

(b) The liquid part of the blood is called plasma. State **two** substances which are transported in blood plasma. [2]

.....

(c) The diagram below shows the human circulatory system.



- (i) From the diagram above, state the letter which shows [2]
- I. the pulmonary artery
 - II. the aorta
- (ii) Name the doctor, working in the 17th century, who discovered how blood circulated around the human body. [1]
Underline your answer.

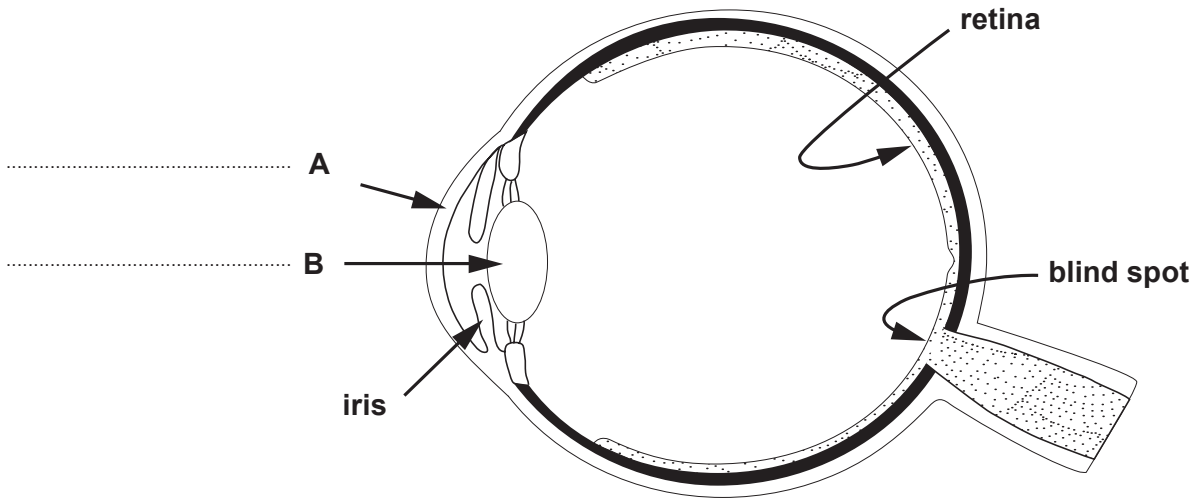
Harvey

Fleming

Mendel



2. The diagram below shows a section through the human eye, with some parts labelled.



(a) (i) Label **A** and **B** on the diagram. [2]

(ii) The retina is the light sensitive layer of the eye where images are formed. Explain why no image is detected at the blind spot. [2]

.....

.....

(b) Name the parts of the eye described below. [2]

Description

Part of the eye

tough, protective coating

.....

layer containing blood vessels

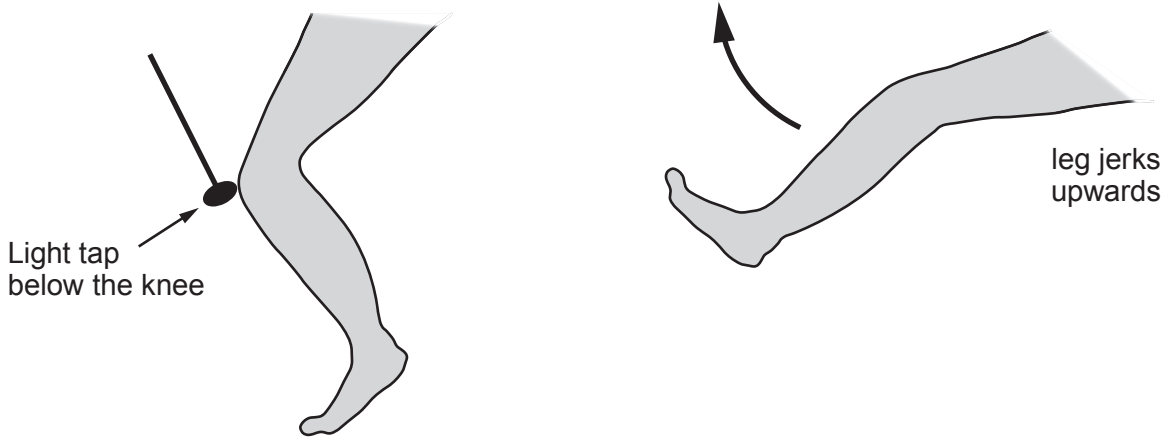
.....

3. (a) Complete the sentence about the human nervous system.

[2]

The central nervous system consists of the and

(b) The diagram below shows the knee jerk response, which is a reflex action.



(i) Apart from being very fast, state **one other** feature of **all** reflex actions.

[1]

.....

(ii) Give **one other** reflex action which occurs in the human body and state its purpose.

[2]

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

4483
010005

4. (a) Complete the sentence. [1]

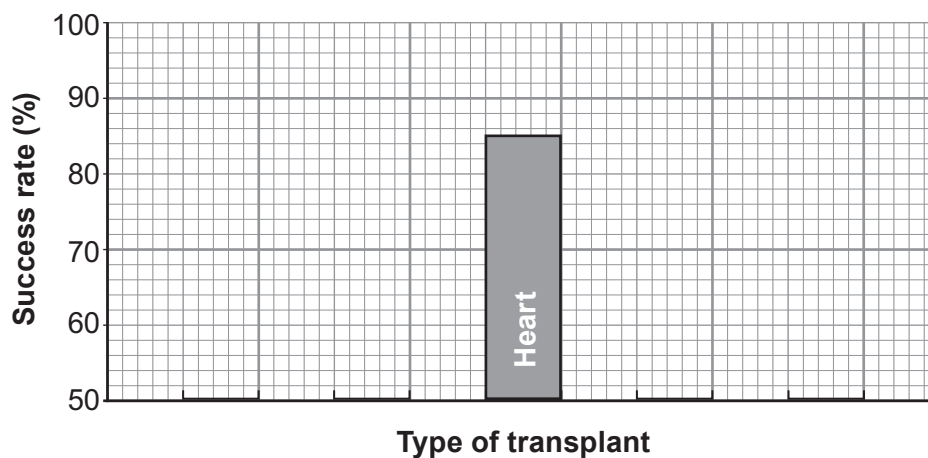
The kidneys remove waste products in a process called

- (b) When a human organ fails to function doctors can carry out a transplant operation using an organ from a donor. The transplant is said to be successful if the transplanted organ functions normally for at least one year.

The table below compares the success rates of some transplant operations.

| type of transplant | success rate (%) | year when doctors first started transplants | number of years doctors have been doing transplants (up to 2014) |
|---------------------------|------------------|---|--|
| kidney (family donor) | 98 | 1960 | 54 |
| kidney (non-family donor) | 87 | 1960 | 54 |
| lung | 77 | 1986 | |
| heart | 85 | 1975 | |
| liver | 84 | 1983 | 31 |

- (i) Complete the table by writing your answers on the dotted lines. [1]
- (ii) Complete the bar chart below by adding the bars for kidneys, liver and lung. Place the bars in order from the **most** to the **least** successful and label them. *The bar for heart has been completed for you.* [3]



- (iii) Use only information in the table and the bar chart to suggest a reason why the success rates for the various transplant operations are different. [1]

.....

.....

- (iv) From your own knowledge, explain why a kidney transplant is more likely to be successful when the donor is a family member. [2]

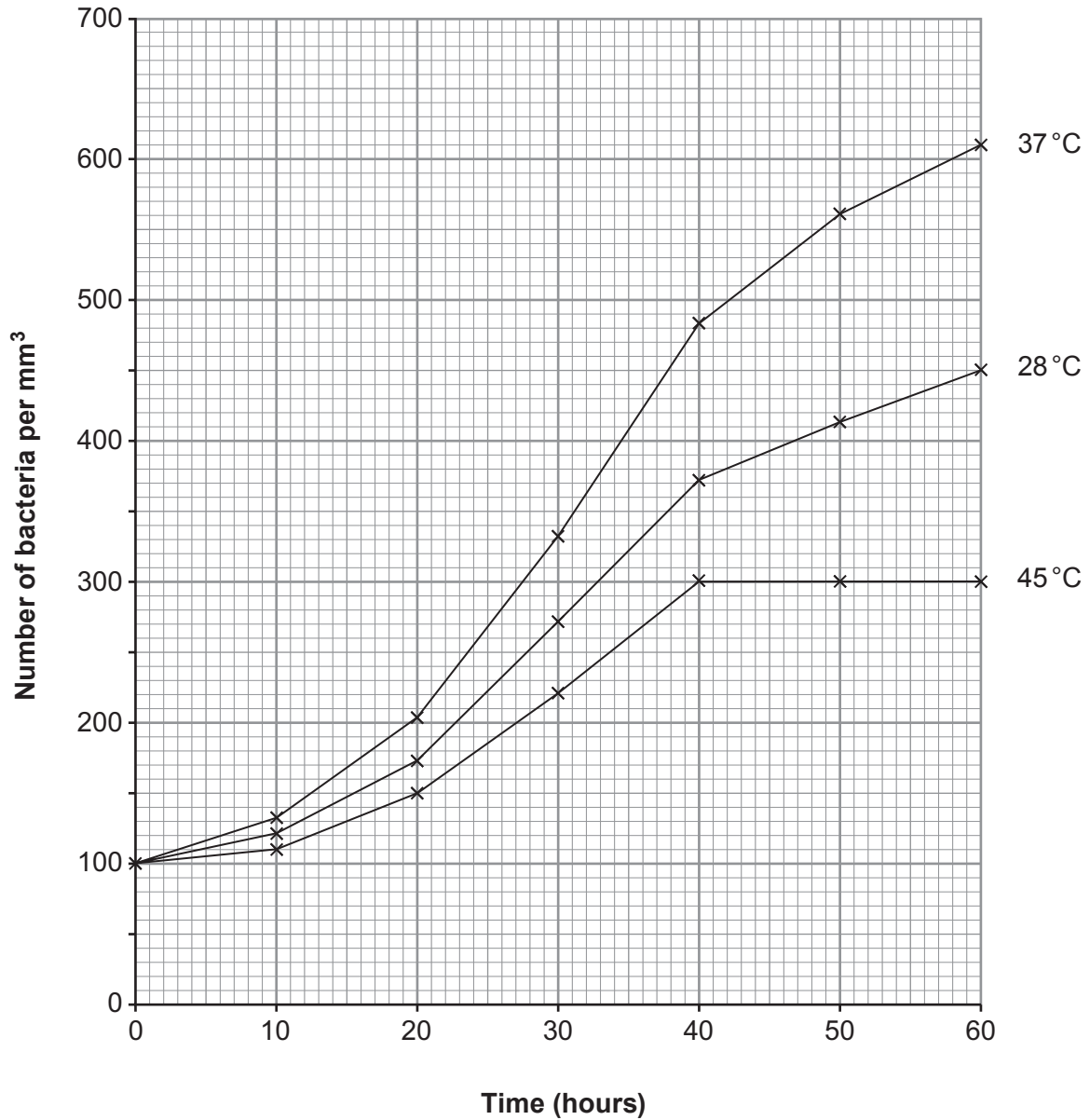
.....

.....

.....

| |
|---|
| |
| 8 |

5. A scientist investigated the growth of the bacterium *E. coli* at different temperatures. The results are shown in the graph below.



(a) From the graph

- (i) Describe the change in numbers of bacteria from 20 – 60 hours at 45°C. [2]

.....

.....

.....

- (ii) Calculate the difference in numbers of bacteria between 28°C and 37°C at 25 hours.
Show your working. [2]

..... per mm³

- (iii) How did increasing the **temperature** affect the numbers of bacteria present? [2]

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

- (b) After the investigation, another scientist was asked to carry out the same investigation using exactly the same methods and apparatus as the first scientist. Why was this necessary? [1]

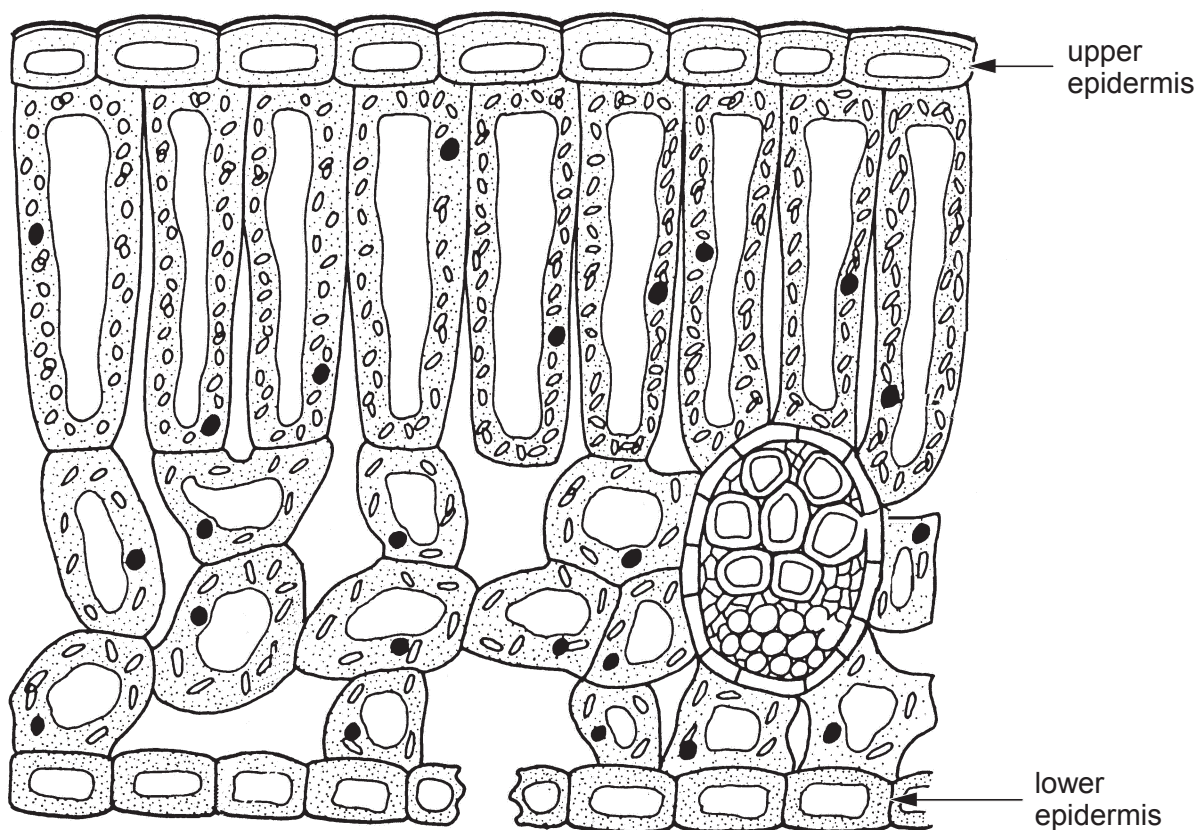
.....
.....

- (c) *E.coli* in food can cause illness in humans. State why meat must be kept in a refrigerator. [1]

.....

| |
|---|
| |
| 8 |

6. (a) The diagram below shows a leaf in section.



- (i) State the name of the tissue in a leaf that transports sugar. [1]

- (ii) On the diagram above, label this tissue with the letter **A**. [1]
- (b) Complete the following sentence. [1]
 Sugar cannot be stored in a plant, it has to be converted into
 for storage.

- (c) (i) Ethanol can be made by reacting sugar with yeast.
State the name of the reaction between sugar and yeast that produces ethanol. [1]

.....

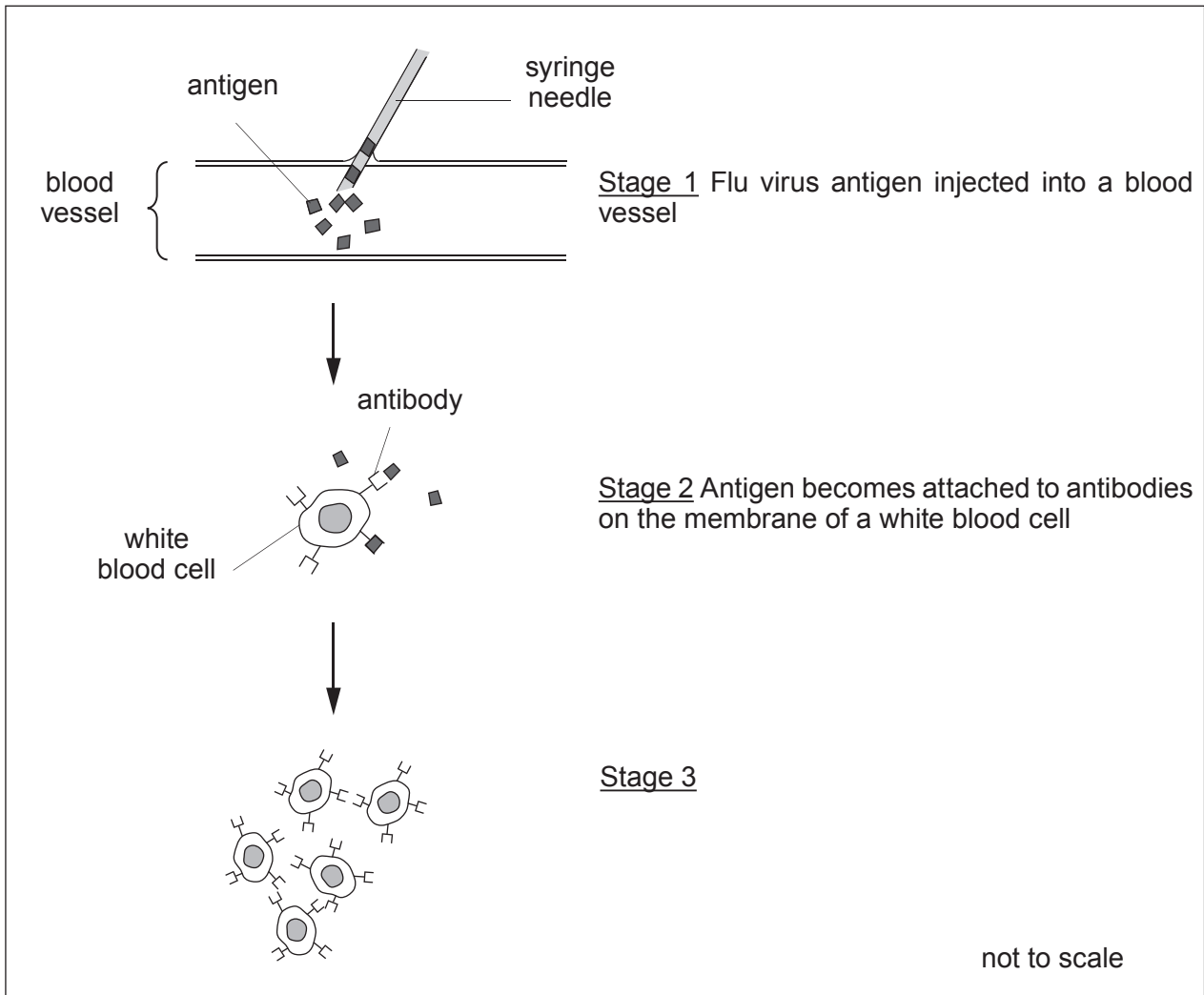
- (ii) Ethanol is a biofuel. The area of farmland used only to grow crops for the production of biofuel could double over the next 15 years.

Suggest **two** reasons why many people have concerns about using so much farmland for this purpose. [2]

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

| |
|---|
| |
| 6 |

7. The diagram below shows stages in the response by one type of white blood cell to a flu virus vaccination.



- (a) (i) Name the type of white blood cell that produces antibodies. [1]

.....

- (ii) Describe the process that has taken place between stages 2 and 3. [2]

.....

- (iii) State the importance of stage 3 in protecting the body from the flu virus. [1]

.....

(b) New forms of flu virus appear almost every year in the UK.
Suggest why a government report recommends that flu vaccines should be given every year. [2]

.....

.....

.....

.....

(c) Name the English doctor who first used vaccination to treat a patient in the UK. [1]

.....

(d) After an injection, blood clots at the site of the wound.
Suggest why it is important for blood to clot at the site of a wound. [2]

.....

.....

.....

.....

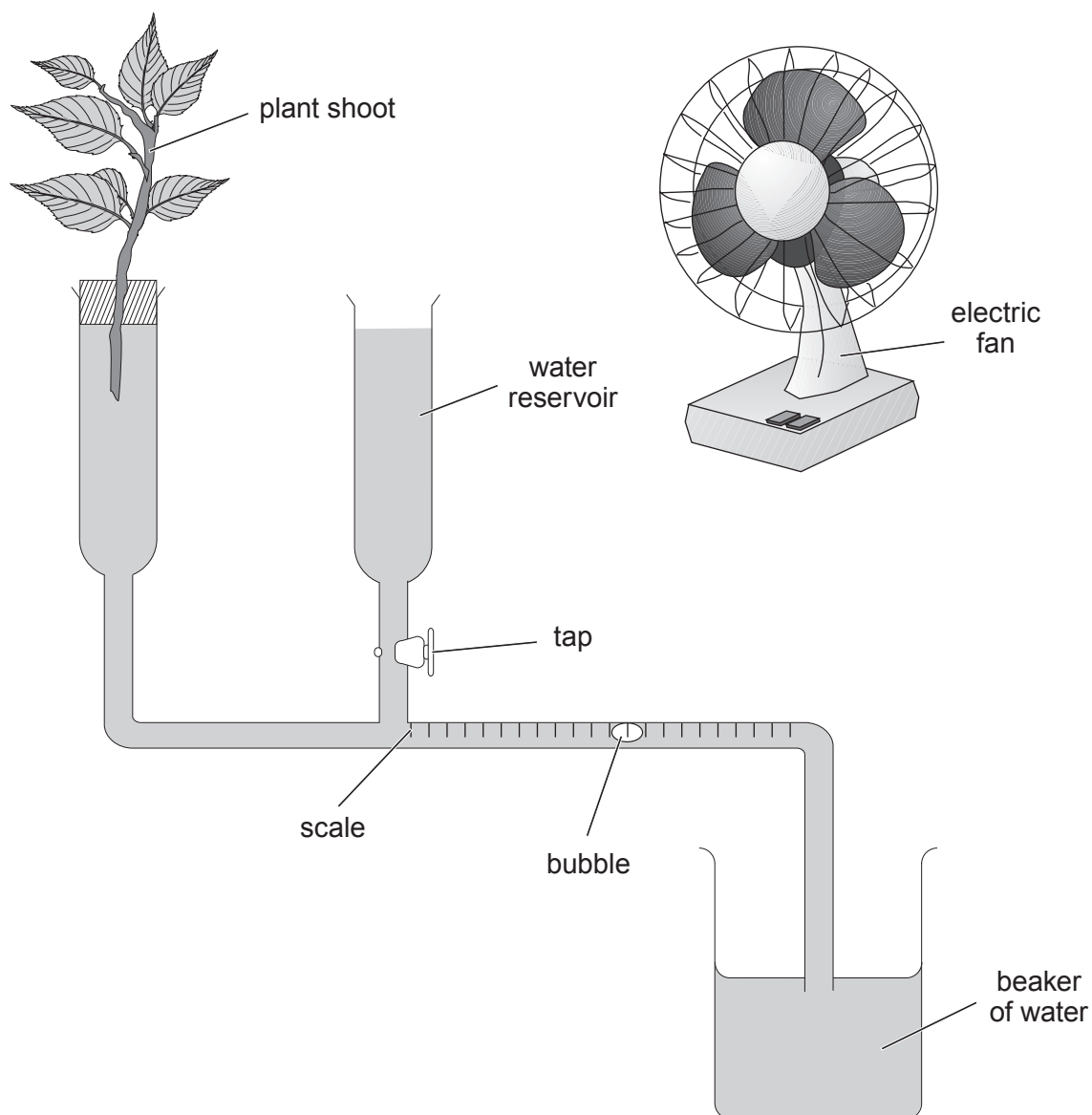
| |
|---|
| |
| 9 |

8. (a) What word is used to describe water loss from the leaves of a plant?

[1]

.....

The diagram below shows a plant shoot in a simple potometer and an electric fan.



(b) Describe how you would investigate the effect of moving air on the rate of water loss from the shoot using the apparatus shown opposite. [6 QWC]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(c) Apart from air movement, give **two other** environmental factors that affect the rate of water loss from a plant. [2]

- 1.
- 2.

END OF PAPER