

Candidate Name	Centre Number	Candidate Number
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GCSE

243/02

**SCIENCE BIOLOGY
HIGHER TIER
BIOLOGY 3**

P.M. THURSDAY, 19 May 2011

45 minutes

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1	5	
2	4	
3	6	
4	6	
5	4	
6	9	
7	6	
8	10	
Total	50	

0243
02/0001

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.

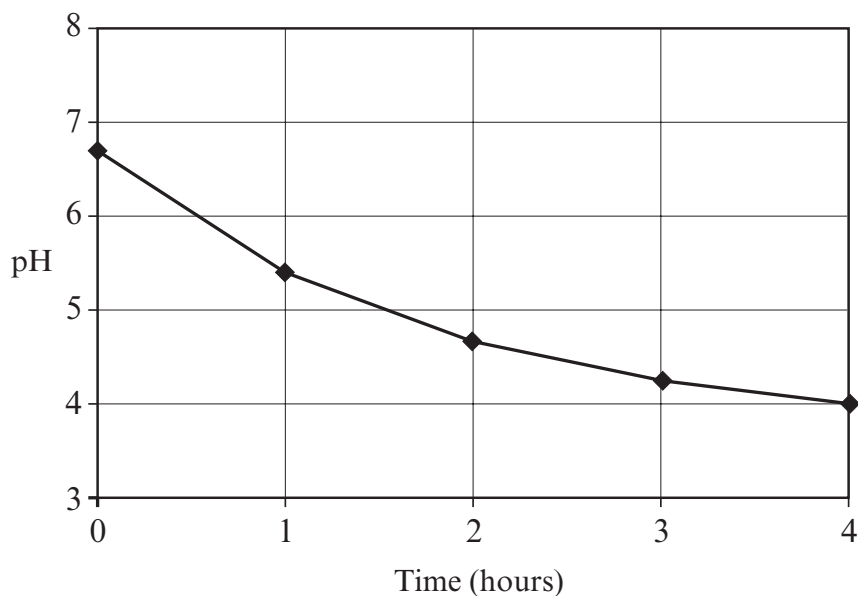
INFORMATION FOR CANDIDATES

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

You are reminded of the necessity for good English and orderly presentation in your answers.

Answer **all** questions.

1. During yoghurt making the pH of the milk used in the process changes. The graph below shows these changes over a 4 hour period.



- (a) **Describe** the change shown in the graph. [1]

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- (b) **Explain** how this change in pH is brought about during the yoghurt making process. [3]

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- (c) State **one** factor that must remain constant during this phase of the yoghurt making process. [1]

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2. Megan was concerned about the high cost of running her washing machine. She washed some of her baby's egg stained clothes in two different washing powders at 30°C and at 80°C. Megan's results are shown in the table below.

Temperature / °C	Washing powder	
	<i>Sudsbright</i> (non biological)	<i>SuperBIO</i> (biological)
30	Egg stains remaining	No egg stains
80	No egg stains	Egg stains remaining

(a) Explain the results for *SuperBIO* at

(i) 30°C;

[2]

.....

.....

.....

(ii) 80°C.

[1]

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.....

(b) Which washing powder would you recommend that Megan uses? Explain your answer. [1]

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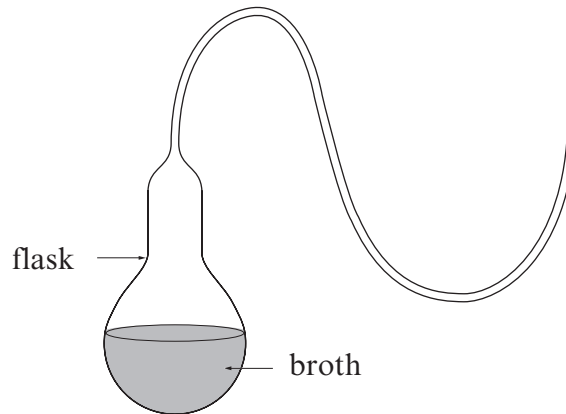
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3. The diagram shows the apparatus used by a famous scientist in the 19th Century to disprove the theory of spontaneous generation.

(a) What is meant by the term *spontaneous generation*? [1]

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.....



(b) (i) Name the flask shown above. [1]

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(ii) Name the famous scientist, who used the apparatus above, to disprove the theory of, spontaneous generation. [1]

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(c) When the above apparatus was used, the contents of the flask were boiled and the neck of the flask was sealed.

(i) State why the contents of the flask were boiled. [1]

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(ii) State why the neck of the flask was sealed. [1]

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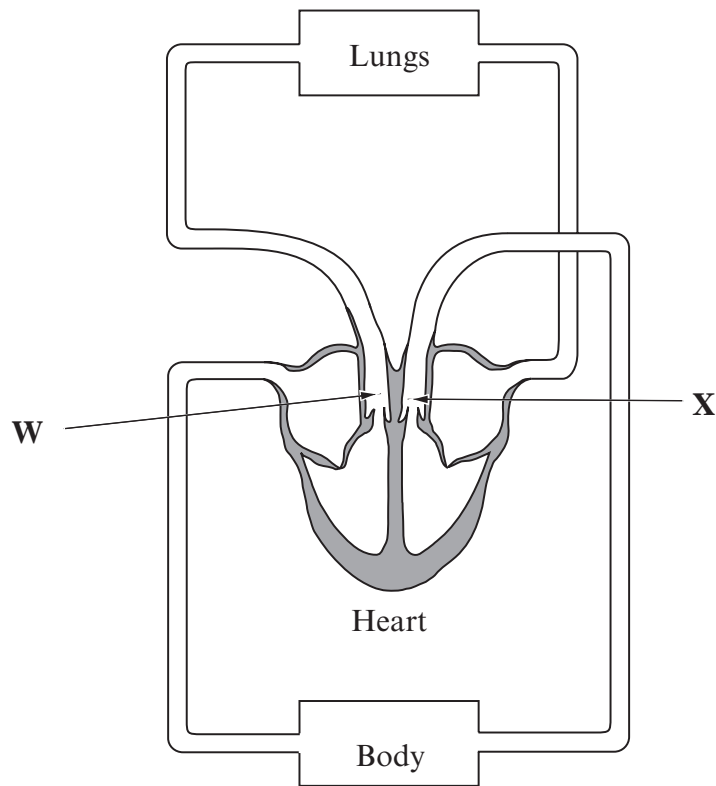
(d) Some of the sealed flasks were opened in a room full of people and were left there for 8 hours. Other sealed flasks were opened on the top of a mountain and left for the same amount of time. Both sets of flasks were then sealed and returned to the laboratory. After 3 days the contents of the flasks were examined.

State **one** difference you would expect to see between the two sets of flasks. [1]

.....

.....

4. The diagram shows the human circulatory system.



(a) (i) Name the blood vessels labelled: [2]

W

X

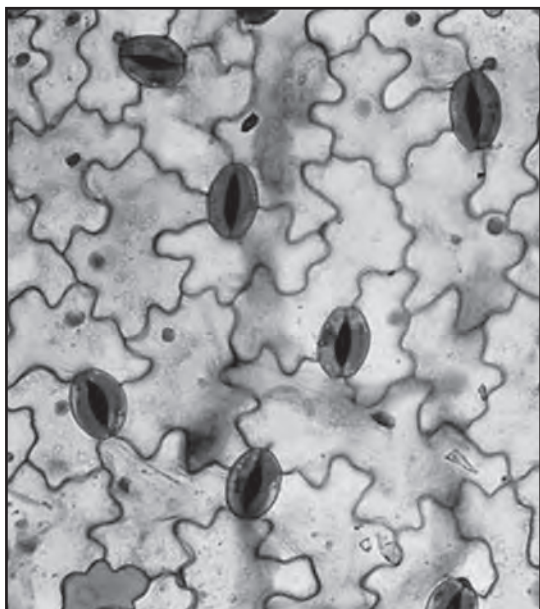
(ii) State **two** differences between the blood in vessels **W** and **X**. [2]

	Blood in vessel W	Blood in vessel X
1
2

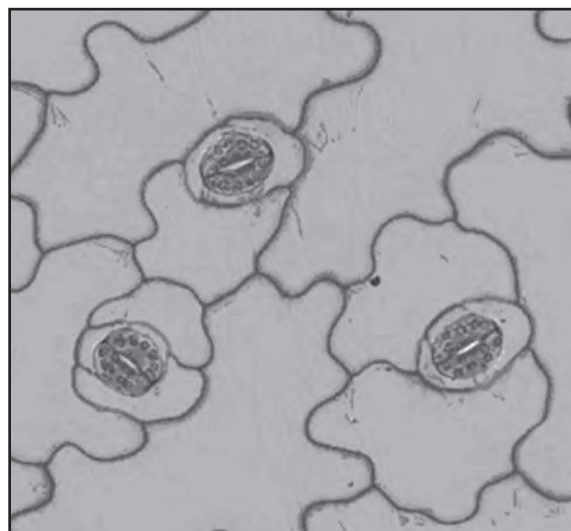
(b) Using the diagram only, state whether the ventricles are contracting or relaxing. Explain your answer. [2]

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5. Students investigated the distribution of stomata on the lower surface of a leaf from two different plants, **A** and **B**.
The students viewed the leaves under the microscope. Both images were viewed under the same magnification and occupied the same surface area.

Leaf from plant **A**

Google Images

Leaf from plant **B**

© Image by John Adds

- (a) Using an arrow, label **one** of the guard cells in the leaf from plant **B**. [1]
- (b) Suggest which of the plants is better adapted to living in a dry environment. Explain your answer. [2]

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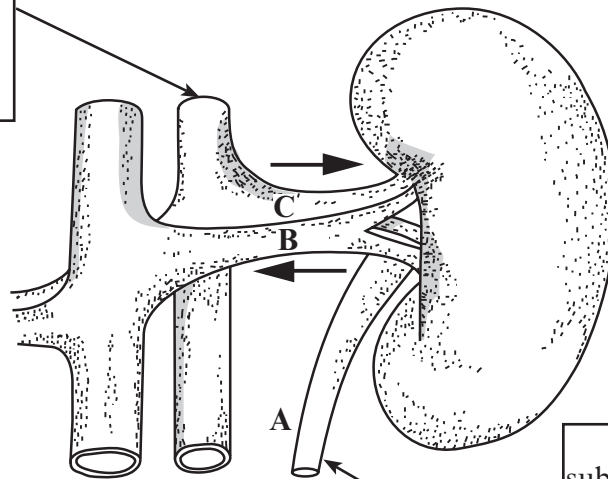
- (c) Stomata can open and close. Explain why it is important that they do not remain closed. [1]

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6. The diagram shows a simplified summary of what happens in a human kidney which is diseased and does not function correctly.

Concentration of substances in blood entering kidney (g per 1)	
protein	75.0
urea	0.5
glucose	1.0
salt	9.0



Concentration of substances in urine (g per 1)	
protein	10.0
urea	40.0
glucose	1.0
salt	12.0

→ = direction of blood flow

- (a) Name A
- B
- C

[3]

(b) What **two** pieces of evidence in the boxes suggest that the person's kidney is not working properly?

[2]

.....

.....

(c) Explain why the concentrations of urea and salt are higher in urine than in the blood.

[2]

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(d) A diseased kidney may be replaced by a healthy one by transplanting one from a donor to a recipient.

State the most important precaution that has to be taken

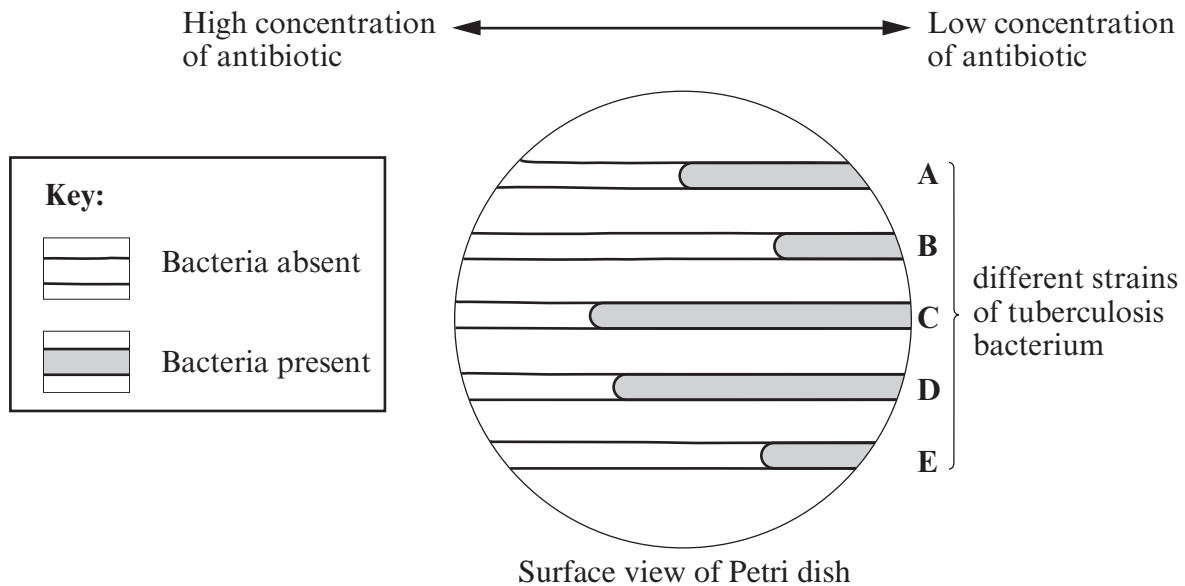
(i) before the transplant takes place; [1]

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.....

(ii) after the transplant has taken place and the surgery has been completed. [1]

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7. A scientist investigated how effective an antibiotic was in treating five different strains of the bacterium which causes tuberculosis. She prepared an agar plate with a concentration gradient of the antibiotic. She then spread the different strains of the bacterium across the agar plate in 5 different lines labelled A to E. The plate was incubated at 37°C for 12 hours.



- (a) Which strain is the most resistant to the antibiotic? Explain your answer. [2]

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- (b) Explain how resistance to antibiotics has evolved in bacteria which infect humans. [4]

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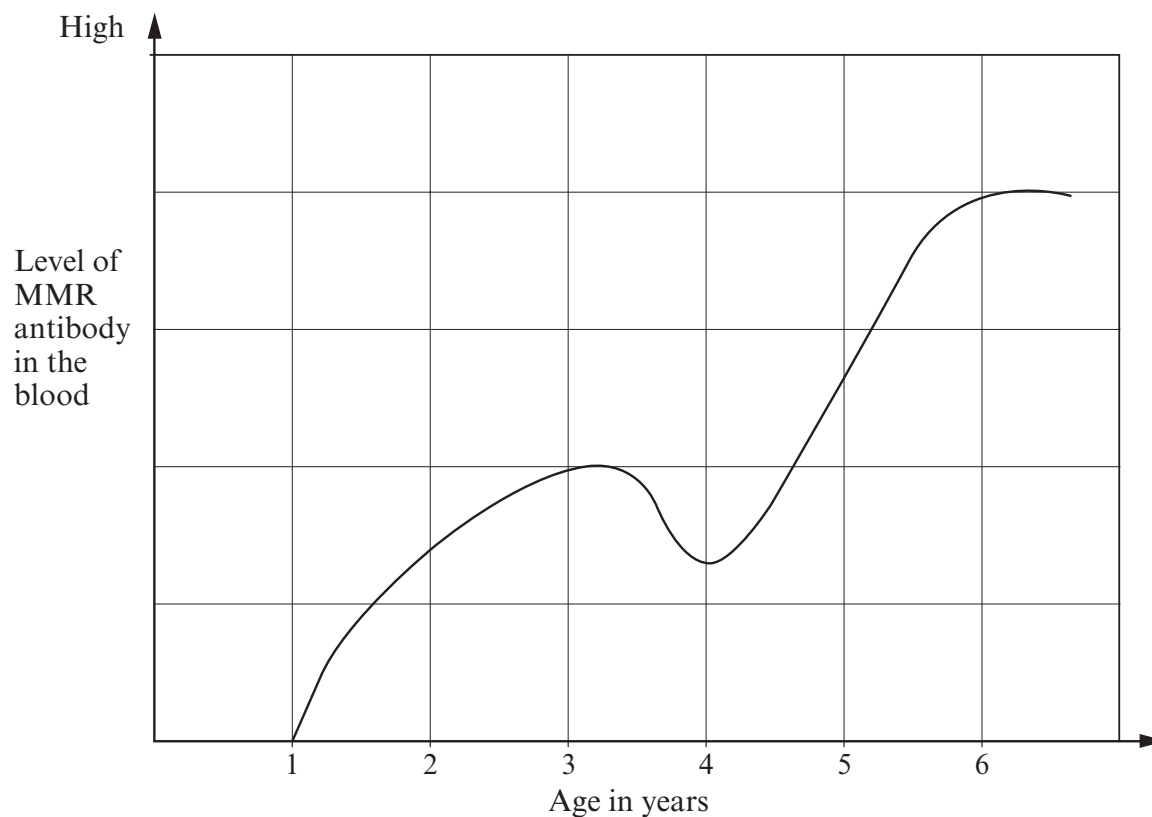
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8. Different types of vaccine are used to protect people against different diseases. Some vaccines are made using the microbes which cause the disease.

The graph below shows the level of antibodies in the blood of a child vaccinated against mumps, measles, and rubella (MMR).



- (a) Use the graph to
- (i) state the **two** ages when the MMR vaccinations were given;
 and [1]
 - (ii) explain why second (booster) vaccinations are needed. [2]

- (b) Describe and explain how a vaccine protects the body from a microbe such as the measles virus. [4]

- (c) An unfounded report stating that the MMR vaccine was a danger to health was published in 2004. After the report was published many parents decided not to have their children vaccinated against MMR. This resulted in an increase in the number of cases of mumps, measles and rubella, as follows:

Date	Number of cases
Jan 2007 - Jan 2008	990
Jan 2008 - Nov 2008	1217

In some countries, vaccination of school children is compulsory.

Make a case

- (i) for compulsory vaccination;

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- (ii) against compulsory vaccination.

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[3]