

Surname	Centre Number	Candidate Number
Other Names		0

**GCSE**

4483/01

BIOLOGY**BIOLOGY 3
FOUNDATION TIER**

A.M. TUESDAY, 14 May 2013

1 hour

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

Answer **all** questions.

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1. (a) (i) The following information relates to the kidney.
Draw lines to join the scientific terms with the correct descriptions. [2]

scientific term

description

ureter

fluid leaving the kidney

urethra

tube carrying waste solution
out of the body

urine

tube carrying waste solution to the bladder

- (ii) Name the process by which waste substances are removed from the blood by the kidneys.
Underline your answer. [1]

excretion

elimination

egestion

- (b) Kidney failure can be treated by a transplant.
State what can be done to reduce the risk of rejection of a transplanted kidney.

- (i) **Before** the transplant operation. [1]

.....

- (ii) **After** the transplant operation. [1]

.....

(c) Kidney failure can also be treated using a machine, which removes waste from the blood.



(i) Name the process carried out by this machine. [1]

.....

(ii) Give one **disadvantage** of this treatment, compared with a kidney transplant. [1]

.....

.....

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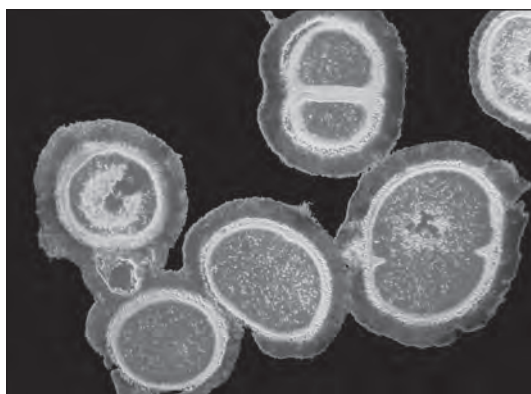
2. Read the following information about treating human diseases with antibiotics.

Problems with antibiotics

From 1944, the antibiotic Tetracyclin was used to treat the disease cholera. In 1952 doctors noticed that it no longer killed all cholera bacteria.

The bacterium *E.coli* often infects humans and can cause blood poisoning. Doctors recorded 18000 cases in 2000 but in 2008, the number rose to 23000 because the bacterium became more difficult to kill with antibiotics.

In 2010, a scientific investigation found that many bacteria, such as MRSA could not be killed by antibiotics.



MRSA

- (a) Use this information to answer the questions.

- (i) Which disease was treated with Tetracyclin and for how long was it fully effective? [1]

disease

fully effective for years

- (ii) I. How many extra cases of blood poisoning were reported in 2008 compared to 2000? [1]

.....

- II. Suggest why doctors are particularly worried that antibiotics are becoming less effective in controlling the bacterium, *E.coli*. [1]

.....

.....



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(b) (i) What term is used to describe bacteria which cannot be killed by antibiotics? [1]

.....

(ii) How may doctors have made the problem of MRSA worse over past years? [1]

.....

.....

(c) Influenza ('flu') is caused by a virus. Why is it not possible to treat this illness with antibiotics? [1]

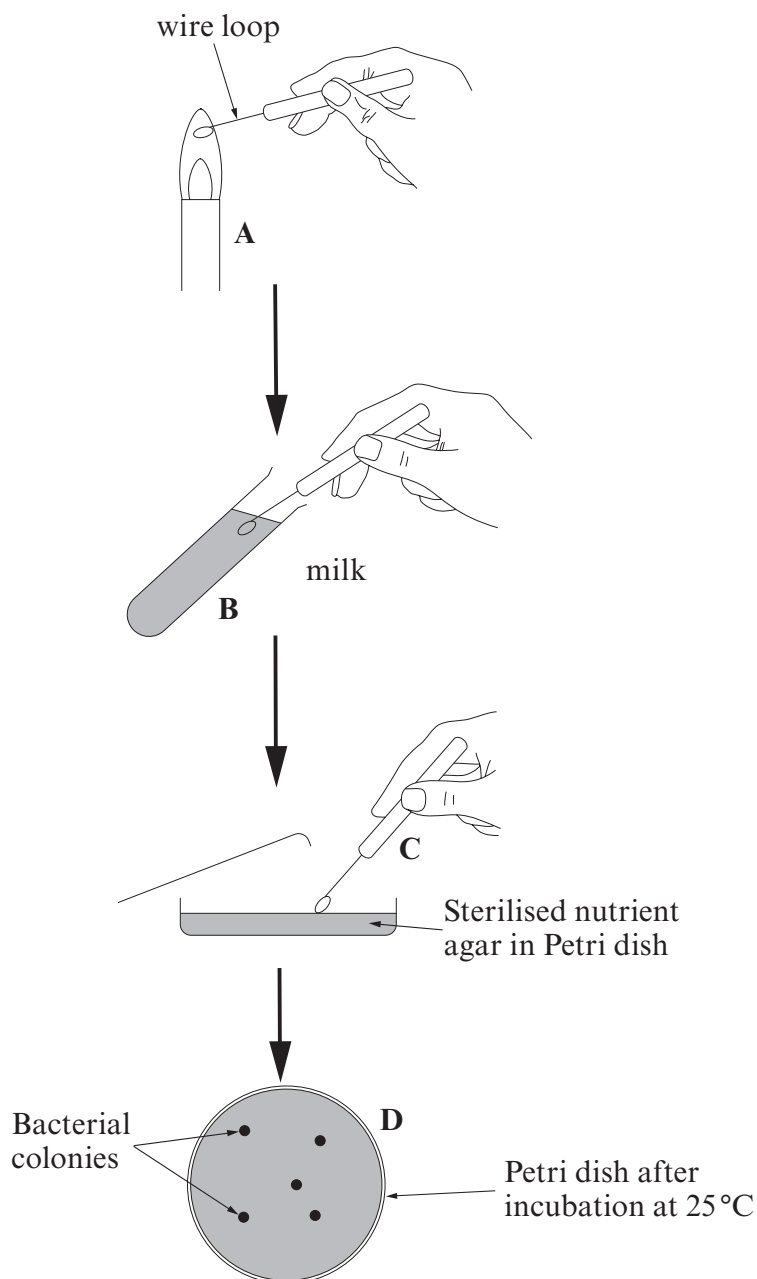
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3. The flow diagram below shows how a student tested milk to find how many bacteria were present.

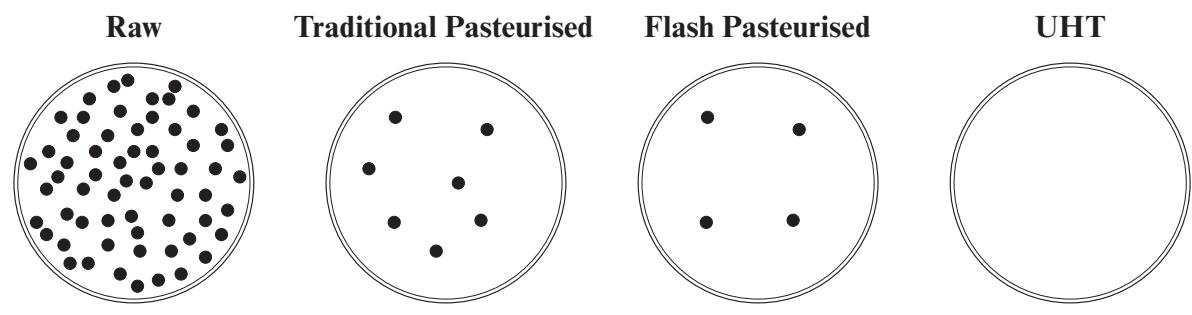


Use the flow diagram and your own knowledge to answer the following questions.

- (a) (i) How did the student know when to stop heating the wire loop in **A** above? [1]
-
- (ii) Why was the agar in **C** sterilised? [1]
-
- (iii) How would the student know how many bacteria were put onto the nutrient agar in **C**? [1]
-

(b) Scientists investigated the number of bacterial colonies in samples of milk which had been treated differently. The results are shown in the diagrams and table below.

Agar plates with bacterial colonies from 0.1 cm³ milk samples



type of milk	heat treatment	number of bacterial colonies in a 0.1 cm ³ sample	number of bacterial colonies in a 30 cm ³ serving
raw	none	60	18 000
traditional pasteurised	63°C for 30 min
flash pasteurised	77°C for 35 seconds	4	1 200
UHT	135°C for 2 seconds	0	0

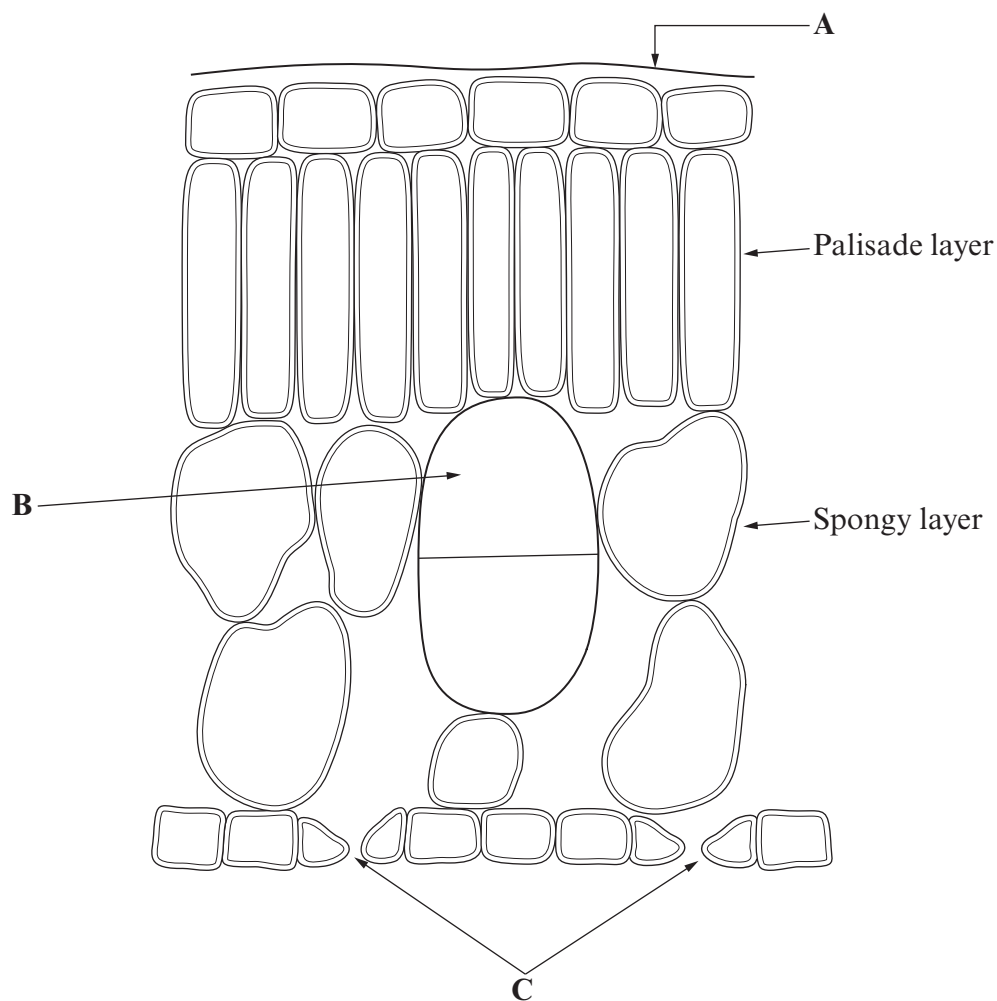
- (i) Use the diagrams above to complete the table by adding the results for traditional pasteurised milk. [2]
- (ii) State the type of milk treated [1]
 - I. at the highest temperature,
 - II. for the longest time.
- (iii) Which type of milk has the greatest number of bacteria in a given volume? [1]

.....
- (iv) UHT milk is stacked on supermarket shelves at room temperature but pasteurised milk must be kept in a refrigerator below 5 °C. What is the reason for this difference? [1]

.....

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4. The diagram below shows a transverse section through a leaf.

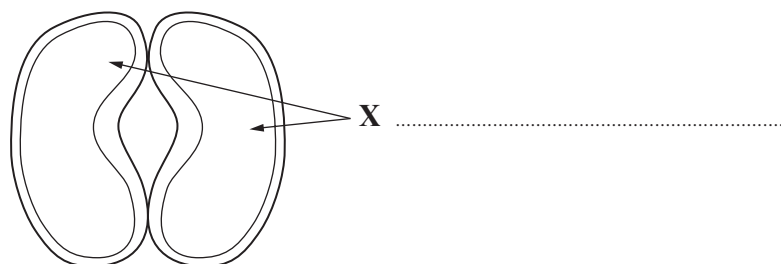


(a) From the diagram above, complete the table below.

[3]

Label	Name of structure	Function
A	prevents water loss from the leaf
B	transports water to all parts of the plant
C	allows water vapour to pass out of the leaf

(b) The diagram below shows a surface view of structure C at high magnification.



(i) Label cells X on the diagram above.

[1]

(ii) State the function of cells X.

[1]

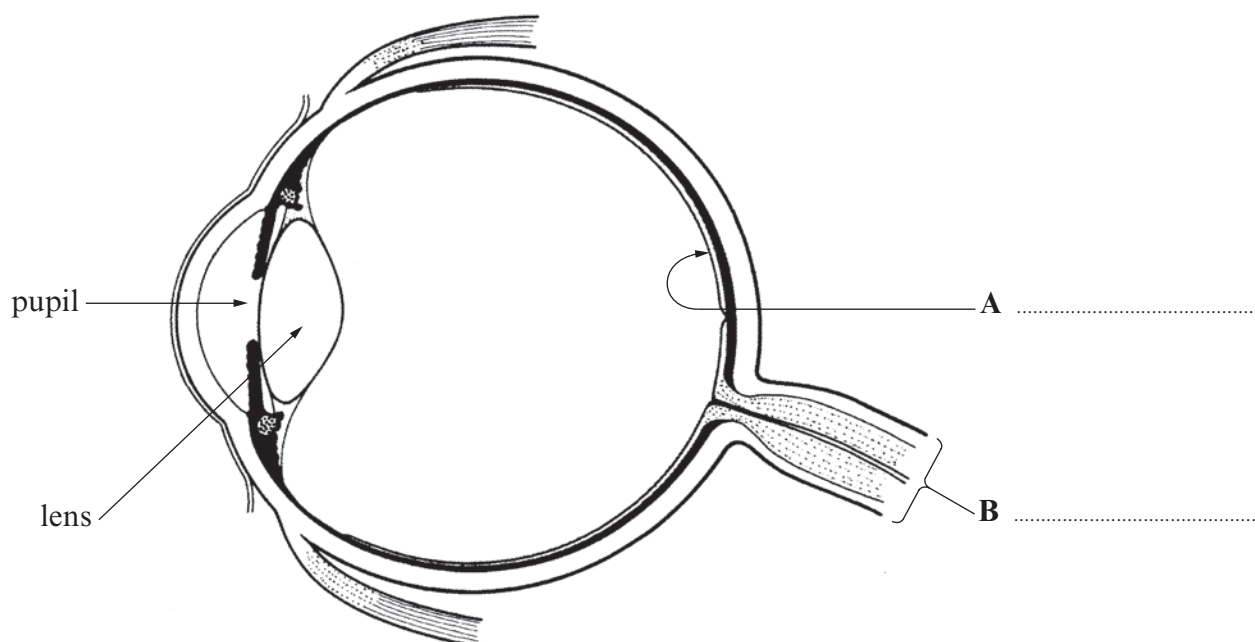
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5. (a) The diagram below shows the structure of the eye. Complete labels **A** and **B**.

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[2]



- (b) Scientists investigated how the diameter of the pupil of the eye changed in different light intensities. The results are shown below.

light intensity (a.u.)	pupil diameter (mm)
0	8.0
5	8.0
10	7.1
15	6.3
20	5.4
25	4.5

- (i) Complete the line graph opposite for these results by:

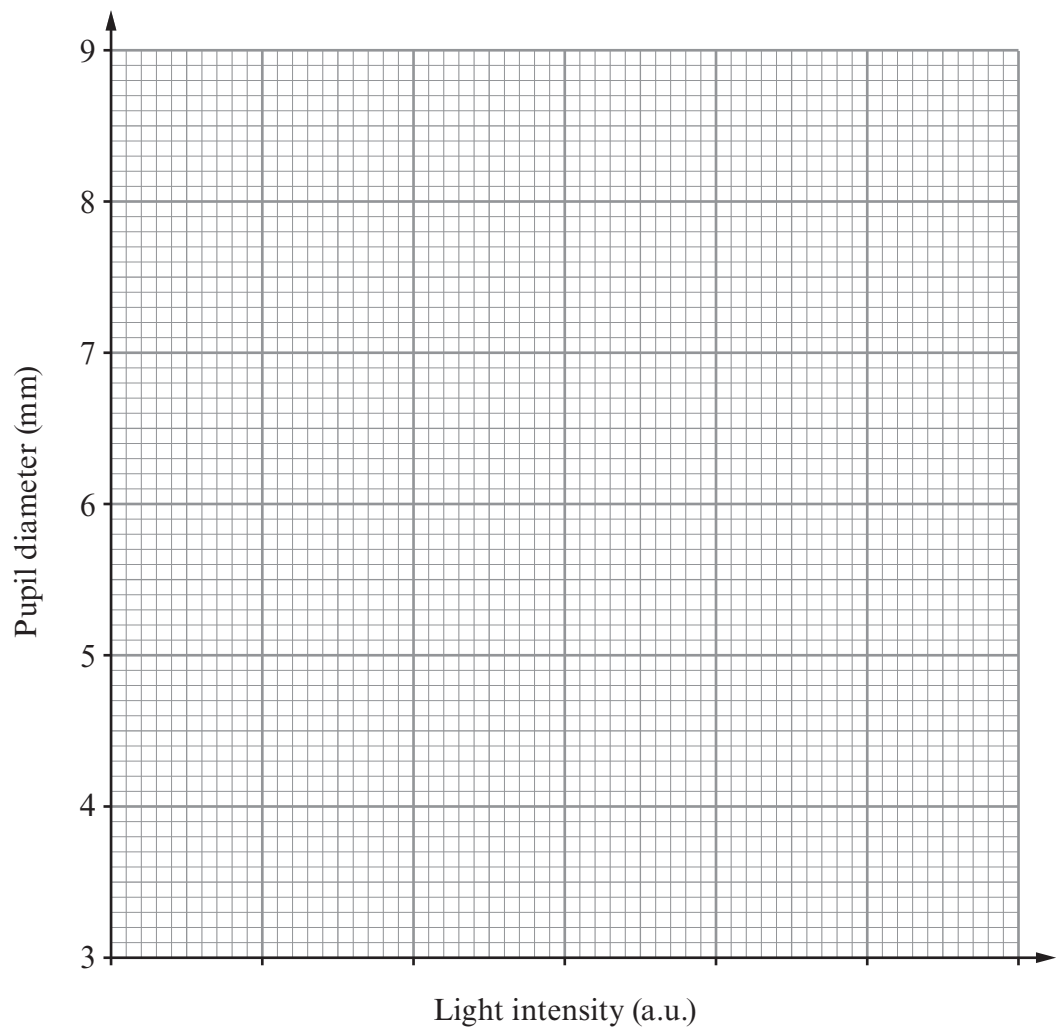
- I. choosing the scale on the axis for light intensity;
- II. plotting the points;
- III. drawing a line, with a ruler, to join the plots.

[1]

[2]

[1]

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(ii) From this graph

I. Describe what happens to the diameter of the pupil as the intensity of light increases. [1]

.....

II. State the pupil diameter at a light intensity of 17 units. [1]

..... mm

(c) The pupil changes in diameter because of a nervous response which happens very quickly and automatically.

(i) Name this type of response. [1]

.....

(ii) What is the purpose of this type of response? [1]

.....

6. The photograph below shows a tomato plant.



- (a) Some of the sugar made in photosynthesis is transported to the tomato fruits.

State the name of the tissue in plants that transports sugar.

[1]

.....

- (b) (i) Siân grows tomato plants. She decides to use a fertiliser called Topgrow. The label from a bottle of Topgrow is shown below.

TOPGROW FERTILISER	
CONCENTRATED NUTRIENT SOLUTION	
Dilution:	1 part Topgrow: 200 parts water
Contents of bottle:	500 cm ³

Using the instructions for use shown on the label, calculate the volume of diluted Topgrow that can be made from the contents of one bottle.

..... [2]

- (ii) Siân carried out a trial to find out the effect of using Topgrow on the tomato plants.

She used tap water only on half the plants and diluted Topgrow on the rest.

What else should Siân have done to make sure that the trial was a fair test? [2]
Give **two** suggestions.

I.

II.

- (iii) The table shows some of the results of the trial.

treatment	mean yield (mean mass of tomatoes per plant) (kg)	mean number of tomatoes per plant	mean mass per tomato (g)
tap water	4.8	40	120
Topgrow	5.2	65

- I. Complete the table above by calculating the mean mass per tomato (in g) for Topgrow. [1]

- II. Siân was pleased with the effect of Topgrow on yield. Suggest why Siân was still disappointed with the results. [1]

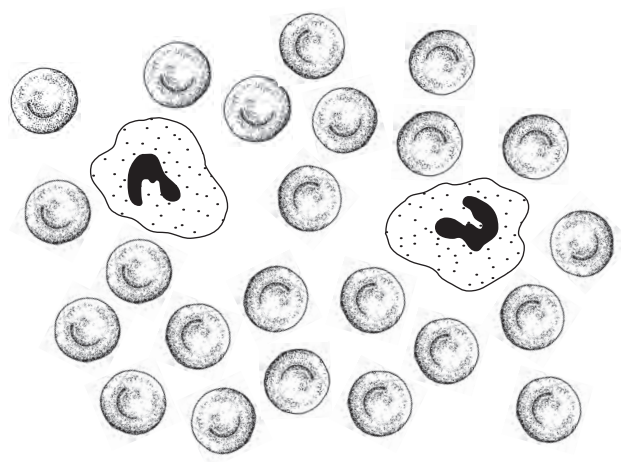
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- (c) Apart from nitrates, give the names of **two** other nutrients required for healthy plant growth.

..... and [2]

9

7. The diagram shows a blood smear as seen through a light microscope.



(a) Complete the table below about the different parts of the blood.

[4]

name of part	function
red cell
.....	produce antibodies
phagocyte
platelets

(b) Explain why the centre of a red blood cell appears paler than the surrounding cytoplasm when seen through a light microscope. [2]

.....

.....

6

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8. The photograph shows part of a factory used for the large scale production of a protein called mycoprotein.



The production of protein in a factory has several advantages over traditional methods such as farming cattle. For example:

- production is relatively rapid
- over a long period of time, production may be cheaper

State **three other** advantages of producing protein in a factory over the farming of cattle. [3]

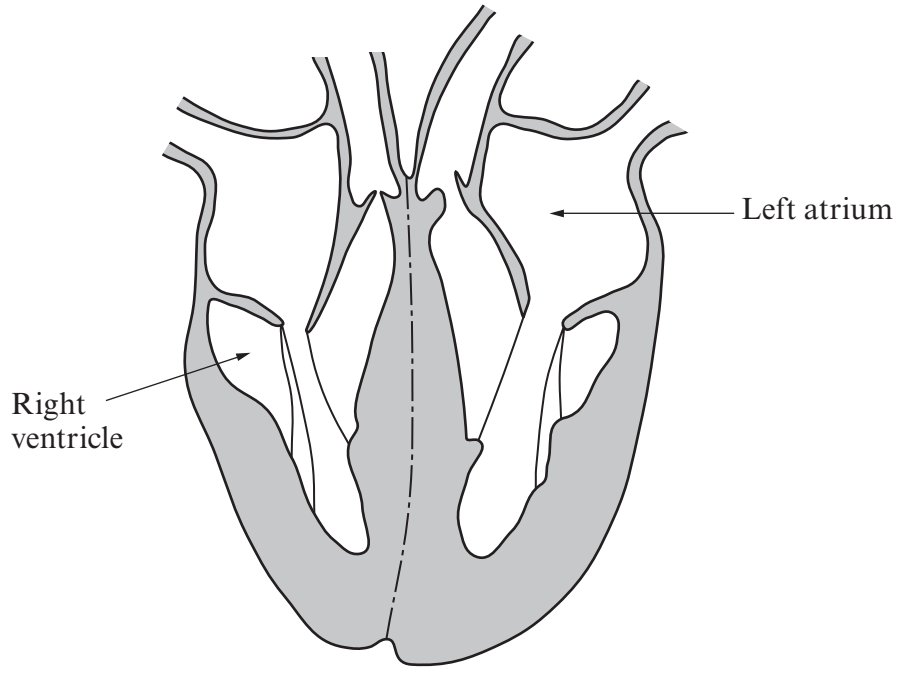
- I.
- II.
- III.

TURN OVER FOR QUESTION 9

3

9. The diagram shows the human heart in section.

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Describe and explain how blood in the right ventricle travels to the left atrium. [6 QWC]

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