

Surname	Centre Number	Candidate Number
Other Names		0



GCSE

0243/01

**SCIENCE
FOUNDATION TIER
BIOLOGY 3**

A.M. MONDAY, 28 January 2013

45 minutes

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

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

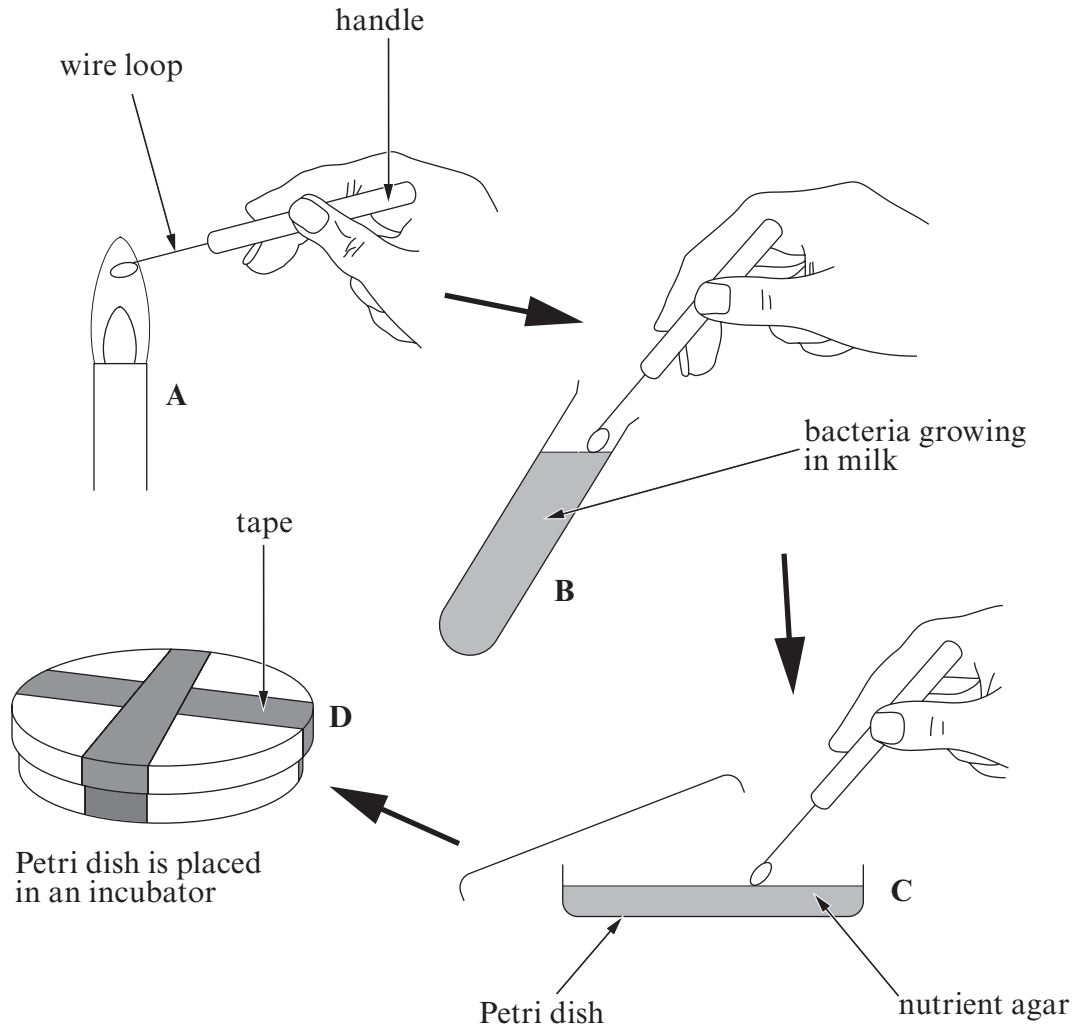
The number of marks is given in brackets at the end of each question or part-question.

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

BLANK PAGE

Answer **all** questions.

1. The diagrams below show how scientists grow bacteria on nutrient agar in the laboratory. Care is needed as the air has many other microbes.



(a) State why the following actions are necessary.

- (i) Strongly heating the wire loop in A.

[1]

.....

- (ii) Keeping the lid over most of the agar in C.

[1]

.....

- (iii) Sealing the dish with tape in D.

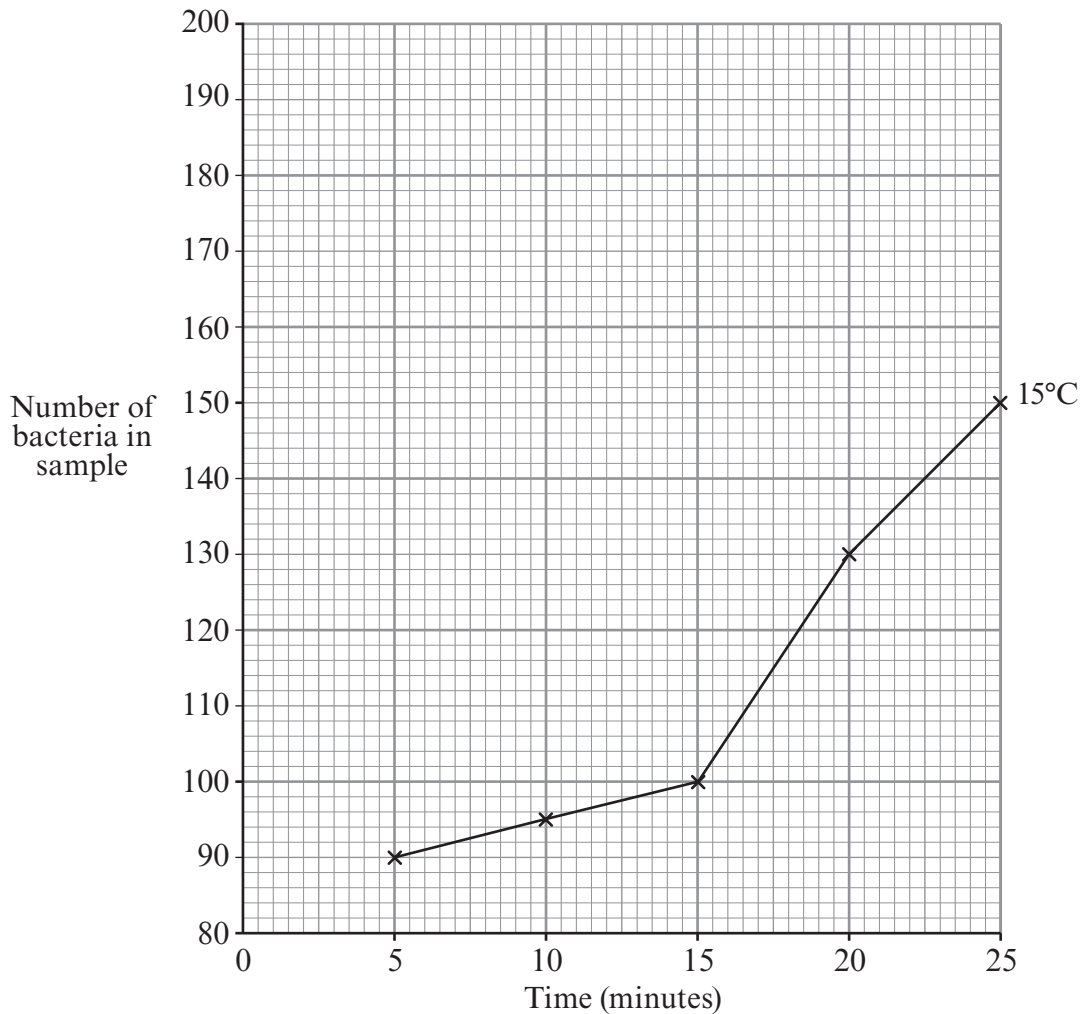
[1]

.....

- (b) Scientists grew bacteria at 15°C. They counted the bacteria every 5 minutes for 25 minutes. The investigation was repeated at 25°C and the results shown in the table below.

Time (minutes)	Number of bacteria (in sample) at 25°C
5	90
10	100
15	130
20	150
25	200

- (i) Plot the results for 25°C on to the graph. Join the plots with a ruler. Label your line 25°C. The results for 15°C have been plotted for you. [3]



(ii) From the graph for 15°C, what is the number of bacteria at 22 minutes? [1]

.....

(iii) Using the information from the graph, underline the correct statement below: [1]

growth is faster at 15°C than at 25°C

growth is faster at 25°C than at 15°C

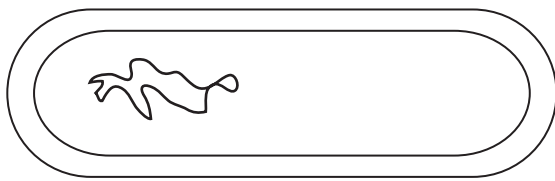
growth is equal at 15°C and 25°C

(c) Why is it important to keep fresh food in a refrigerator below 5°C? [1]

.....

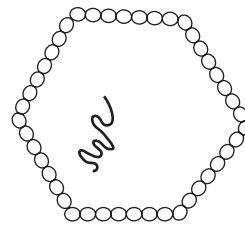
9

2. The diagrams show three different microorganisms.



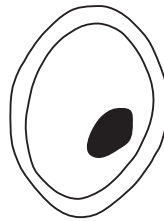
A
bacterium

0.0005 mm



B
virus

0.00001 mm



C
yeast

0.005 mm



Give the correct letter from the diagrams above for each statement below. You may use letters more than once. [5]

(a) Reproduces by dividing into two.

(b) Reproduces by budding.

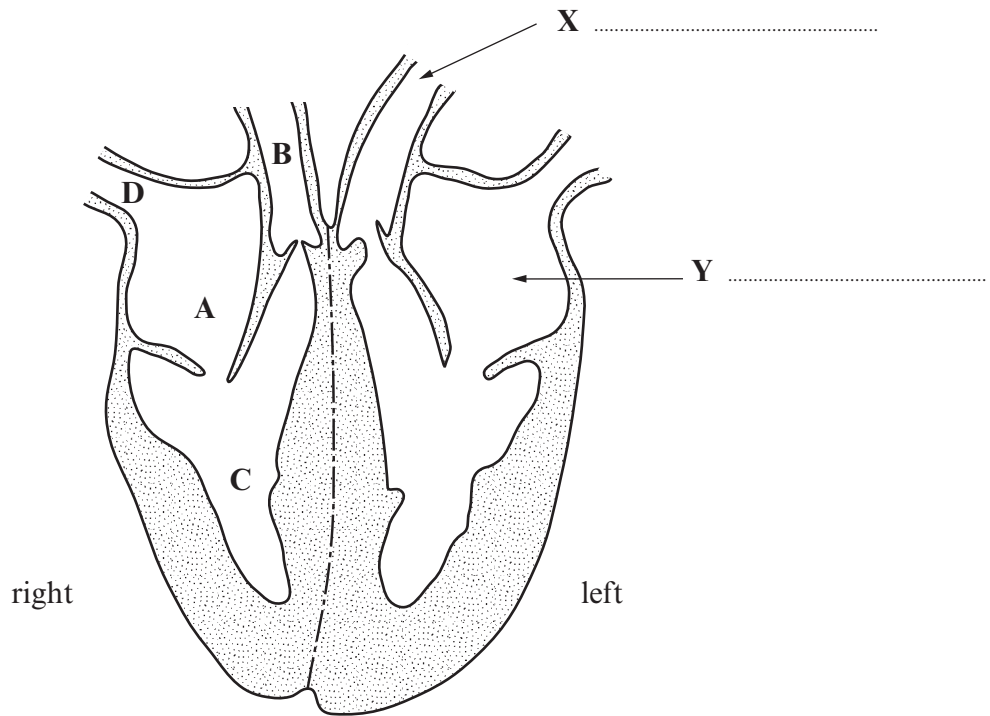
(c) The smallest microorganism.

(d) Has a nucleus.

(e) Can only reproduce inside a host cell.

5

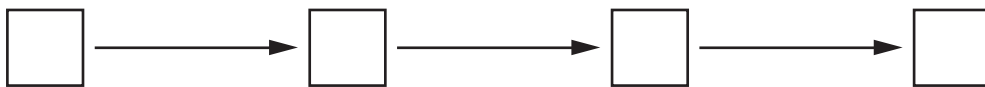
3. (a) The diagram below shows a section through the human heart.



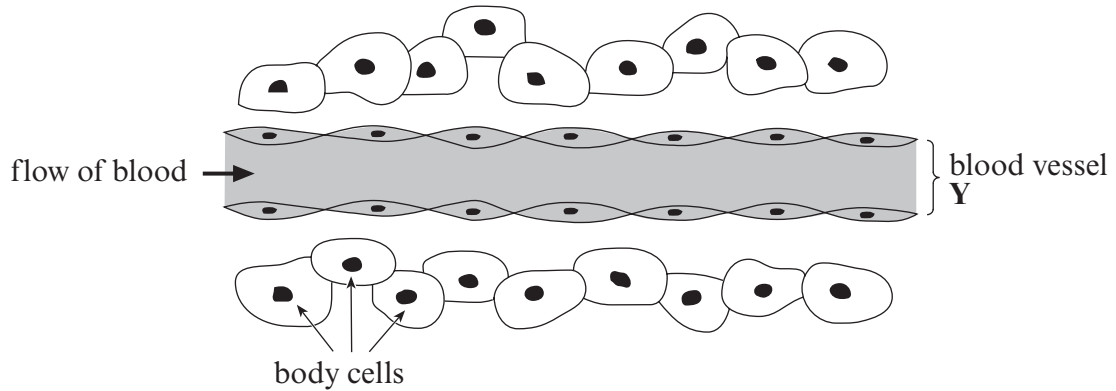
(i) Label **X** and **Y** on the diagram using some of the words below. [2]

atrium ventricle valve aorta

(ii) From the diagram, write letters **A**, **B**, **C** and **D** in the boxes below, in the correct order to show the path of the blood as it flows through the right side of the heart. [1]



(b) The diagram below shows a small blood vessel found in the body.



(i) Name blood vessel Y. Underline the correct answer. [1]

- artery capillary vein

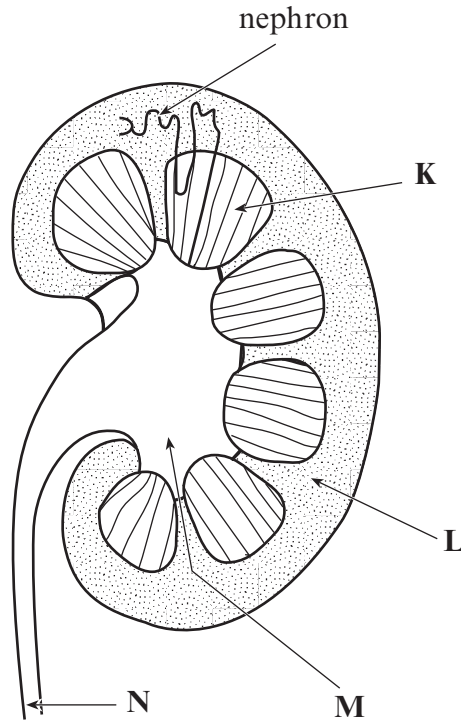
(ii) Choose words from the list to complete the sentences below. [3]

- carbon dioxide, oxygen, diffusion, protein.

As the blood flows through the body organs which cells need, passes out of the blood and, which cells produce, passes into the blood. These substances enter and leave the blood by

0243
010007

4. The diagram shows the structure inside a human kidney.



(a) Give the letters which show [3]

(i) cortex;

(ii) medulla;

(iii) pelvis.

(b) Complete the following sentences about urine, the solution which leaves the kidney. Use some of the words from the list. [4]

urea, ureter, urethra, bladder protein.

(i) Urine contains the waste product

(ii) Urine leaves the kidney in the

(iii) Urine is stored in the

(iv) Urine leaves the body through the

(c) From the table below, name the substance *not* removed from the blood by the kidney.

[1]

Substance	Blood entering kidney (arbitrary units)	Blood leaving kidney (arbitrary units)
water	230	174
glucose	168	168
mineral salts	325	302

.....

Examiner
only

8

5. (a) Read the following information.

Pruteen
The wonder food?

- In 1980, scientists made a protein-rich food, quickly, in large quantities and at very low cost, to feed hungry people.
- The food, Pruteen, was made by growing bacteria on methanol, an industrial waste material.
- Tests showed that Pruteen was a high quality protein, although it was tasteless.
- Unfortunately, very few humans chose to eat Pruteen when it was offered. Later it was used successfully to feed farm animals.

ICI/Science Direct 2008

From **this** information:

(i) Which microbes were used to make Pruteen? [1]

.....

(ii) Name the nutrient which enabled the microbes to grow. [1]

.....

(iii) How were the scientists able to produce Pruteen so cheaply? [1]

.....

(iv) For what reason would Pruteen be suitable as a food for meat-producing farm animals? [1]

.....

(v) Suggest a reason why humans did not want to eat Pruteen. [1]

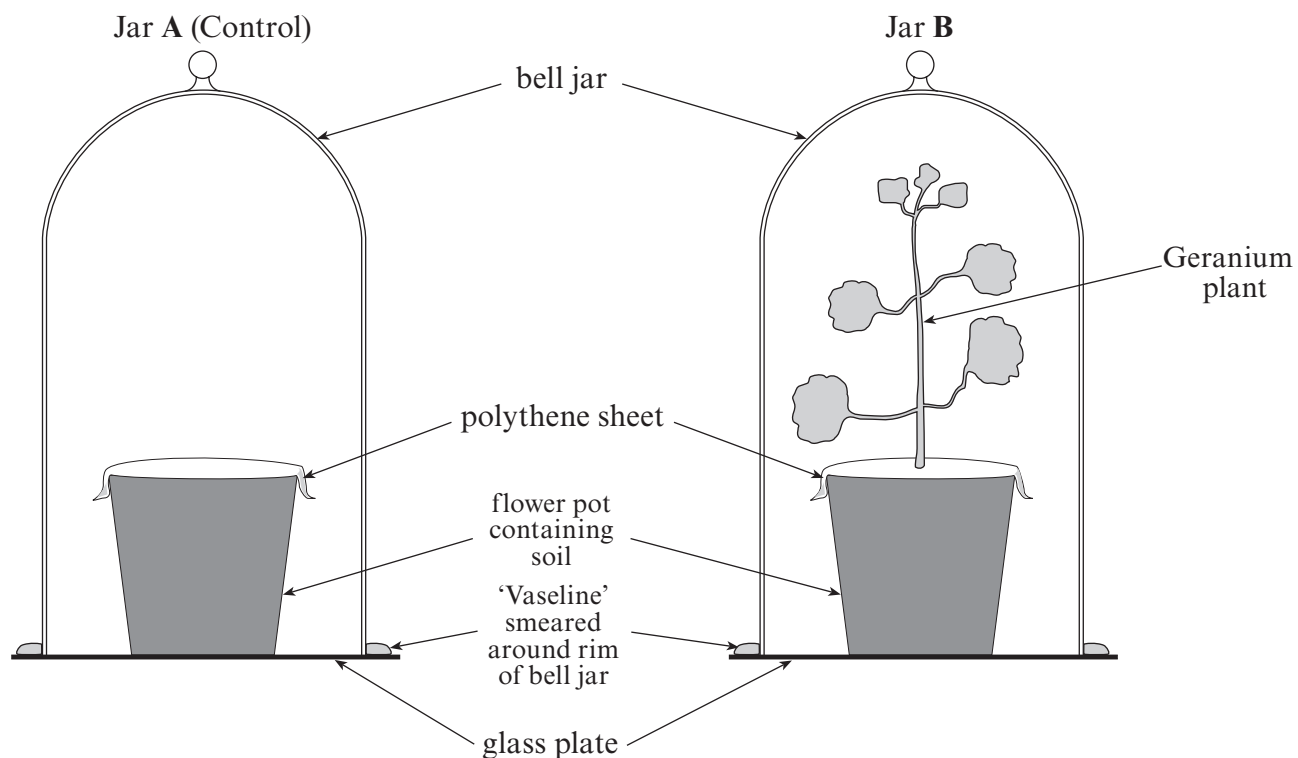
.....

(b) Microbes grow and multiply very rapidly. How is this an advantage to food producers? [1]

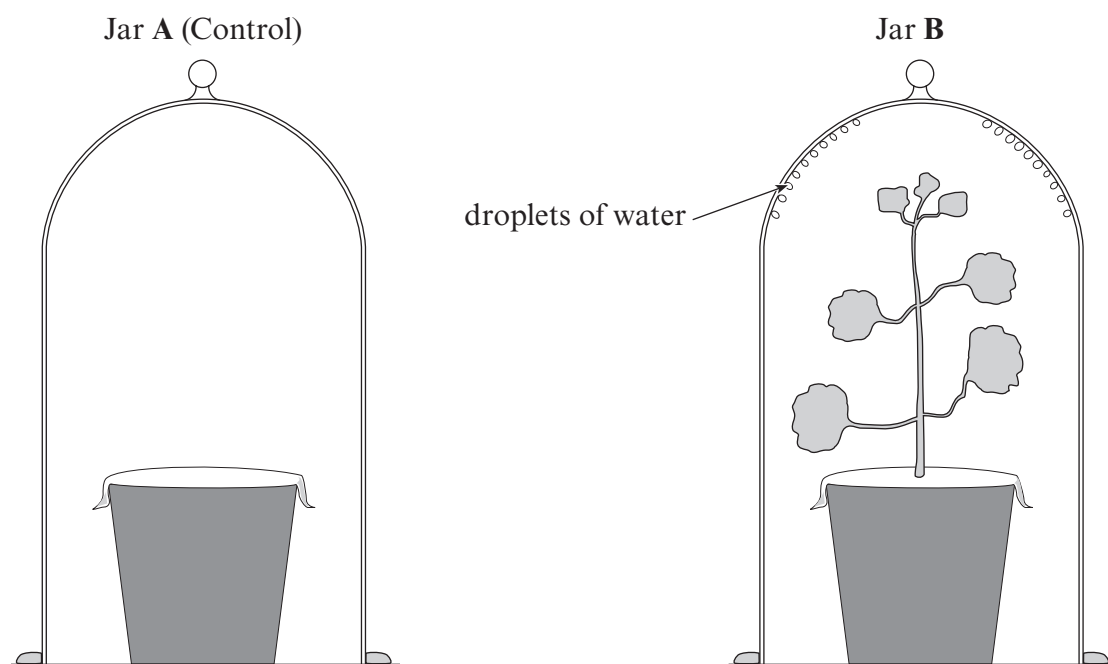
.....

BLANK PAGE

6. Bethan and Alun set up the following experiment and left it for 24 hours.



After 24 hours the jars were examined. Droplets of water had developed on the inside of Jar B. No droplets of water were found on the inside of Jar A.



(a) (i) Explain why droplets of water appear on the inside of jar **B**. [2]

.....

.....

.....

(ii) State the purpose of the control jar **A**. [1]

.....

(iii) Suggest why

I. the soil in both jars **A** and **B** was covered with polythene; [1]

.....

II. the rims of both jars **A** and **B** were smeared with 'Vaseline' petroleum jelly. [1]

.....

(b) Name the vessels which transport water in plants. [1]

.....

6

7. Bacteria cause milk to go sour. During the souring of milk, the concentration of oxygen in it decreases.

(a) Explain how bacteria affect the concentration of oxygen in milk. [1]

(b) Cows' milk can be treated in two main ways to increase the length of time that it can be stored safely.

- Pasteurisation – milk is heated to 71.7°C for 15 seconds and cooled quickly.
- Ultra Heat Treated (UHT) – milk is heated to 135°C for at least 1 second and cooled quickly.

In an experiment to compare the freshness of different kinds of milk, tubes were set up as shown in the table.

- Equal volumes of milk were added to each tube.
- 1 cm³ of a blue dye was also added to each tube. The dye changes from blue to pink to white as oxygen decreases in the milk.
- All tubes were kept at 30°C.
- The colour of the dye was recorded every 30 minutes.

Time (min)	Type of milk in each tube			
	UHT	1 day old pasteurised milk	3 day old pasteurised milk	untreated milk
0	blue	blue	blue	blue
30	blue	blue	blue	pink
60	blue	blue	pink	white
90	blue	pink	white	white
120	blue	pink	white	white

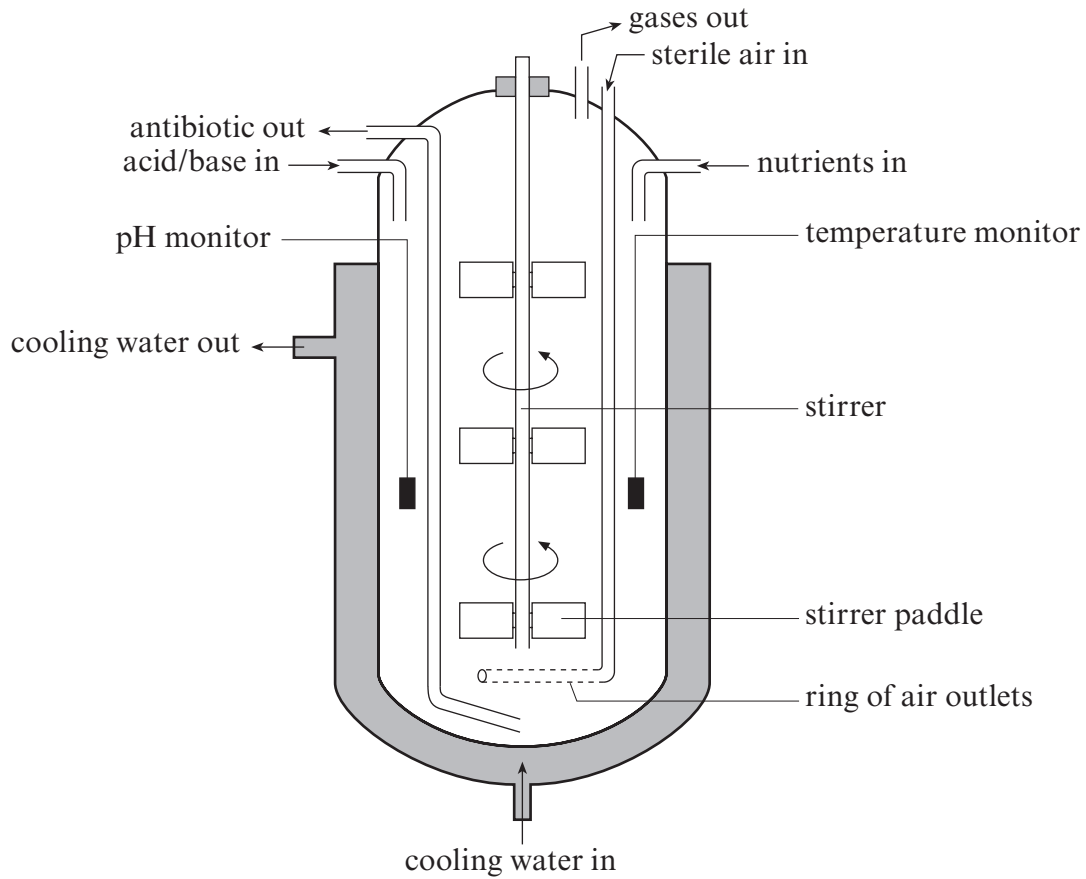
- (i) Why were all the tubes treated in the same way? [1] Examiner
only
-
- (ii) Which tube had the greatest number of bacteria after 30 minutes? [1]
-
- (iii) (I) Which milk was the freshest after 120 minutes? [1]
-
- (II) Explain your choice and why it remained freshest. [2]
-
-

6

TURN OVER

8. The antibiotic penicillin is produced in large stainless steel fermenters containing a liquid nutrient culture medium in which *Penicillium* is grown.

The diagram below shows a fermenter.



- (a) (i) Name a nutrient that should be added to the fermenter. [1]

.....

- (ii) Why is air pumped into the fermenter? [1]

.....
.....

- (b) To which group of living organisms does *Penicillium* belong? [1]

.....

3

END OF PAPER