

EDEXCEL • GCSE BIOLOGY 1B10

Higher Tier — Paper 2

June 2025 exam series

QUESTION PAPER

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Please check the examination details below before entering your candidate information

Candidate surname					Other names				
Centre Number					Candidate Number				

Pearson Edexcel Level 1/Level 2 GCSE (9–1)

Monday 9 June 2025

Morning (Time: 1 hour 45 minutes)

Paper reference **1BI0/2H**

Biology
PAPER 2

Higher Tier

You must have:
Ruler, calculator

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
– *there may be more space than you need.*

Information

- The total mark for this paper is 100.
- The marks for **each** question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*
- In questions marked with an **asterisk** (*), marks will be awarded for your ability to structure your answer logically, showing how the points that you make are related or follow on from each other where appropriate.

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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

Some questions must be answered with a cross in a box ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

- 1 (a) As bananas ripen, they change colour and taste sweeter.

Figure 1 shows two bunches of bananas.

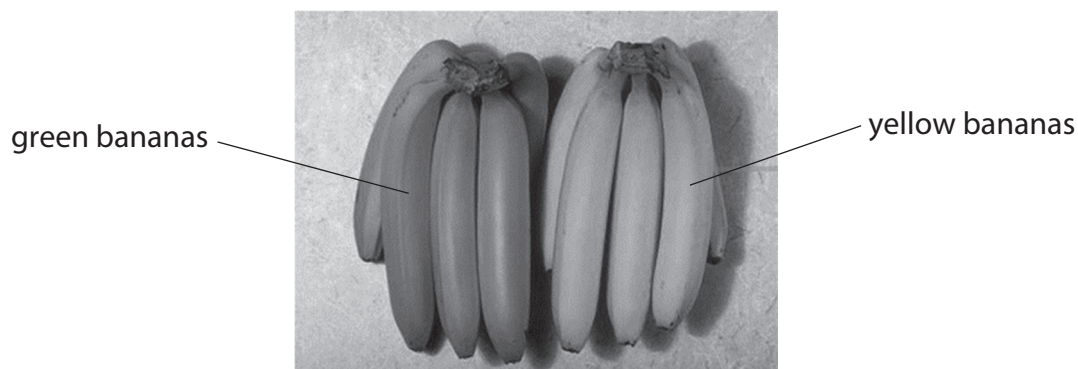


Figure 1

Unripe bananas contain more starch.

Describe the chemical test for starch.

(2)

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- (b) As bananas ripen the starch is converted to glucose.

Describe how bananas can be tested for the presence of glucose.

(3)

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(c) A banana with green skin tested positive for starch and negative for glucose.

A banana with yellow skin tested positive for both starch and glucose.

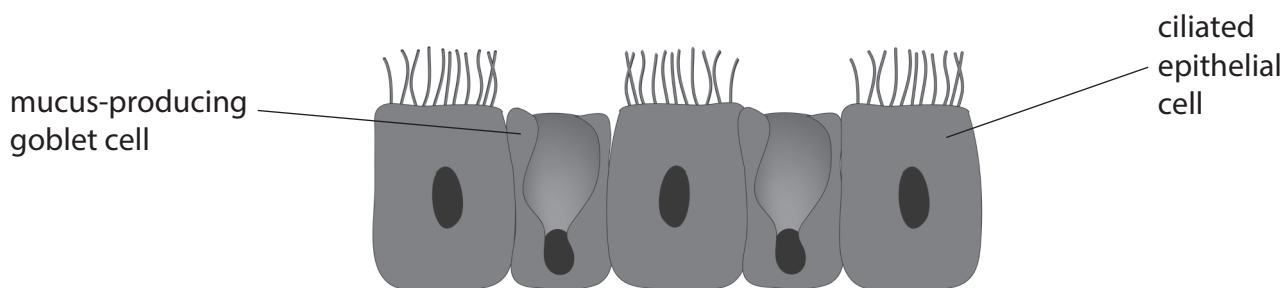
Explain why there was glucose in the yellow banana.

(2)

(Total for Question 1 = 7 marks)



- 2 (a) Figure 2 shows a diagram of mucus-producing goblet cells and ciliated epithelial cells in the airways of the lungs.



(Source: © K.K.T Madhusanka/Shutterstock)

Figure 2

Describe how pathogens are removed from the airways by ciliated epithelial cells.

(2)

(b) During a race, athletes respire aerobically and anaerobically.

Figure 3 shows an athlete after a race.



(Source: © voronaman/Shutterstock)

Figure 3

Explain how aerobic respiration provides energy for running.

(2)

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- (c) The rate of respiration of maggots was investigated using the equipment shown in Figure 4.

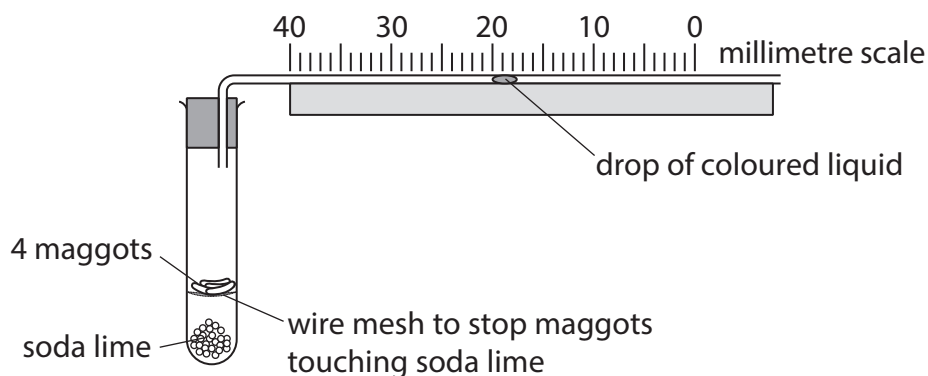


Figure 4

- (i) State the reason why the soda lime is placed in the test tube.

(1)

- (ii) The drop of liquid in Figure 4 is at 20 mm.

The drop of coloured liquid moved at a mean rate of 2 mm per minute.

Draw, on Figure 5, the new position of the bubble after the five minutes.

(1)



Figure 5

(iii) The investigation was repeated with two maggots.

Explain how the movement of the drop of coloured liquid would be affected if the investigation was repeated using fewer maggots.

(2)

(iv) State **one** way this investigation can be improved to obtain more reliable results.

(1)

(Total for Question 2 = 9 marks)

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- 3 (a) In 2018, all the plants were removed from the soil in a 1000 m² area.

A wall was built around this area to keep people out.

In 2019, three species of plants were recorded growing in this area.

Two of these species were indigenous.

- (i) State what is meant by the term 'indigenous'.

(1)

- (ii) Name **one** piece of equipment that could be used to sample the number of indigenous plants in this area.

(1)

- (b) The area was surveyed every year and the number of plants of each species (A to H) was estimated.

Figure 6 shows the results.

estimated number of each plant species found in the survey								
year	A	B	C	D	E	F	G	H
2018	—	—	—	—	—	—	—	—
2019	491	23	66	—	—	—	—	—
2020	664	48	186	1	8	—	—	—
2021	470	25	283	3	6	7	1	—
2022	120	41	354	7	4	11	7	—
2023	44	39	421	21	6	11	9	8

Figure 6



- (i) State the trend shown by the data in Figure 6 for plant species C from 2019 to 2023.

(1)

- (ii) A scientist suggested that the decrease in the number of plants of species B in 2021 was caused by competition from one of the other species of plant.

Which species is most likely to have out-competed species B in 2021?

(1)

- ☐ **A** species A
- ☐ **B** species C
- ☐ **C** species D
- ☐ **D** species H

- (iii) Explain **one** way that this species could have out-competed species B.

(2)

- (iv) Give **one** way that species H could have moved into the area.

(1)

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(c) Plants also need water to grow.

Explain how water is absorbed into the plant.

(2)

(Total for Question 3 = 9 marks)



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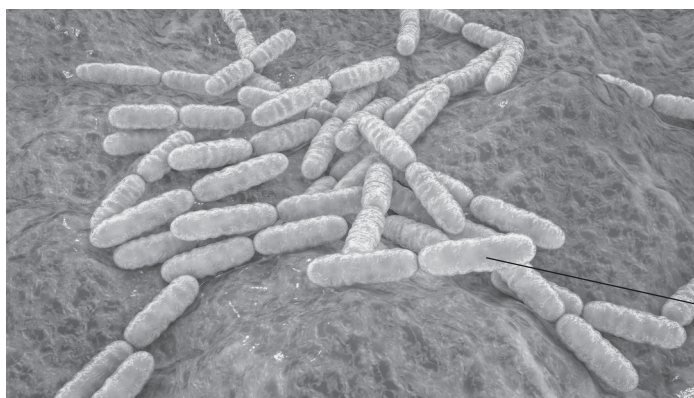
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- 4 (a) Figure 7 shows a type of bacteria (*Lactobacillus acidophilus*) that is found in cow's milk.



(Source: © Kateryna Kon/Shutterstock)

Figure 7

The magnification of this image is $\times 18\,000$.

Measure the length of the bacterium labelled A.

Use your measurement to calculate the actual length of this bacterium in millimetres.

Give your answer in standard form.

(3)

..... mm

(b) Figure 8 shows the growth rate of two species of bacteria at different pH values.

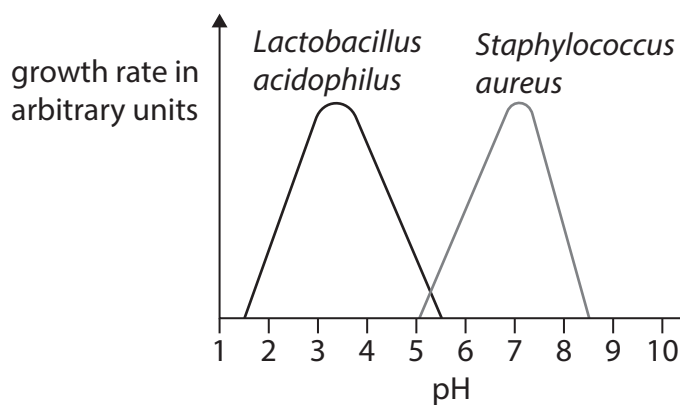


Figure 8

- (i) State a pH that allows the growth of both *Lactobacillus acidophilus* and *Staphylococcus aureus*.

(1)

- (ii) Describe the relationship between pH and the growth of *Staphylococcus aureus*, as shown in Figure 8.

(2)

(c) A student investigated the effect of temperature on the decay of milk.

Milk was placed in a beaker in a water bath at 5 °C for 72 hours.

The pH of the milk was measured every 24 hours using a pH probe.

The investigation was repeated at different temperatures.

Figure 9 shows the results of this investigation.

temperature in °C	pH			
	at 0 hours	at 24 hours	at 48 hours	at 72 hours
5	6.6	6.6	6.6	6.5
10	6.6	6.5	6.4	6.3
20	6.6	6.0	5.6	5.2
30	6.6	5.8	5.0	4.8

Figure 9

(i) Which is a variable that the student needs to control in this investigation?

(1)

- ☐ **A** pH of the milk
- ☐ **B** temperature of the milk
- ☐ **C** incubation time
- ☐ **D** volume of the milk



- (ii) Describe the changes in the pH of the milk at 30°C from 0 hours to 72 hours, as shown in Figure 9.

(2)

- (iii) Calculate the rate of decay of the milk at 20°C for the 72 hours of this investigation.

Use the equation:

$$\text{rate of decay} = \frac{\text{change in pH}}{\text{time taken}}$$

(2)

..... change in pH per hour

(Total for Question 4 = 11 marks)



- 5 (a) A teacher was demonstrating a process to students.

The teacher had a beaker of water and added five drops of food colouring to the beaker.

The time it took for the food colouring to spread evenly through the water was recorded.

Figure 10 shows this process.

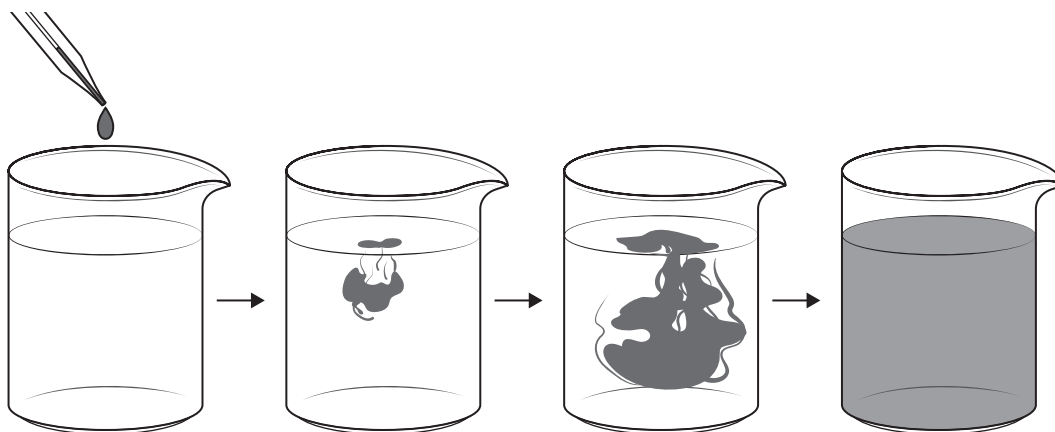


Figure 10

- (i) State the process being demonstrated.

(1)

- (ii) A student asked if different food colourings spread evenly in the same amount of time.

Give **two** variables that would need to be controlled if the investigation was repeated with different food colourings.

(2)

1

2

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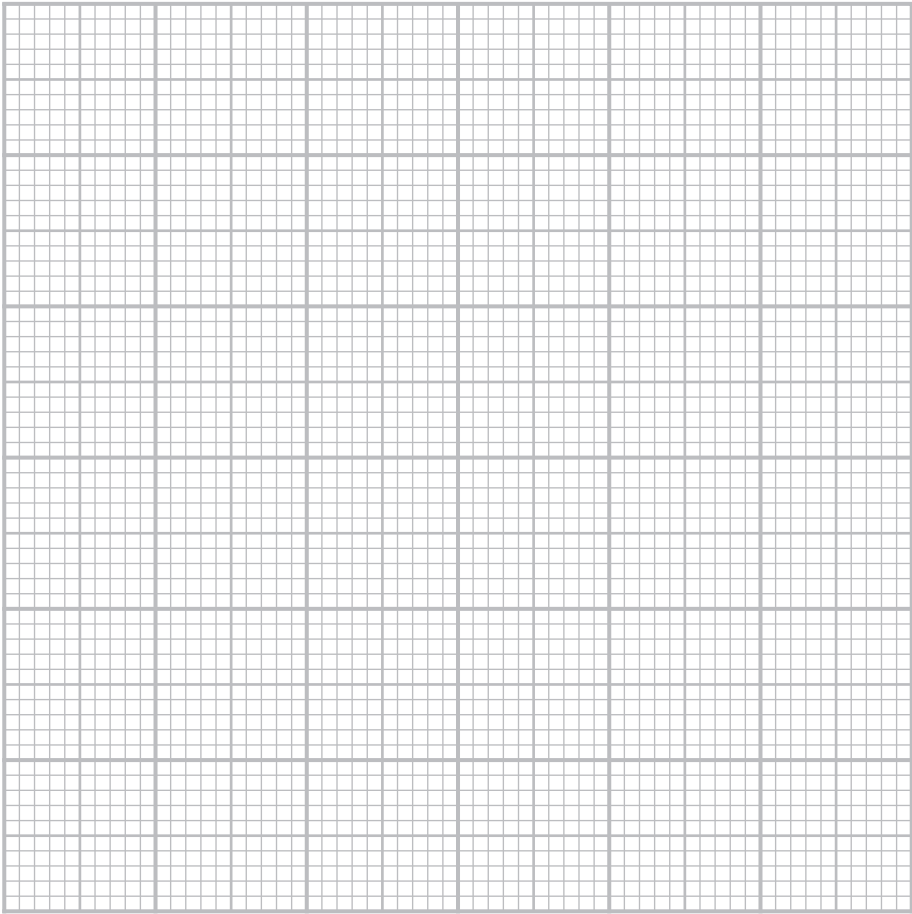
(b) The teacher repeated this process with water at different temperatures. Figure 11 shows the results of this experiment.

water temperature in °C	time taken for food colouring to spread evenly through the water in seconds
20	116
25	101
30	75
35	52
40	33

Figure 11

(i) Draw a line graph to show the results in Figure 11.

(4)



(ii) Explain why the time taken decreased.

(2)

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(Total for Question 5 = 9 marks)

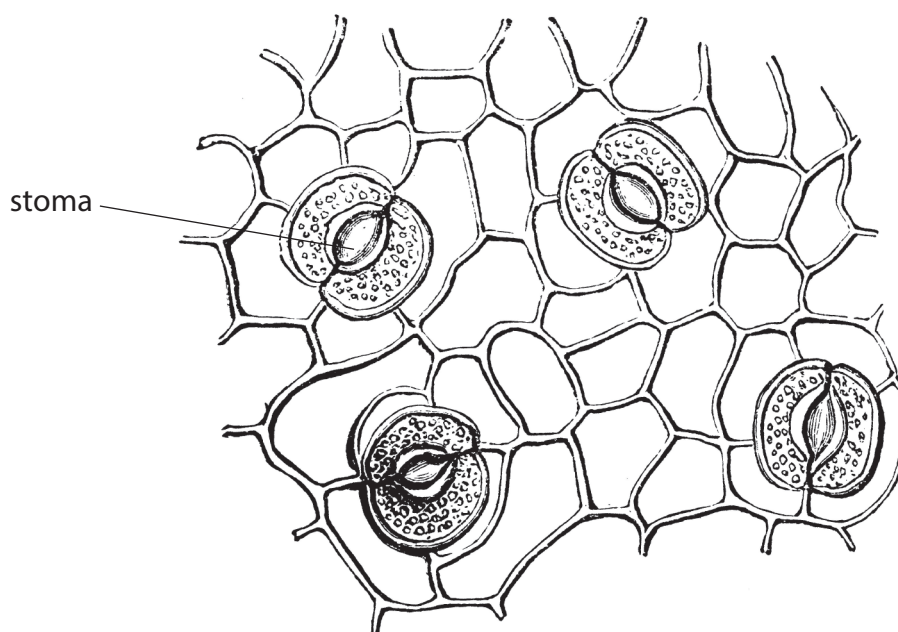
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- 6 Figure 12 shows the lower epidermis of a leaf, with a stoma labelled.



(Source: © Quagga Media/Alamy Stock Photo)

Figure 12

- (a) (i) State the number of guard cells shown in Figure 12.

(1)

- (ii) State **one** gas that leaves the stomata and **one** gas that enters the stomata during daylight.

(2)

gas leaving stomata

gas entering stomata

- (iii) State why the stomata close.

(1)

(b) A student wanted to view the cross-section of a leaf on a prepared slide.

Describe how a light microscope would be used to observe this slide.

(3)

(c) Sugars are transported from the leaves to the rest of the plant.

Explain how sugars are moved through the plant.

(2)

(Total for Question 6 = 9 marks)



- 7 (a) Figure 13 shows the biomass of each population of organisms in a food chain.



Figure 13

- (i) Calculate the percentage efficiency of biomass transfer from the aphids to the ladybirds.

Use the equation:

$$\text{percentage efficiency} = \frac{\text{biomass in higher trophic level}}{\text{biomass in previous trophic level}} \times 100$$

Give your answer to the nearest whole number.

(3)

..... %

- (ii) Give **two** reasons why the biomass of ladybirds is lower than the biomass of aphids in this food chain.

(2)

1

.....

2

.....

- (iii) Aphids are a problem for rose growers as they damage the leaves of rose plants.

Explain how ladybirds could be used to reduce the number of aphids.

(2)

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- (b) As human population rises, food security is an increasing problem throughout the world.

Give **three** factors that reduce the amount of food available for humans throughout the world.

(3)

1

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2

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3

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(Total for Question 7 = 10 marks)



- 8 (a) Figure 14 is a diagram of the human heart.

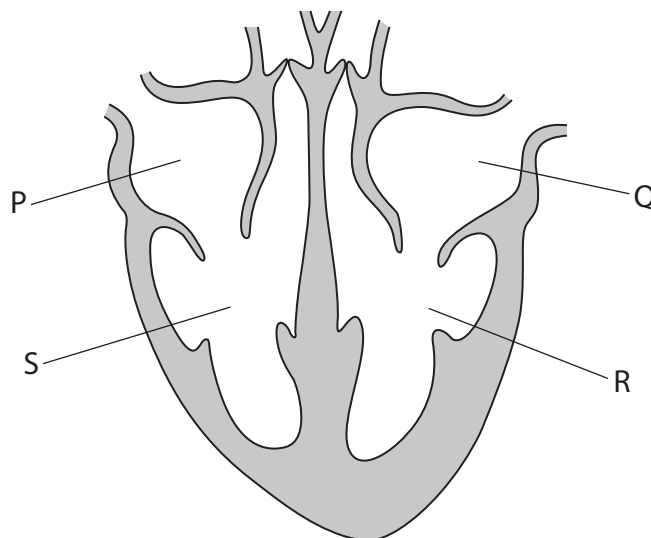


Figure 14

- (i) Which chambers of the heart contain only oxygenated blood?

(1)

- ☐ **A** chamber P and chamber Q
- ☐ **B** chamber S and chamber R
- ☐ **C** chamber P and chamber S
- ☐ **D** chamber Q and chamber R

- (ii) The heart has a valve called the bicuspid valve between chamber Q and chamber R.

Explain the role of this valve.

(2)

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(b) Explain why heart rate increases during exercise.

(3)

(c) (i) Every person has a maximum heart rate.

Figure 15 shows how different types of activity affect a person's heart rate and the type of respiration they are using during that activity.

	walking	jogging	cross-country running	running fast (sprinting)
percentage of maximum heart rate	50%	65%	75%	90%
type of respiration	aerobic	aerobic	aerobic and anaerobic	aerobic and anaerobic

Figure 15

A person had a maximum heart rate of 190 beats per minute. Calculate the heart rate of this person when they are jogging.

Give your answer to 3 significant figures.

(3)

..... beats per minute



(ii) Erythrocytes (red blood cells) transport oxygen to respiring cells.

Explain how erythrocytes (red blood cells) are adapted to carry and release oxygen.

(3)

(Total for Question 8 = 12 marks)

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- 9 (a) The menopause occurs when the menstrual cycle stops.

Figure 16 shows the hormone concentrations in the blood before the menopause and after the menopause.

hormone	mean hormone concentration before the menopause	mean hormone concentration after the menopause
oestrogen	33 pg/mL	23 pg/mL
progesterone	11 ng/mL	0.4 ng/mL
testosterone	35 ng/dL	16 ng/dL

Figure 16

- (i) Compare and contrast the hormone concentrations before and after the menopause.

(3)

- (ii) Explain the roles of FSH and LH in the menstrual cycle.

(3)



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[illegible]

(6)

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(Total for Question 9 = 12 marks)



10 (a) Figure 18 shows a diagram of a nephron in the human kidney.

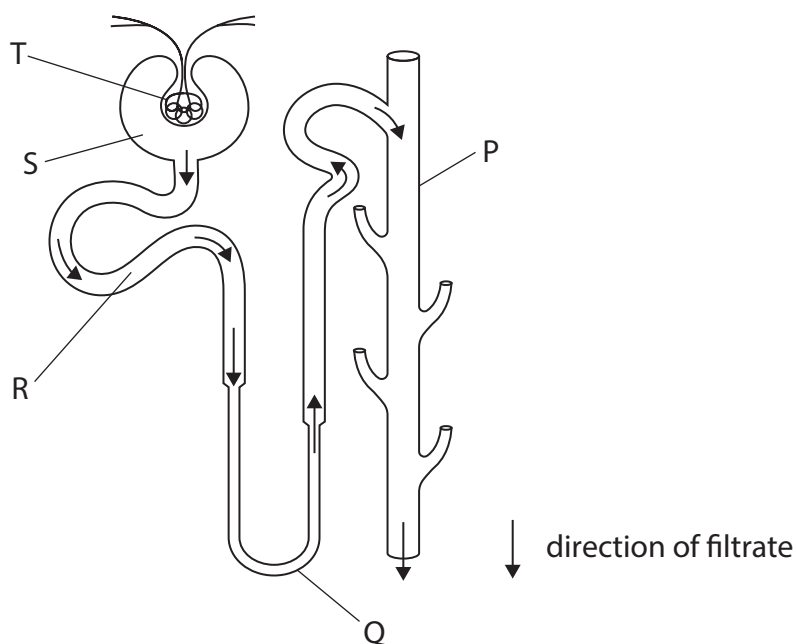


Figure 18

(i) Which letter indicates the glomerulus?

(1)

- ☐ A letter S
- ☐ B letter T
- ☐ C letter Q
- ☐ D letter P

(ii) Which letter indicates the Bowman's capsule?

(1)

- ☐ A letter T
- ☐ B letter S
- ☐ C letter R
- ☐ D letter P

(iii) Describe the process that occurs in the proximal convoluted tubule (PCT).

(2)

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(b) State the role of the ureters and the bladder in the urinary system.

(2)

ureters

bladder



*(c) Explain how the water content of the blood is regulated when a person has consumed a large volume of water and is now overhydrated.

(6)

(Total for Question 10 = 12 marks)

TOTAL FOR PAPER = 100 MARKS



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