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CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

8435059854

BIOLOGY **0610/33**

Paper 3 Theory (Core) **October/November 2024**

1 hour 15 minutes

You must answer on the question paper.

No additional materials are needed.

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.
- You should show all your working and use appropriate units.

INFORMATION

- The total mark for this paper is 80.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **20** pages. Any blank pages are indicated.

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[Turn over

1 **(a)** Fig. 1.1 is a diagram showing the diffusion of oxygen molecules across a cell membrane.

The arrow shows the direction of the net movement of oxygen molecules through the membrane.

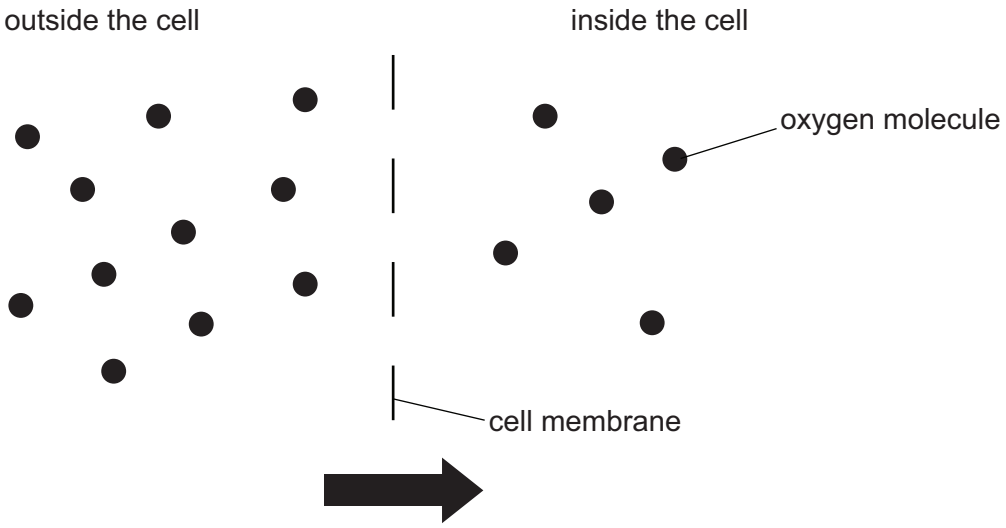


Fig. 1.1

(i) Using the information in Fig. 1.1, explain why the net movement of oxygen molecules is from the outside of the cell to the inside of the cell.

.....

.....

.....

.....

..... [2]

(ii) State where the energy for diffusion comes from.

.....

.....

..... [1]

(b) **(i)** State the name of the cells that transport oxygen in the human body.

..... [1]

(ii) State the name of the molecule that oxygen binds to when it is transported around the body.

..... [1]

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(c) Table 1.1 shows some factors that may affect the rate of diffusion of oxygen molecules.

Complete Table 1.1 by stating whether each factor increases, decreases or has no effect on the rate of diffusion of oxygen molecules.

Table 1.1

factor	how the factor affects the rate of diffusion
low temperature	
increase in the diffusion distance	
increase in the surface area of the cell membrane	

[3]

(d) Some molecules are transported by active transport rather than by diffusion.

Describe what is meant by the term active transport.

.....

.....

.....

.....

..... [3]

[Total: 11]

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2 **(a)** Fig. 2.1 is a diagram of the female reproductive system in humans.

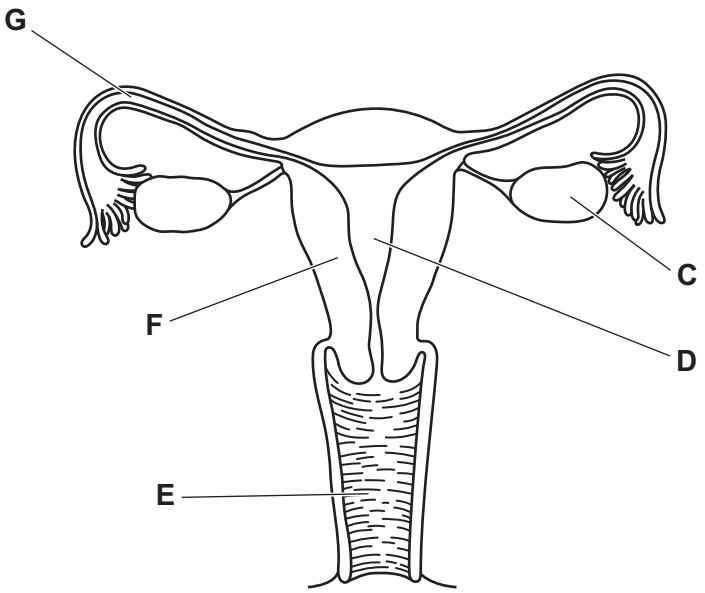


Fig. 2.1

Table 2.1 shows some of the functions of the female reproductive system.

Complete Table 2.1 by writing the letters from Fig. 2.1 to show which structure is responsible for each function.

Table 2.1

function of the part of the female reproductive system	letter from Fig. 2.1
site of fertilisation	
site of implantation of the fertilised egg cell	
the place where egg cells develop	

[3]

(b) Complete the sentences about fertilisation.

Fertilisation occurs when the ..... of two gametes fuse.

The fertilised egg cell is called a ..... .

[2]

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(c) Fig. 2.2 shows the changes in the thickness of the uterus lining in one menstrual cycle in a human.

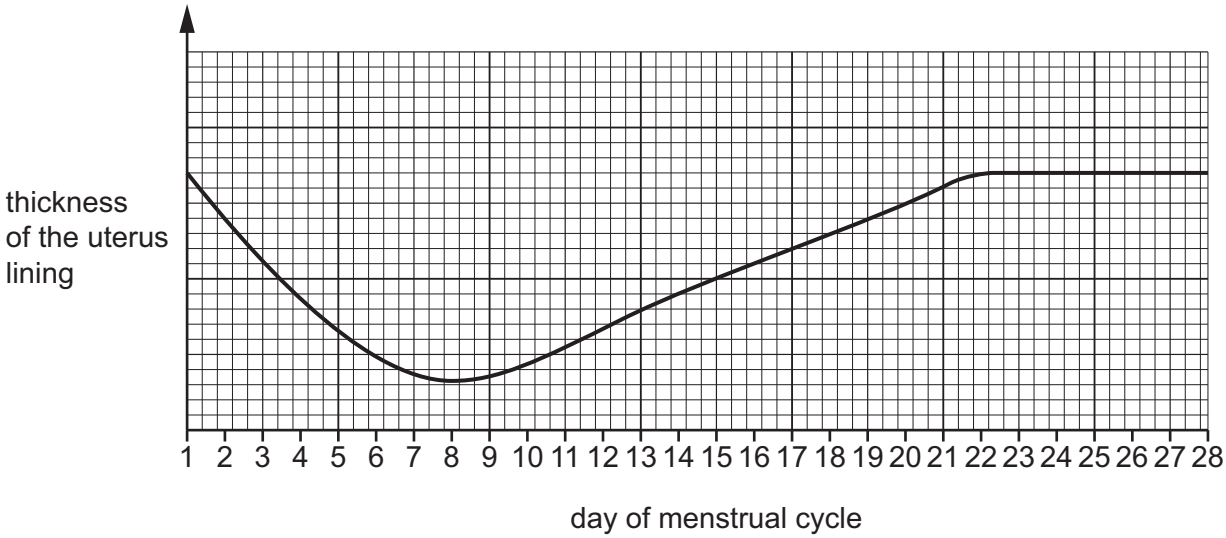


Fig. 2.2

Using the information in Fig. 2.2:

(i) State the days of the menstrual cycle when the uterus lining is lost.

from day ..... to day ..... [1]

(ii) State the days of the menstrual cycle when the uterus lining is thickest.

from day ..... to day ..... [1]

(d) State the name and describe the role of a hormone produced in the testes.

name .....

role .....

.....

..... [3]

[Total: 10]

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3 **(a)** A balanced diet contains all the nutrients needed by the body to maintain health.

(i) Water is needed as part of a balanced diet.

A woman was advised to drink 2.7 dm^3 of water per day.

A cup contains 250 cm^3 of water.

Calculate the number of cups of water the woman needs to drink.

Give your answer to the nearest whole number.

Space for working.

..... cups [3]

(ii) Water is an important solvent in the body.

State **two** body processes that use water as a solvent.

1 .....

2 .....
[2]

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(b) Fig. 3.1 shows part of the human digestive system.

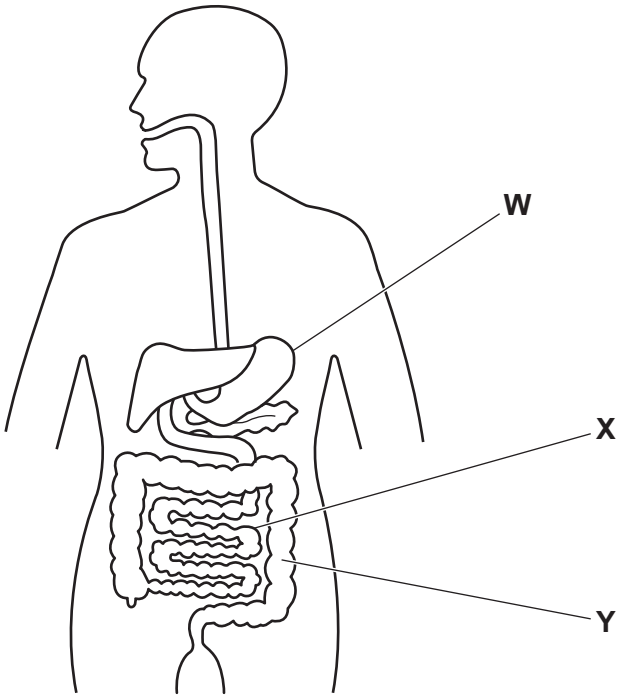


Fig. 3.1

(i) State the names of the organs labelled **X** and **Y**.

X .....

Y .....

[2]

(ii) Circle **two** substances that are absorbed into the blood from organ **X**.

amino acids carbon dioxide fibre

glucose starch urea

[2]

(iii) State **two** functions of organ **W**.

1 .....

.....

2 .....

.....

[2]

(c) After absorption, nutrients are taken into and used by cells.

State the name of this process.

..... [1]

[Total: 12]

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4 **(a)** Fig. 4.1 is a photomicrograph of part of a cross-section of a leaf.

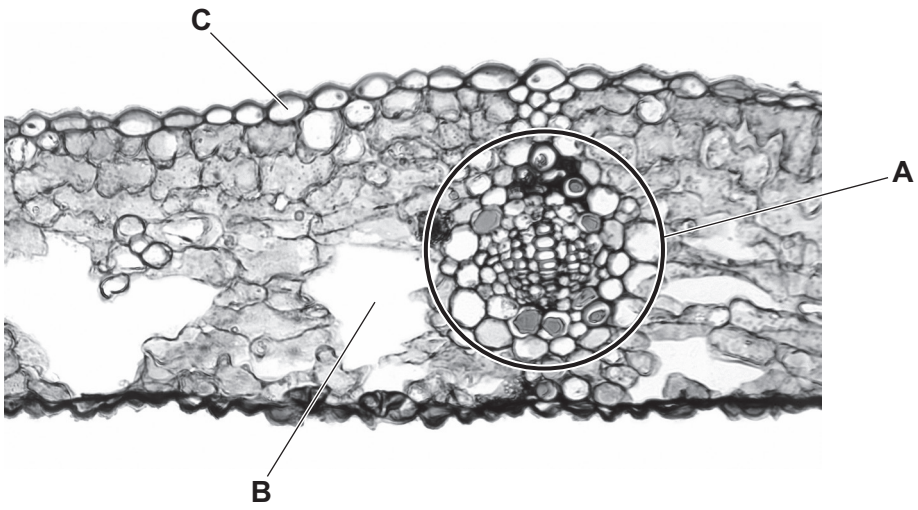


Fig. 4.1

(i) State the name of the structure circled and labelled **A** on Fig. 4.1.

..... [1]

(ii) Using the information in Fig. 4.1, complete Table 4.1.

Table 4.1

letter on Fig. 4.1	name of the leaf structure	**one** function of the leaf structure
B		
C		

[4]

(b) State the word equation for photosynthesis.

..... [2]

(c) Root hair cells absorb water.

State **one** way that root hair cells are adapted for their function.

.....

.....

..... [1]

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(d) Describe how tropic responses in plants allow roots to absorb more water from the soil.

.....

.....

.....

.....

.....

.....

..... [3]

[Total: 11]

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5 **(a)** A student investigated the concentration of lactic acid in the blood of an athlete during a 400 m race.

Fig. 5.1 shows the results of the investigation.

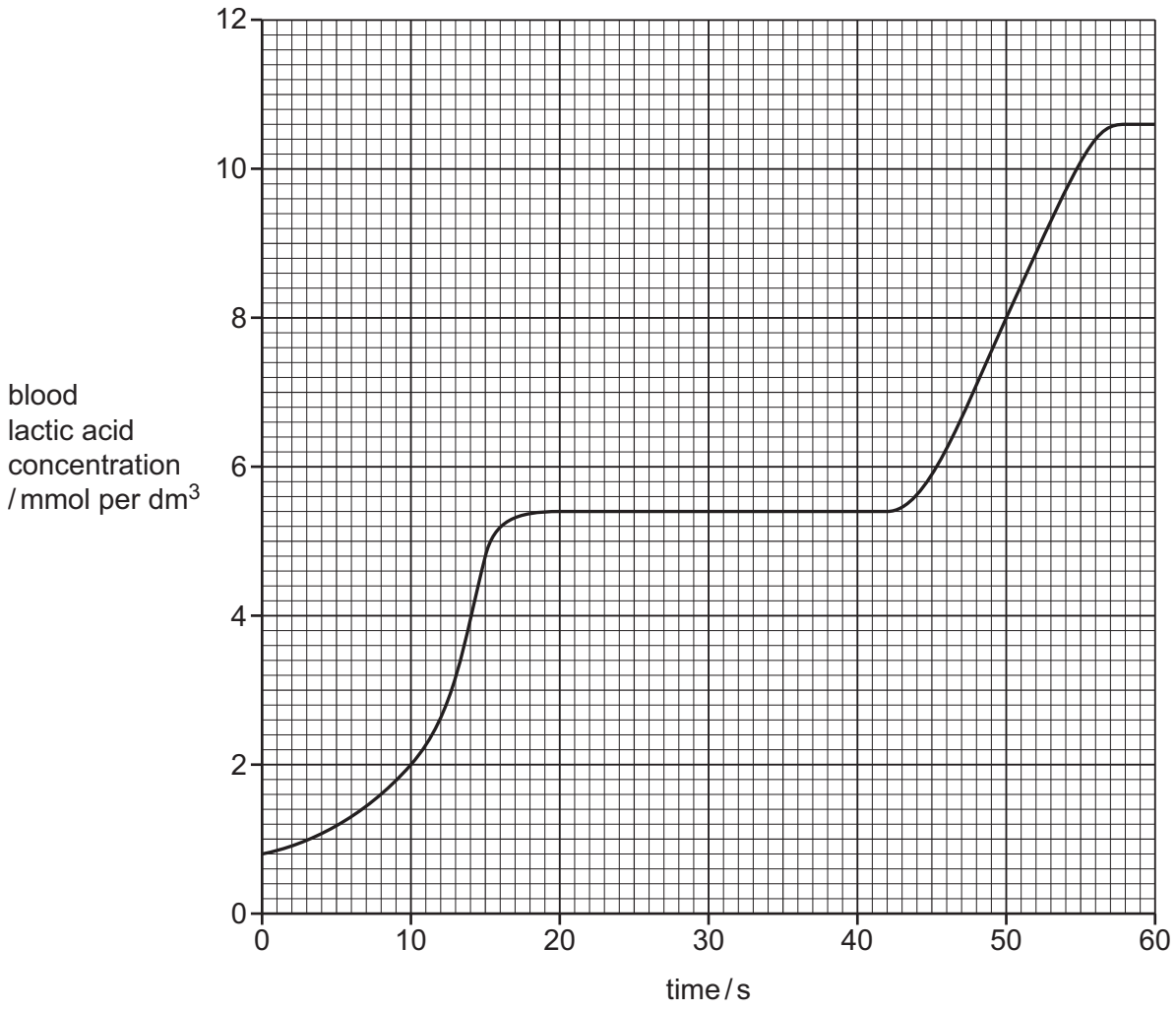


Fig. 5.1

(i) Using the information in Fig. 5.1, state the time during the race when blood lactic acid concentration is 4.8 mmol per dm^3.

..... s [1]

(ii) Using the information in Fig. 5.1, calculate the increase in blood lactic acid concentration between 0 seconds and 20 seconds.

blood lactic acid concentration at 0 seconds ..... mmol per dm^3

blood lactic acid concentration at 20 seconds ..... mmol per dm^3

increase = ... mmol per dm^3
[2]

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(iii) The list shows three statements about the data in Fig. 5.1.

Tick (✓) **one** correct statement.

The lactic acid concentration doubled between 0 and 5 seconds.	
The lactic acid concentration was constant between 30 and 50 seconds.	
The lactic acid concentration increased between 45 and 55 seconds.	

[1]

(b) Complete the sentences about aerobic respiration.

During aerobic respiration, glucose reacts with ..... .

Aerobic respiration takes place in the ..... in cells.

Aerobic respiration releases ..... energy than anaerobic respiration.

[3]

(c) Respiration releases energy.

State **three** uses of energy in living organisms.

1 .....

2 .....

3 .....

[3]

[Total: 10]

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6 **(a)** A sexually transmitted infection (STI) is an infection transmitted through sexual contact.

Table 6.1 shows some STIs and the type of pathogen that causes the infection.

Table 6.1

name of STI	type of pathogen
chlamydia	bacteria
gonorrhoea	bacteria
hepatitis B	virus
syphilis	bacteria

State the names of the STIs shown in Table 6.1 that can be treated using antibiotics.

.....

..... [1]

(b) **(i)** Antibiotics are one type of drug.

Describe what is meant by the term drug.

.....

.....

.....

.....

..... [2]

(ii) State why the effectiveness of some antibiotics has reduced over time.

.....

.....

..... [1]

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(c) HIV can be transmitted through sexual contact.

The box on the left contains the term HIV.

The boxes on the right contain some methods of disease transmission.

Draw **two** lines to show **two other** ways that HIV can be transmitted from one person to another.

	breastfeeding
	contaminated food
HIV	coughing and sneezing
	a mosquito bite
	sharing needles

[2]

(d) Table 6.2 shows the number of people infected with different STIs in one country.

Table 6.2

name of STI	number of people infected
chlamydia	1 800 000
gonorrhoea	600 000
hepatitis B	850 000
AIDS	1 200 000
syphilis	130 000

(i) State the STI in Table 6.2 that has half the number of people infected that AIDS has.

..... [1]

(ii) State the STI in Table 6.2 that has the highest number of people infected.

..... [1]

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(e) Describe how the spread of STIs can be controlled.

.....

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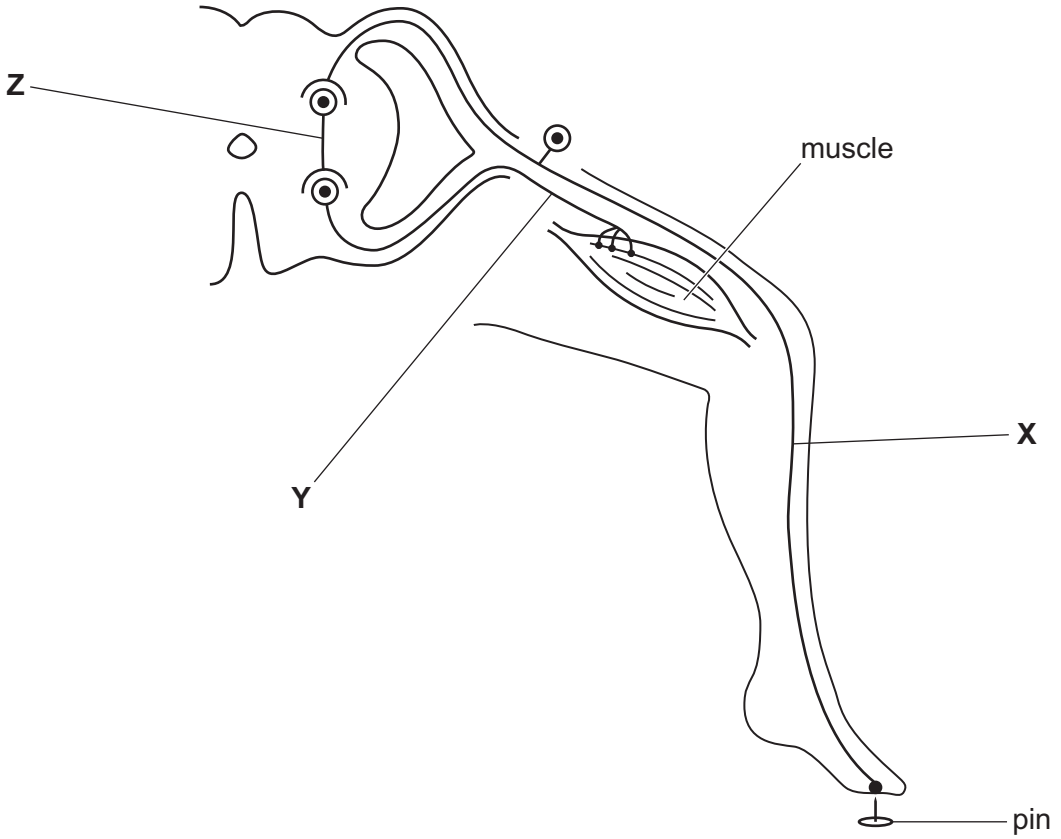
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7 **(a)** Fig. 7.1 shows the reflex arc that is involved when someone steps on a pin.



not to scale

Fig. 7.1

(i) The skin is a sense organ and can detect the pin.

State the type of stimulus that the cells in the skin are responding to.

..... [1]

(ii) Describe the reflex action shown in Fig. 7.1.

.....

.....

.....

.....

.....

.....

.....

.....

..... [4]

(b) The response of the pupil to changes in light intensity is also an example of a reflex action.

(i) Fig. 7.2 shows the size of the pupil in dim light.

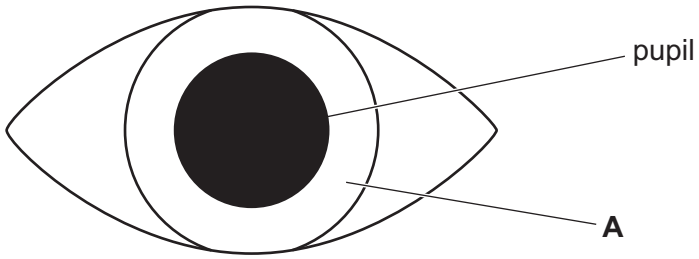


Fig. 7.2

On Fig. 7.3, draw the expected appearance of the pupil in bright light.

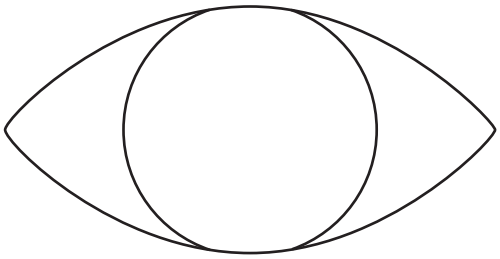


Fig. 7.3

[1]

(ii) State the name of the structure labelled **A** in Fig. 7.2.

..... [1]

(iii) State the name of the tissue in the eye that detects light.

..... [1]

[Total: 8]

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8 Crop plants are producers.

(a) Describe what is meant by the term producer.

.....

.....

..... [2]

(b) State **three** processes in the carbon cycle that involve producers.

1 .....

2 .....

3 .....

[3]

(c) Complete the sentence about genetically modified crop plants.

Crop plants can be genetically modified to confer resistance to

..... and ..... . [2]

[Total: 7]

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