Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
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BIOLOGY **0610/31**

Paper 3 Theory (Core) **May/June 2020**

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. Blank pages are indicated.

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1 **(a)** Fig. 1.1 shows some of the structures involved in excretion.

View solution

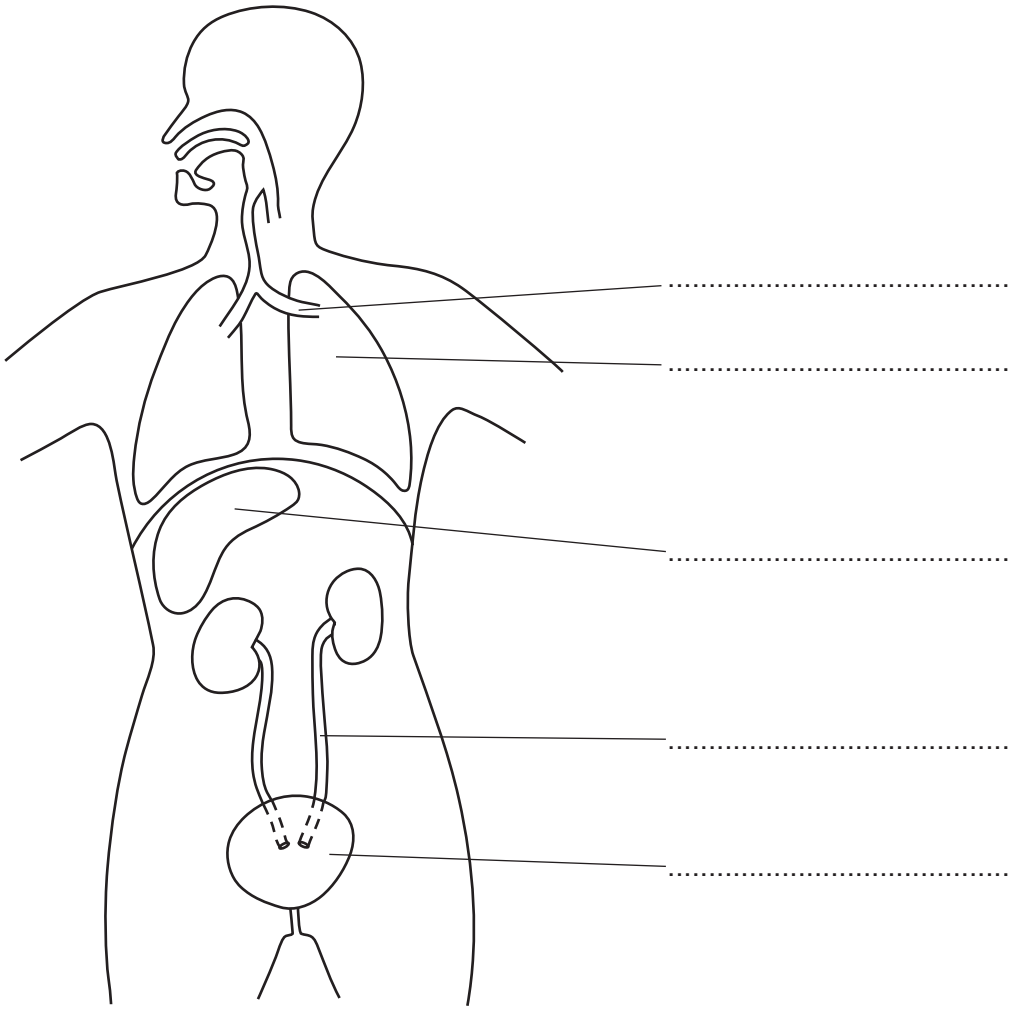

Fig. 1.1

Complete Fig. 1.1 by labelling the structures in the spaces provided.

Choose structures from the list:

bladder	**bronchus**	**heart**	**liver**	**lung**
pancreas	**trachea**	**ureter**	**urethra**	

[5]

(b) Urea is excreted.

View solution

(i) State the name of the substance that urea is made from.

..... [1]

(ii) State where in the body urea is made.

..... [1]

View solution

(c) Urine produced by the kidneys contains three excretory substances: urea, water and mineral salts.

Table 1.1 shows the average mass of urea, water and mineral salts in 100 g of blood plasma and in 100 g of urine.

View solution

Table 1.1

substance	average mass / g	
	in 100 g of blood plasma	in 100 g of urine
water	90.00	95.00
urea	0.03	2.00
mineral salts	0.69	1.35

Calculate the percentage increase in the average mass of mineral salts between blood plasma and urine.

Give your answer to two decimal places.

Space for working.

..... %
[3]

(d) Describe the process that produces the carbon dioxide that is excreted by the lungs.

View solution

.....

.....

.....

..... [2]

(e) State the name of the component of blood that transports carbon dioxide to the lungs.

..... [1]

[Total: 13]

View solution

2 Fig. 2.1 shows an image of two sperm cells.

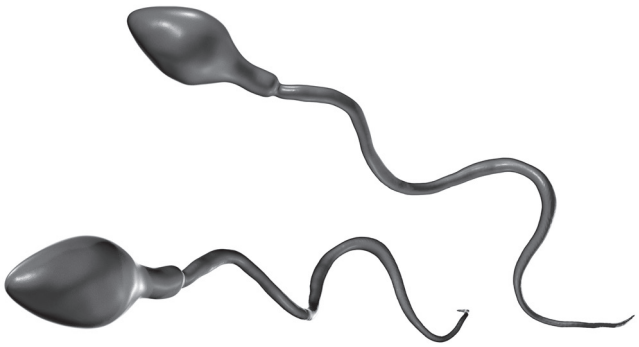

Fig. 2.1

(a) State **two** adaptive features of sperm.

View solution

1 .....

.....

2 .....

.....

[2]

(b) Describe the process of fertilisation.

View solution

.....

.....

.....

..... [2]

(c) Fig. 2.2 shows a fetus during development.

View solution

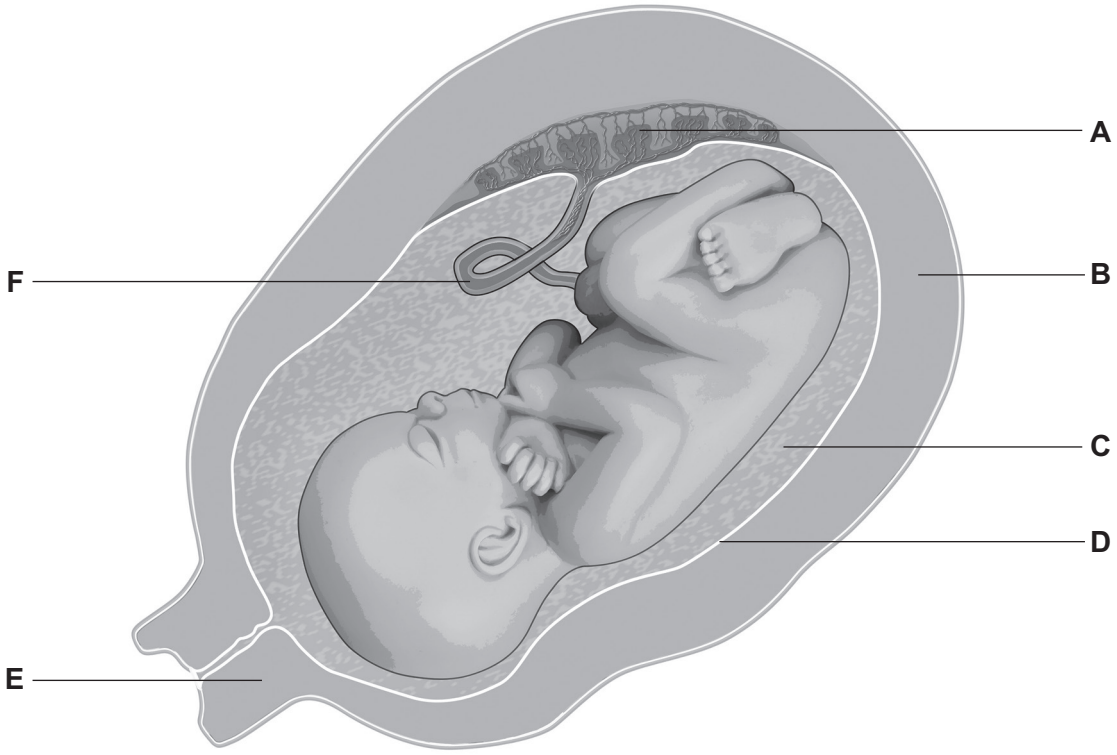

Fig. 2.2

Complete Table 2.1 by stating:

- the missing letters from Fig. 2.2
- the missing name of the structure
- **one** function for structures **C**, **A** and **F** during pregnancy or birth.

Table 2.1

letter on Fig. 2.2	name of the structure	**one** function
C	amniotic fluid	
		dilates during birth
A	placenta	
F	umbilical cord	
	uterus wall	contracts during birth

[6]

[Total: 10]

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3 Complete the sentences about genetic engineering.

View solution

Use words from the list.

Each word may be used once, more than once, or not at all.

adding **bacteria** **crops** **family** **insects**

minerals **organism** **removing** **viruses**

vitamin **weeds**

In genetic engineering the genetic material of an ..... is changed by ..... , changing or inserting individual genes.

An example of this is inserting a human gene into ..... so that they produce human insulin.

Crop plants have genes inserted into them to make them resistant to herbicides.

Herbicides kill ..... .

Crop plants can also be genetically engineered by inserting a gene so that they produce a ..... which is a nutrient needed by humans in very small amounts.

[5]

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4 Fig. 4.1 shows a photomicrograph of a cross-section of part of a leaf.

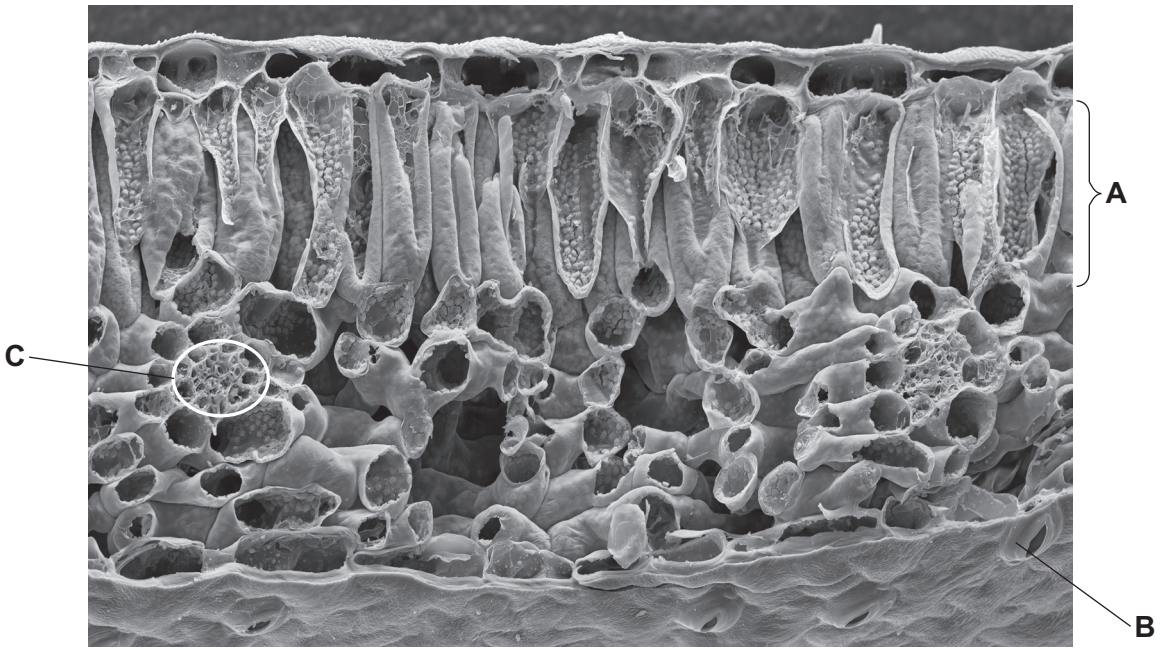

Fig. 4.1

(a) (i) Identify tissue **A** on Fig. 4.1 and state the name and function of this tissue.

View solution

name .....

function .....

.....

[2]

(ii) Structure **C** in Fig. 4.1 is part of the transport system in the leaf.

View solution

State the names of **two** tissues that structure **C** contains.

1 .....

2 .....

[2]

(iii) Identify and state the name of cell **B** in Fig. 4.1.

..... [1]

View solution

(b) A plant is in bright sunlight and has plenty of water.

View solution

Gases move into and out of its leaves.

Complete Table 4.1 to show the net direction of movement for the named gases.

Place a tick (✓) in each correct box.

Table 4.1

name of gas	moves into leaves	moves out of leaves
carbon dioxide		
oxygen		
water vapour		

[3]

[Total: 8]

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5 **(a)** Fig. 5.1 shows the average number of cigarettes smoked per day by male and female smokers between 1974 and 2014 in one country. Cigarettes contain tobacco.

View solution

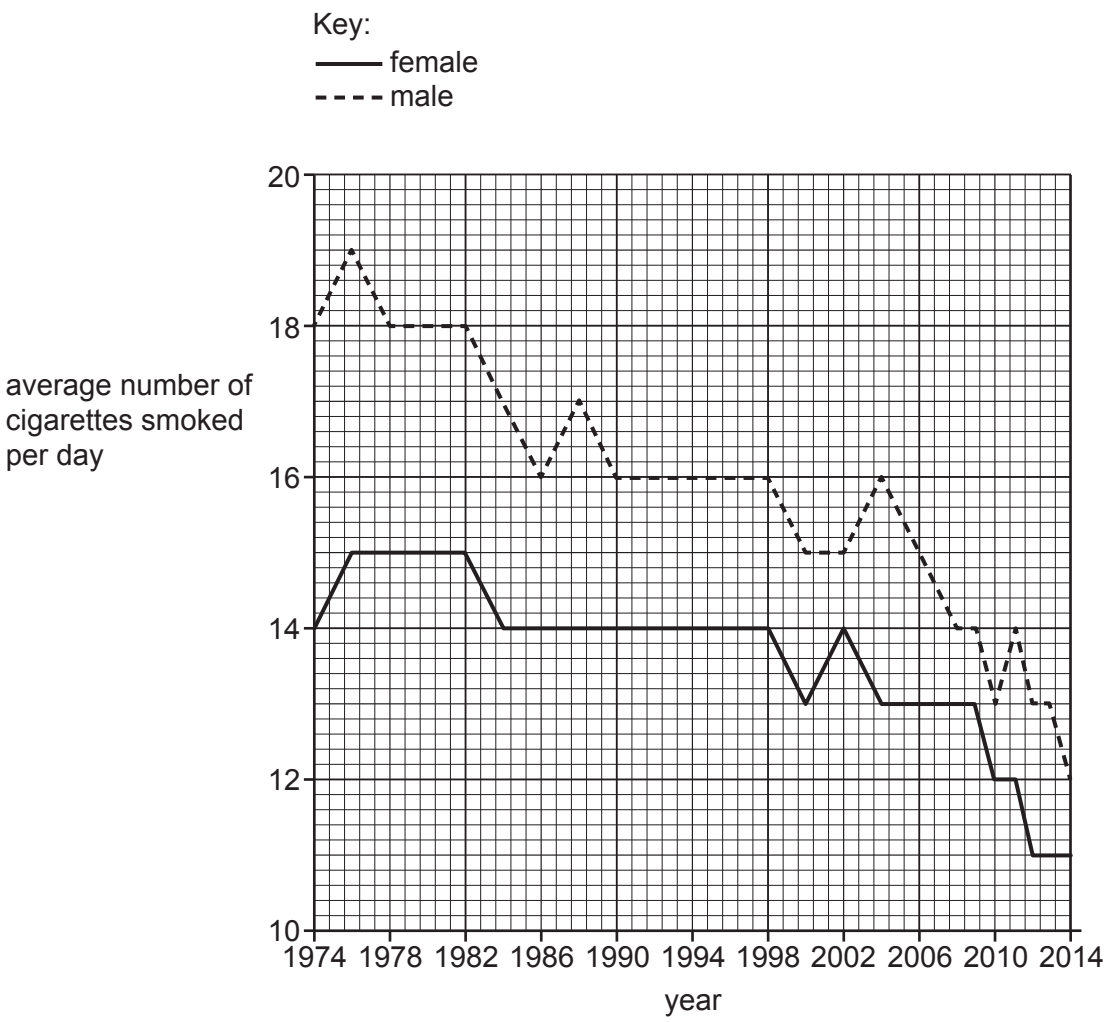


Fig. 5.1

(i) State the average number of cigarettes smoked per day by female smokers in 1982.

..... [1]

(ii) State a year in which male smokers smoked an average of 19 cigarettes per day.

..... [1]

(iii) State **two** conclusions that can be made from the data shown in Fig. 5.1.

1 .....

.....

.....

2 .....

.....

.....

[2]

(b) Tar is a toxic component of tobacco smoke.

View solution

(i) State **two** effects of tar on the gas exchange system.

1 .....

.....

2 .....

.....

[2]

(ii) State the names of **two** toxic components of tobacco smoke other than tar.

View solution

1 .....

2 .....

[2]

(c) Describe **one** effect on the fetus of the mother smoking tobacco during pregnancy.

View solution

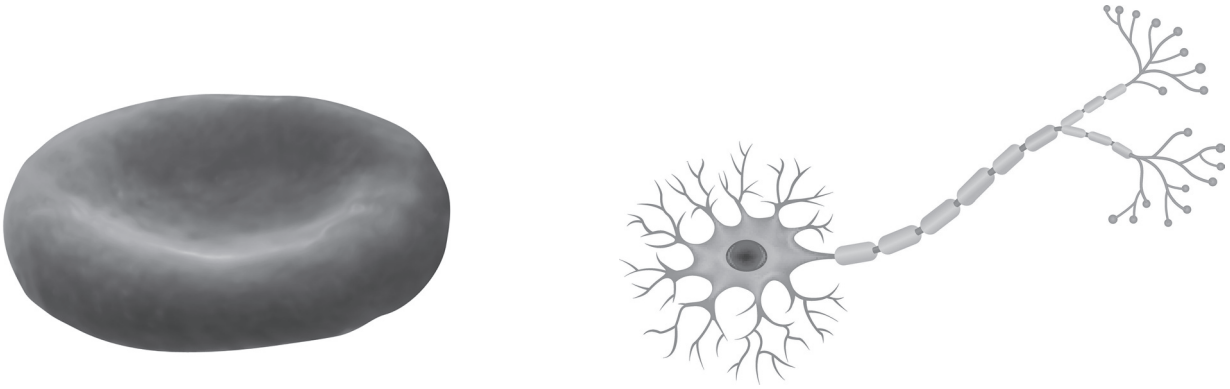
.....

.....

..... [1]

[Total: 9]

6 Fig. 6.1 shows images of cells from two different organ systems.



A **B**

not to scale

Fig. 6.1

(a) State the names of the cells shown in Fig. 6.1.

View solution

cell **A** .....

cell **B** .....

[2]

(b) Complete the definition of the term *tissue* by inserting the missing words.

View solution

A tissue is a group of cells with similar ..... working together to perform a shared ..... .

[2]

(c) State the names of the organ systems these organs belong to.

View solution

brain .....

stamen .....

ovary .....

[3]

[Total: 7]

7 **(a)** Fig. 7.1 shows a tropical forest where the trees have been cut down.

View solution



Fig. 7.1

(i) State the name of the type of habitat destruction shown in Fig. 7.1.

..... [1]

(ii) Describe **two** reasons why humans destroy habitats such as tropical forests.

View solution

1 .....

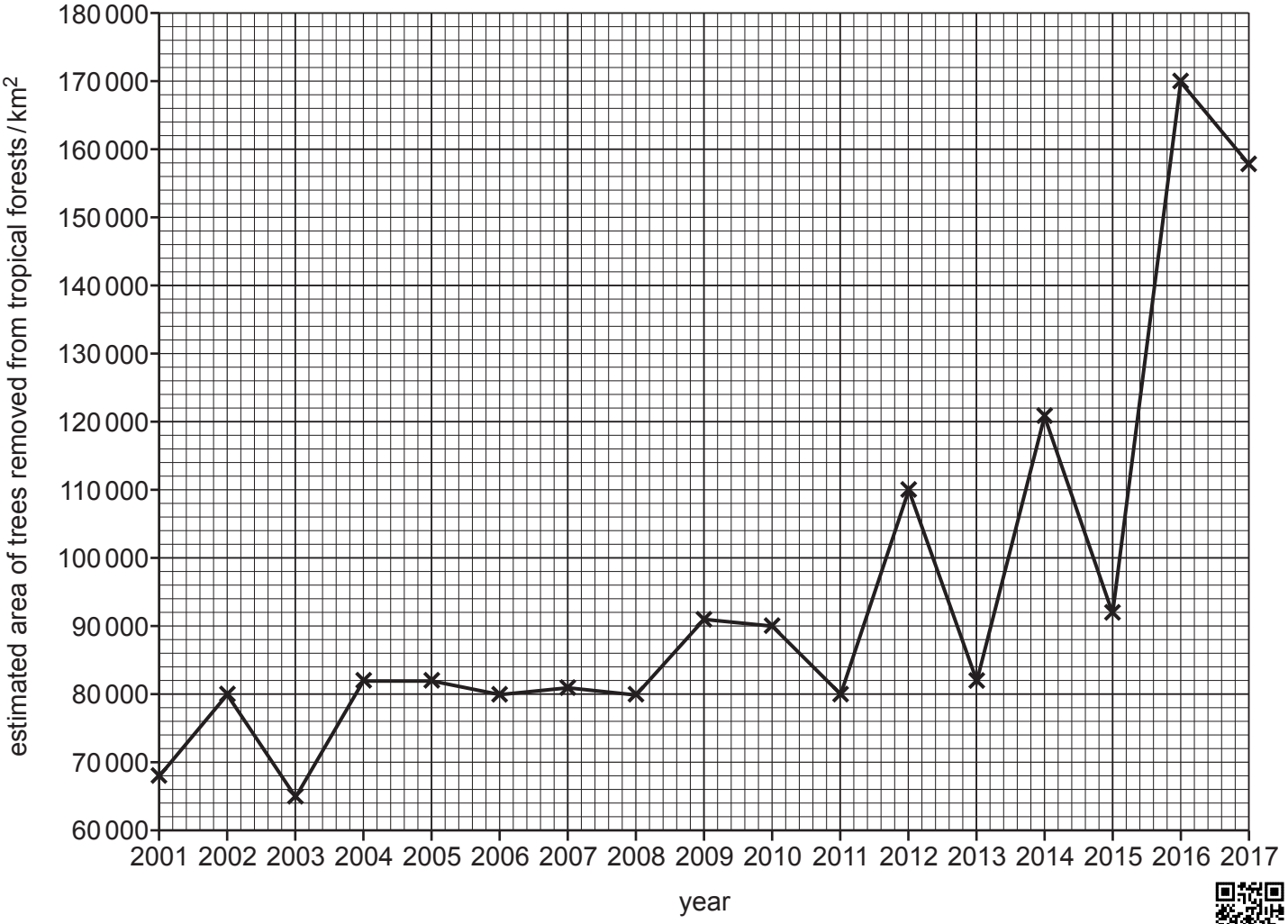
.....

2 .....

.....

[2]

(b) Fig. 7.2 is a graph showing the estimated area of trees that have been removed from tropical forests between 2001 and 2017.



View solution

Fig. 7.2

(i) State the year which had the lowest estimated area of trees removed from tropical forests on Fig. 7.2.

..... [1]

(ii) State the area of trees removed in 2012 on Fig. 7.2.

..... km^2 [1]

View solution

(iii) A student made three statements about the data in Fig. 7.2:

View solution

1 The number of trees cut down increases every year.

2 The number of trees cut down in 2014 was three times more than the number of trees cut down in 2003.

3 Fewer trees were cut down in 2017 than in 2016.

Complete Table 7.1 by using the data in Fig. 7.2 to decide if each statement is true or false and state the evidence that supports your decision.

Table 7.1

statement number	true or false	evidence from Fig. 7.2
1	.....	....
2	.....	....
3	.....	....

[3]

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(c) Fig. 7.3 shows pollution in a marine environment and Fig. 7.4 shows pollution in a land environment.

View solution

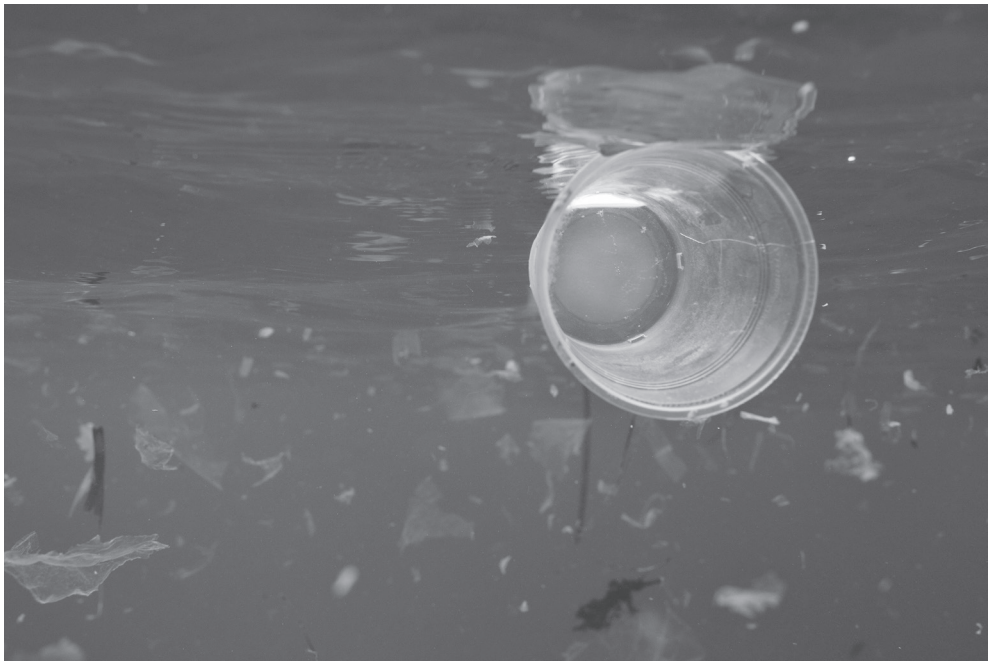

Fig. 7.3



Fig. 7.4

State the name of **one** source of pollution for each of the environments shown in Fig. 7.3 and Fig. 7.4.

marine .....

land .....

[2]

[Total: 10]

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8 **(a)** Fig. 8.1 is a diagram of a section of human skin.

View solution

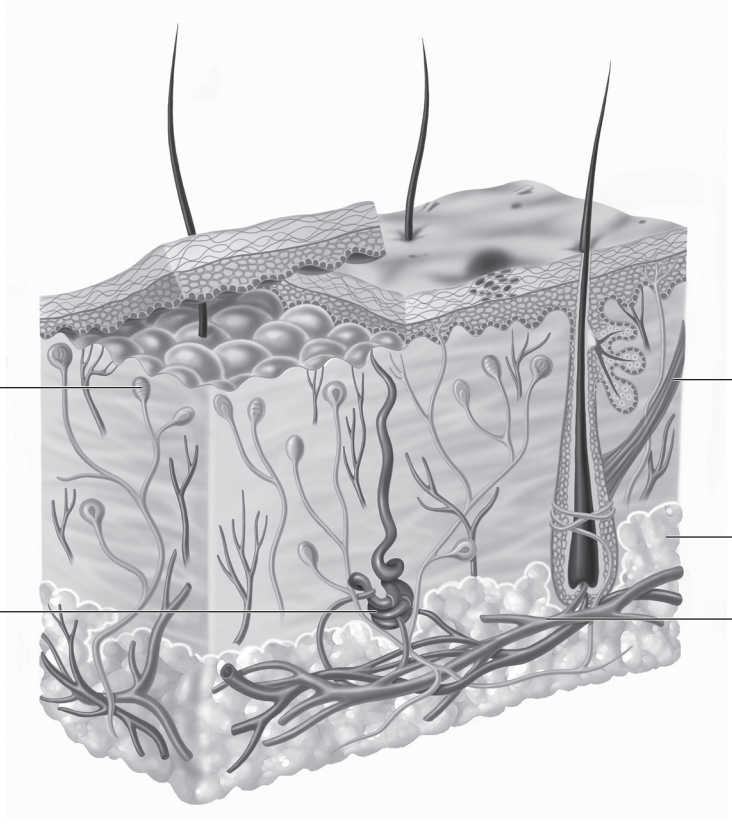

Fig. 8.1

State the names of the structures identified by the labels in Fig. 8.1.

C .....

D .....

E .....

F .....

G .....

[5]

(b) Complete the sentences about temperature control in humans by writing the missing words in the gaps.

View solution

If body temperature increases above normal, ... in the

..... detect the rise in temperature and impulses are sent to the skin.

Glands in the skin produce a liquid called ..... . The main component of this liquid is water.

The water in the liquid ..... from the surface of the skin using heat energy from the body. This lowers the body temperature.

The maintenance of a constant body temperature is an example of

..... .

[5]

[Total: 10]

9 The eye is an example of a sense organ.

(a) Define the term *sense organ*.

View solution

.....

.....

.....

..... [2]

(b) Fig. 9.1 shows a section through the eye.

View solution

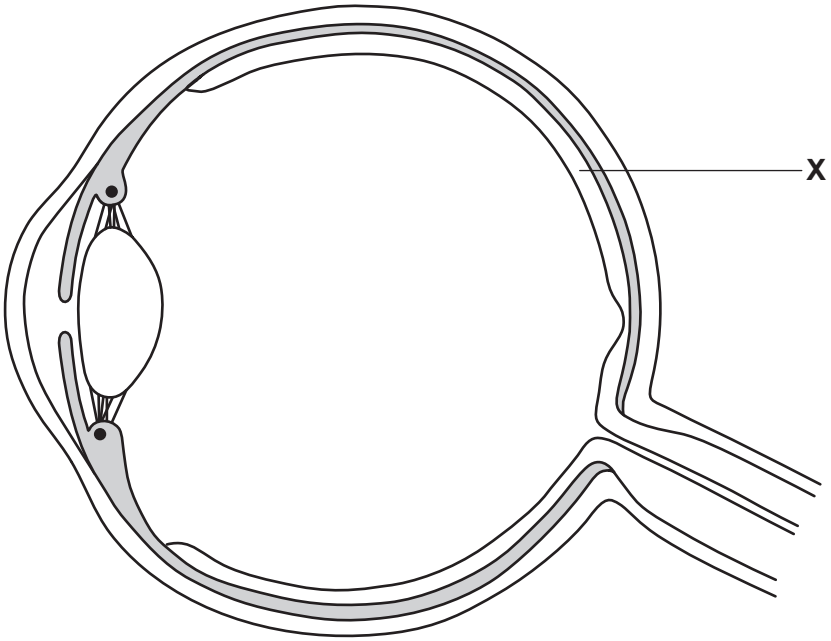

Fig. 9.1

(i) State the name of structure **X** in Fig. 9.1.

..... [1]

(ii) List **three** parts of the eye that light passes through to reach structure **X**.

1 .....

2 .....

3 .....

[3]

(iii) Label the optic nerve **on** Fig. 9.1 by drawing a label line and the letter **N**. [1]

(iv) State the function of the optic nerve.

..... [1]

[Total: 8]

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