Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

9254380606

BIOLOGY **0610/32**

Paper 3 Theory (Core) **May/June 2021**

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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1 Fig. 1.1 is a diagram of the human gas exchange system.

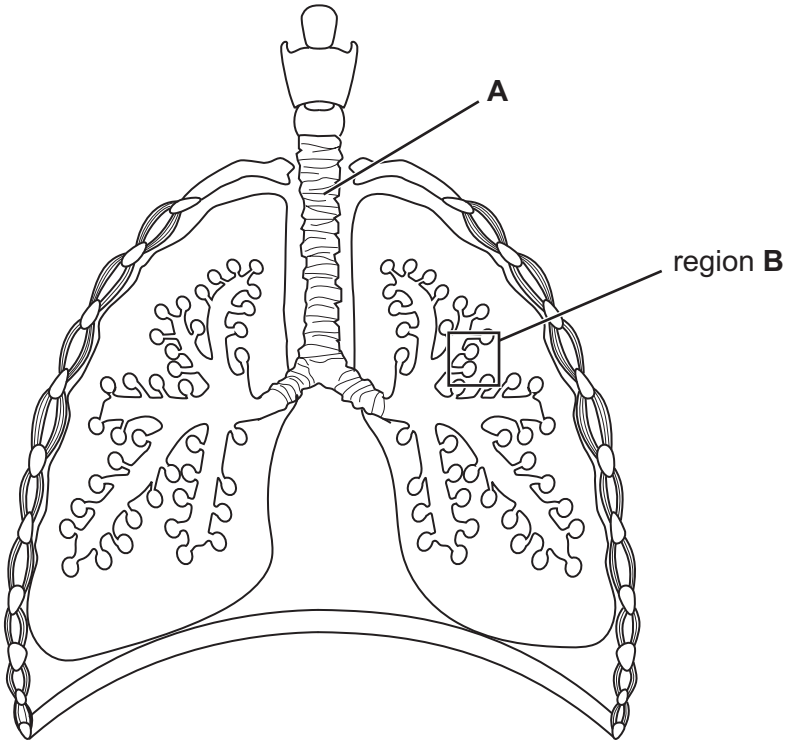


Fig. 1.1

(a) (i) Identify using a label line and a label **on Fig. 1.1**:

- a lung
- the diaphragm. [2]

(ii) State the name of structure **A** in Fig. 1.1.

..... [1]

(iii) Oxygen molecules pass through structure **A** on their way to the red blood cells.

State the names of **three** other structures in the gas exchange system that oxygen molecules must pass through on their way to the red blood cells.

1 .....

2 .....

3 .....
[3]

(iv) State the name of the process that moves oxygen into the red blood cells.

..... [1]

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(b) Fig. 1.2 is a magnified image of the exchange surface shown in region **B** in Fig. 1.1.

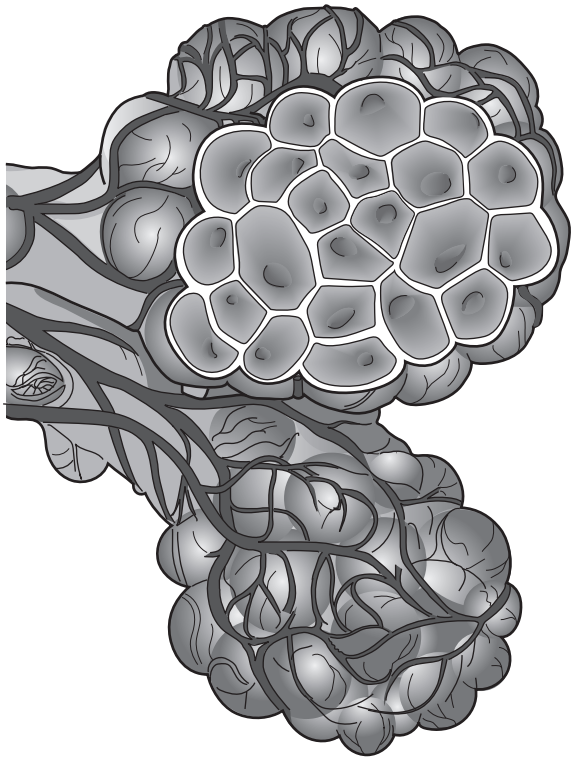


Fig. 1.2

(i) State the name of the main blood vessel that delivers blood to the lungs.

..... [1]

(ii) The gas exchange surface shown in Fig. 1.2 is permeable to make gas exchange efficient.

List **two** other features of gas exchange surfaces.

1 .....

2 .....

[2]

(c) Oxygen concentration is higher in inspired air than in expired air.

State **one** other way the composition of inspired air differs from the composition of expired air.

..... [1]

[Total: 11]

2 **(a)** **(i)** List the chemical elements in a carbohydrate.

..... [1]

(ii) State the name of **one** chemical element that is found in a protein but is **not** found in a carbohydrate.

..... [1]

(b) Fig. 2.1 shows a variegated leaf which uses photosynthesis to make carbohydrates.

A variegated leaf has green parts that contain chlorophyll and white parts that do **not** contain chlorophyll.



Fig. 2.1

(i) State the word equation for photosynthesis.

..... [2]

(ii) The carbohydrate produced by photosynthesis can be stored as starch in the leaf.

A plant with variegated leaves used up its store of starch because it was placed in the dark.

Explain why the plant used up its store of starch when it was placed in the dark.

.....

.....

.....

.....

..... [2]

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(iii) The plant with variegated leaves was then left in a warm, sunny place. After a few days, a leaf from this plant was removed and tested for starch.

Predict the results of the starch test by placing ticks (✓) in Table 2.1.

Table 2.1

part of leaf	starch present	starch absent
green		
white		

[1]

(iv) State the name of the mineral ion that is needed to make chlorophyll.

..... [1]

(c) Starch is a large molecule.

The boxes on the left show the names of some other large molecules.

The boxes on the right show some sentence endings.

Draw **five** lines to make five correct sentences.

large molecule	**sentence endings**
Cellulose	
	is made from amino acids.
DNA	
	is made from fatty acids and glycerol.
Glycogen	
	is made from glucose.
Oil	
	is the genetic material.
Protein	

[5]

[Total: 13]

3 **(a)** Fig. 3.1 is a diagram showing stages during the development of a human embryo and fetus.

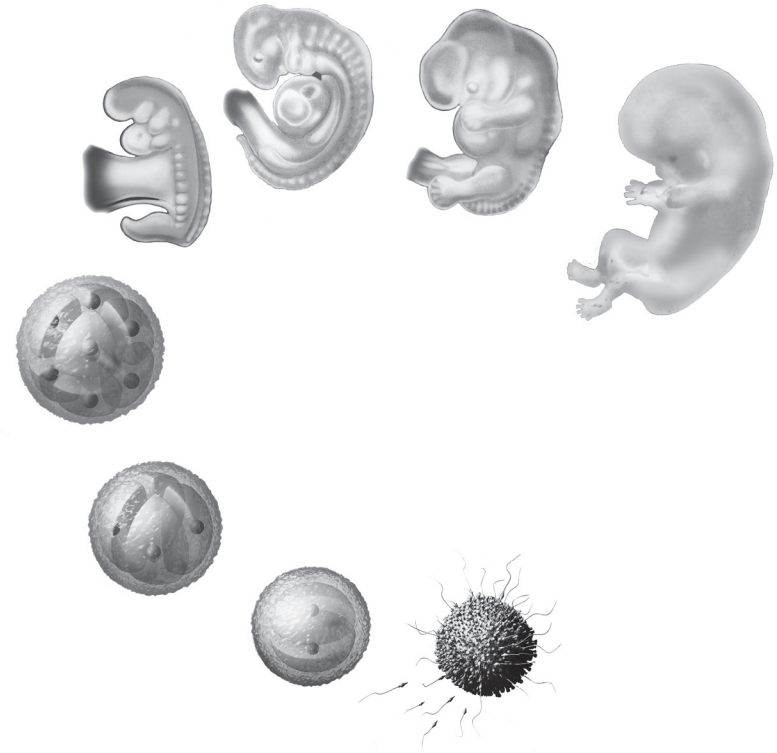


Fig. 3.1

(i) Put a tick (✓) in the box that describes a human embryo.

a ball of cells	
a cell with energy stores and a jelly coating	
a cell with a flagellum	
is made of cells that have a cell wall	

[1]

(ii) Table 3.1 shows some of the events (**D** to **J**) that occur between fertilisation and birth.

The events are not in the correct order.

Table 3.1

D	a baby is born
E	complexity of the fetus increases more than size
F	a zygote is formed
G	embryo implants into the wall of the uterus
H	size of the fetus increases more than complexity
J	the zygote divides by mitosis to produce two cells

Put the events into the correct sequence by ordering the letters.

One has been done for you.

	J				

[3]

(b) Complete the sentences using the words and phrases from the list.

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

afterbirth **amniotic sac** **amniotic fluid** **cervix**

oviduct **penis** **umbilical cord** **uterus wall** **vagina**

Birth begins when the strong muscles of the ..... start to contract. This causes the ..... to dilate. The ..... can break at this stage. The muscles start to push the baby out. The baby moves through the ..... . The ..... is tied and cut. Finally the ..... is delivered.

[6]

[Total: 10]

4 **(a)** **(i)** Define the term genetic engineering.

.....

.....

.....

.....

..... [2]

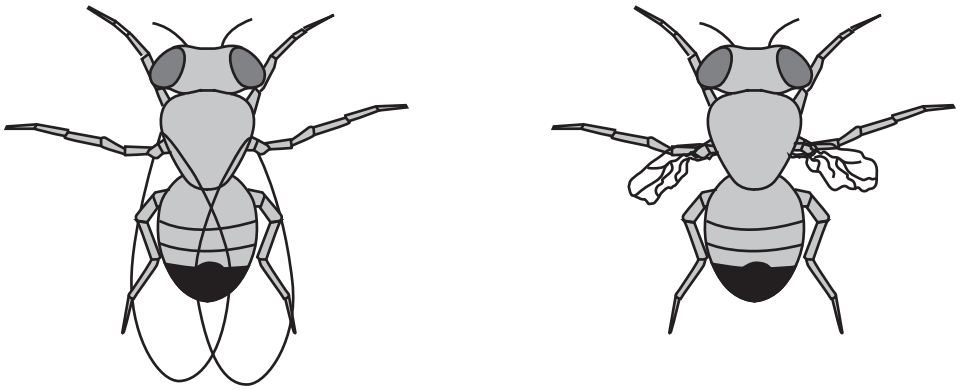
(ii) State **one** example of genetic engineering.

.....

.....

..... [1]

(b) Fig. 4.1 is a diagram of a fruit fly with normal wings and a fruit fly with vestigial wings.



normal wings **vestigial wings**

Fig. 4.1

A gene determines whether fruit flies have normal wings or vestigial wings.

There are two alleles for this gene:

- **A** is dominant and represents the allele for normal wings
- **a** is recessive and represents the allele for vestigial wings.

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(i) A homozygous dominant fruit fly was crossed with a heterozygous fruit fly.

Complete the genetic diagram to predict the probability of the offspring having vestigial wings.

parental phenotypes normal wings × normal wings

parental genotypes ..... × .....

gametes ..... , ... × ..... , ...

offspring genotypes ....

offspring phenotypes ....

probability of offspring having vestigial wings .....

[5]

(ii) State the genotype of a pure-breeding fruit fly that has normal wings.

..... [1]

(iii) The binomial name for a fruit fly is *Drosophila melanogaster*.

State the genus of this fruit fly.

..... [1]

[Total: 10]

5 **(a)** Fig. 5.1 shows a section through a human molar tooth.

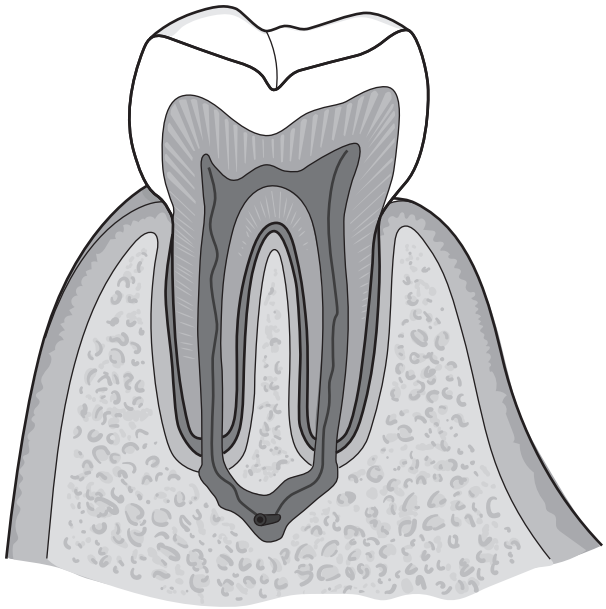


Fig. 5.1

(i) Use label lines and labels to identify these structures **on** Fig. 5.1:

- cement
- gum
- nerves. [3]

(ii) State the function of the canine teeth in humans.

.....

.....

..... [1]

(b) Sheep are herbivores. They do not have canine teeth, or teeth in the front upper jaw.

The other types of teeth in sheep are similar to humans.

Fig. 5.2 shows an x-ray of the teeth in the skull of a sheep.

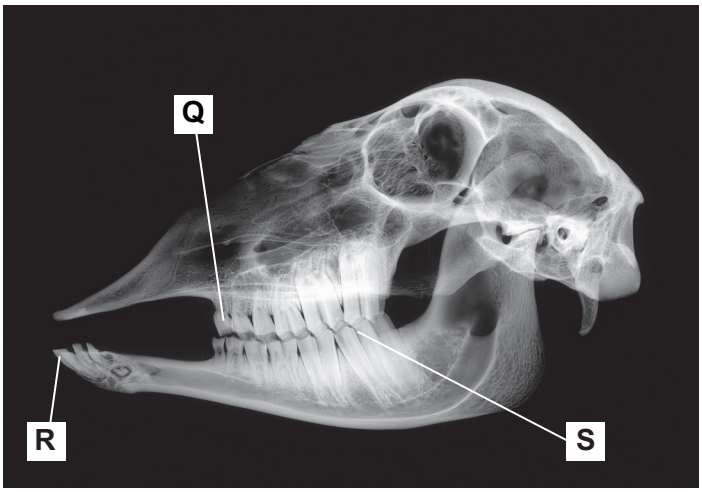


Fig. 5.2

The boxes on the left show a letter from Fig. 5.2.

The boxes in the middle show the name of a type of tooth shown in Fig. 5.2.

The boxes on the right show the function of each type of tooth.

Draw **one** line to link each letter from Fig. 5.2 to its correct name.

Draw **one** line to link each name to its correct function.

Draw a total of **six** lines.

letter from Fig. 5.2	name	function
Q	incisor	
		biting off pieces of food
R	molar	
		grinding food
S	premolar	

[5]

(c) State the type of digestion that breaks up large pieces of food.

..... [1]

(d) Fig. 5.3 is a diagram showing the stages of dental decay.

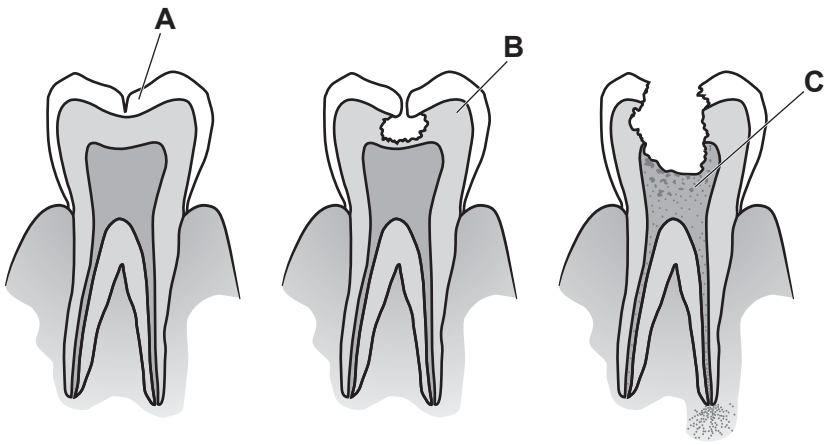


Fig. 5.3

(i) Describe the causes of dental decay.

Use the letters in Fig. 5.3 in your answer.

.....

.....

.....

.....

.....

.....

.....

.....

..... [4]

(ii) Describe **one** way of preventing dental decay.

.....

.....

..... [1]

[Total: 15]

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6 **(a)** The activity of the heart can be monitored by measuring the pulse rate.

Two students measured their pulse rates before, during and after exercise.

The results are shown in Fig. 6.1.

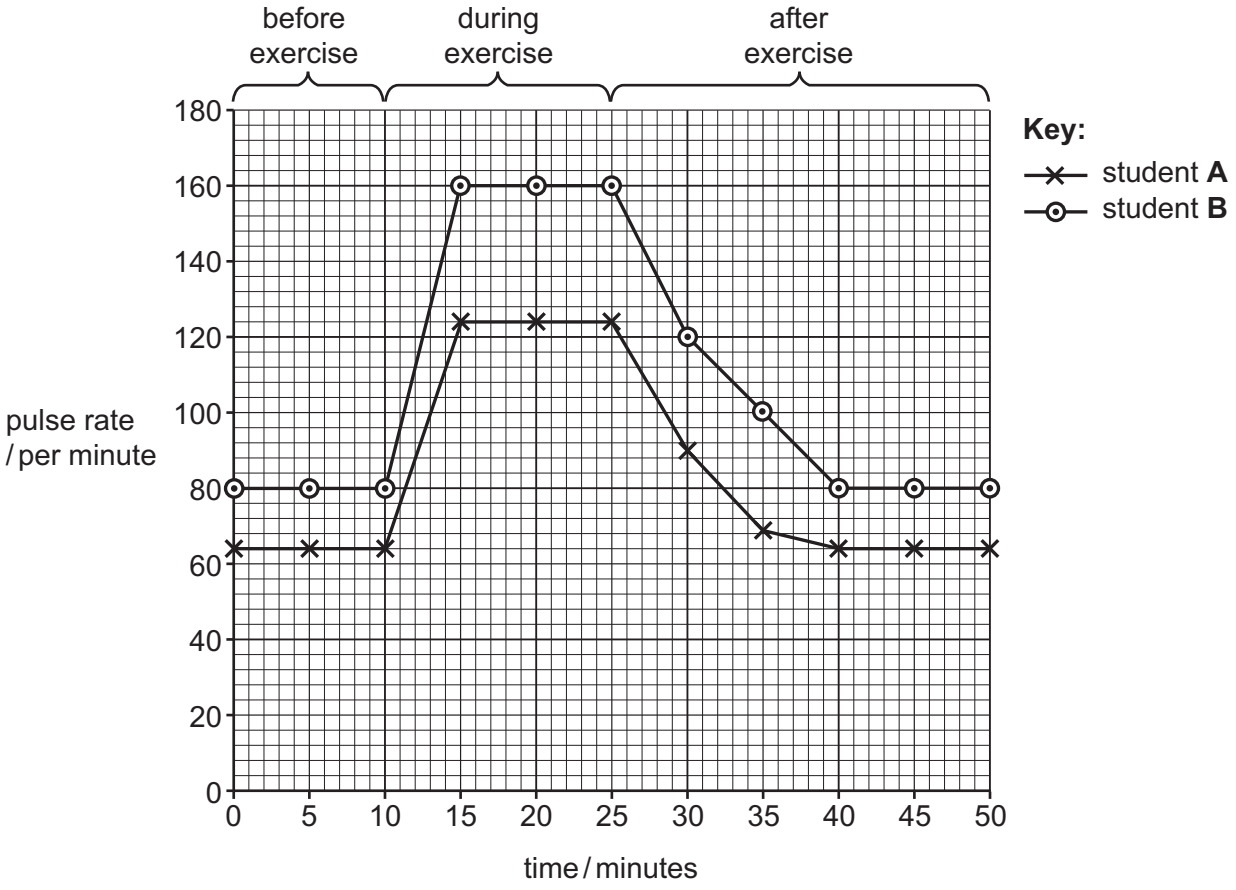


Fig. 6.1

(i) Describe the changes in the pulse rates shown in Fig. 6.1 for student **A** and student **B**.

.....

.....

.....

.....

.....

.....

..... [4]

(ii) Calculate the percentage change in the pulse rate between 0 and 15 minutes for student **A**.

Give your answer to the nearest whole number.

Space for working.

..... %
[3]

(iii) State **two** other methods that can be used to monitor the activity of the heart.

1 .....

2 .....
[2]

(b) Exercise levels, environmental temperature and changes in water intake can affect the volume and concentration of urine produced.

Complete the sentences by circling the correct words **in bold**.

The first sentence has been done for you.

More exercise causes the volume of urine to **increase / (decrease) / stay the same** and the concentration of urine to (**increase**) **/ decrease / stay the same**.

A greater intake of water causes the volume of urine to **increase / decrease / stay the same** and the concentration of urine to **increase / decrease / stay the same**.

A higher environmental temperature causes the volume of urine to **increase / decrease / stay the same** and the concentration of urine to **increase / decrease / stay the same**.
[2]

[Total: 11]

7 Measles is an example of a transmissible disease that is caused by a virus.

(a) Complete the definition of transmissible disease.

A transmissible disease is a disease in which the ..... can be passed from one ..... to another.

[2]

(b) Fig. 7.1 is a pie chart showing the number of people infected with four different transmissible diseases in one country in 2018.

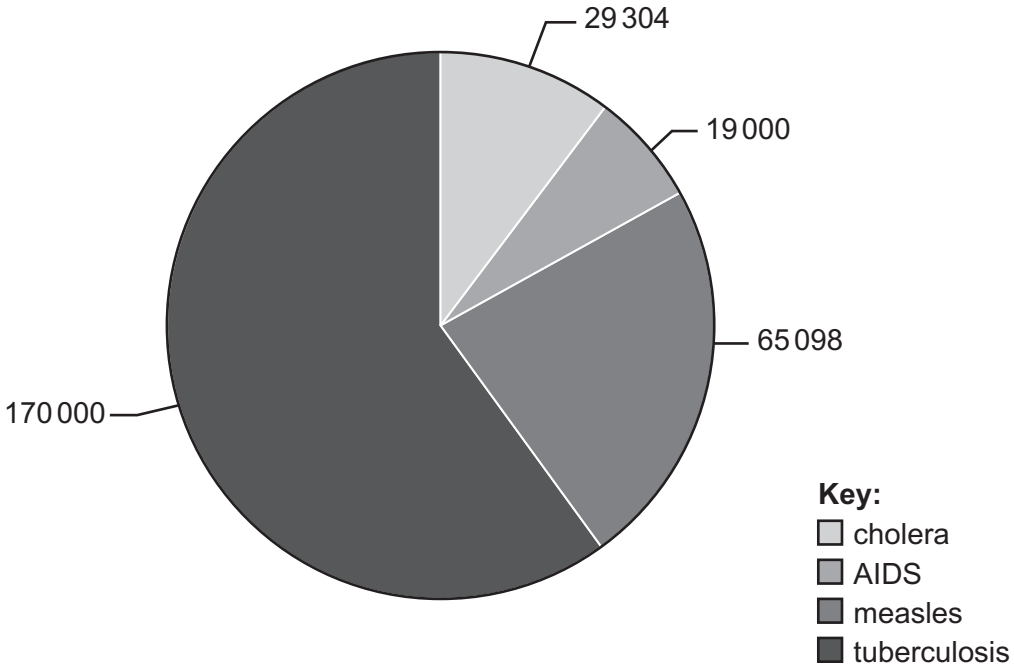


Fig. 7.1

(i) State the name of the disease with the smallest number of infections in Fig. 7.1.

..... [1]

(ii) Use the information in Fig. 7.1 to calculate the total number of people infected with these four diseases.

..... people infected
[1]

(iii) State the type of organism that causes cholera.

..... [1]

(c) (i) The list shows some examples of ways that disease-causing organisms can be transmitted.

air **animals** **blood**

contaminated surfaces **food**

Complete Table 7.1 to show which are examples of direct contact and which are examples of indirect contact.

Each example can be used once, more than once or not at all.

Table 7.1

direct contact	indirect contact

[2]

(ii) Table 7.2 shows **three** ways the body can defend itself and some examples of the three methods.

Place ticks (✓) in the boxes to show the correct type of defence mechanism for each example.

Table 7.2

example of defence mechanism	cells	chemical	mechanical
antibody production			
hairs in the nose			
mucus			
phagocytosis			
skin			
stomach acid			

[3]

[Total: 10]

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