

(ii) Explain why the population of *L. bulgaricus* does not continue to increase during the fermentation to make yoghurt.

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

(c) The curve shown in Fig. 5.2 is a sigmoid population growth curve.

Define the term *growth*.

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

(d) Bacteria, such as *L. bulgaricus*, can reproduce rapidly.

Name the process of reproduction in bacteria.

..... [1]

- (e) Sometimes food additives are added to yoghurt. Some people suggest that it is healthier to eat yoghurt without additives.

Suggest the advantages and disadvantages of putting food additives into yoghurt.

advantages

.....

.....

.....

disadvantages

.....

.....

..... [4]

[Total: 15]

2 Fig. 5.1 is a diagram of the human immunodeficiency virus (HIV).

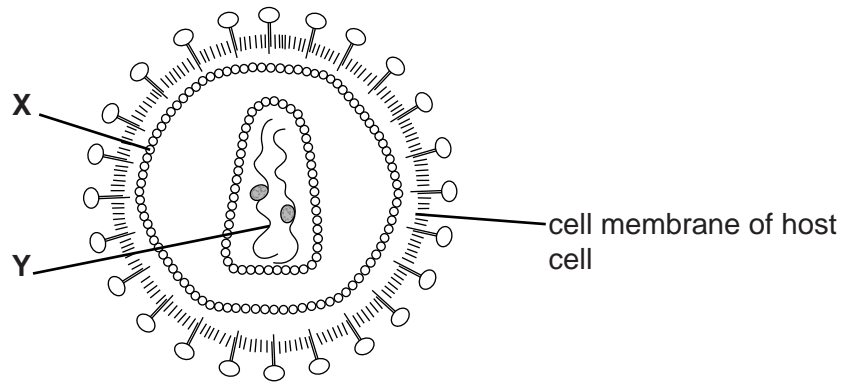


Fig. 5.1

(a) (i) Name the parts of the virus labelled X and Y.

X

Y [2]

(ii) State three ways in which the **structure** of bacteria differs from the structure of viruses.

1

2

3 [3]

- (b) Sub-Saharan Africa has the highest proportion of the population living with HIV in the world. The World Health Organization estimates both the total number of people who live with HIV and the total number of people that are newly infected each year.

Fig. 5.2 shows the estimated numbers for sub-Saharan Africa between 1990 and 2010.

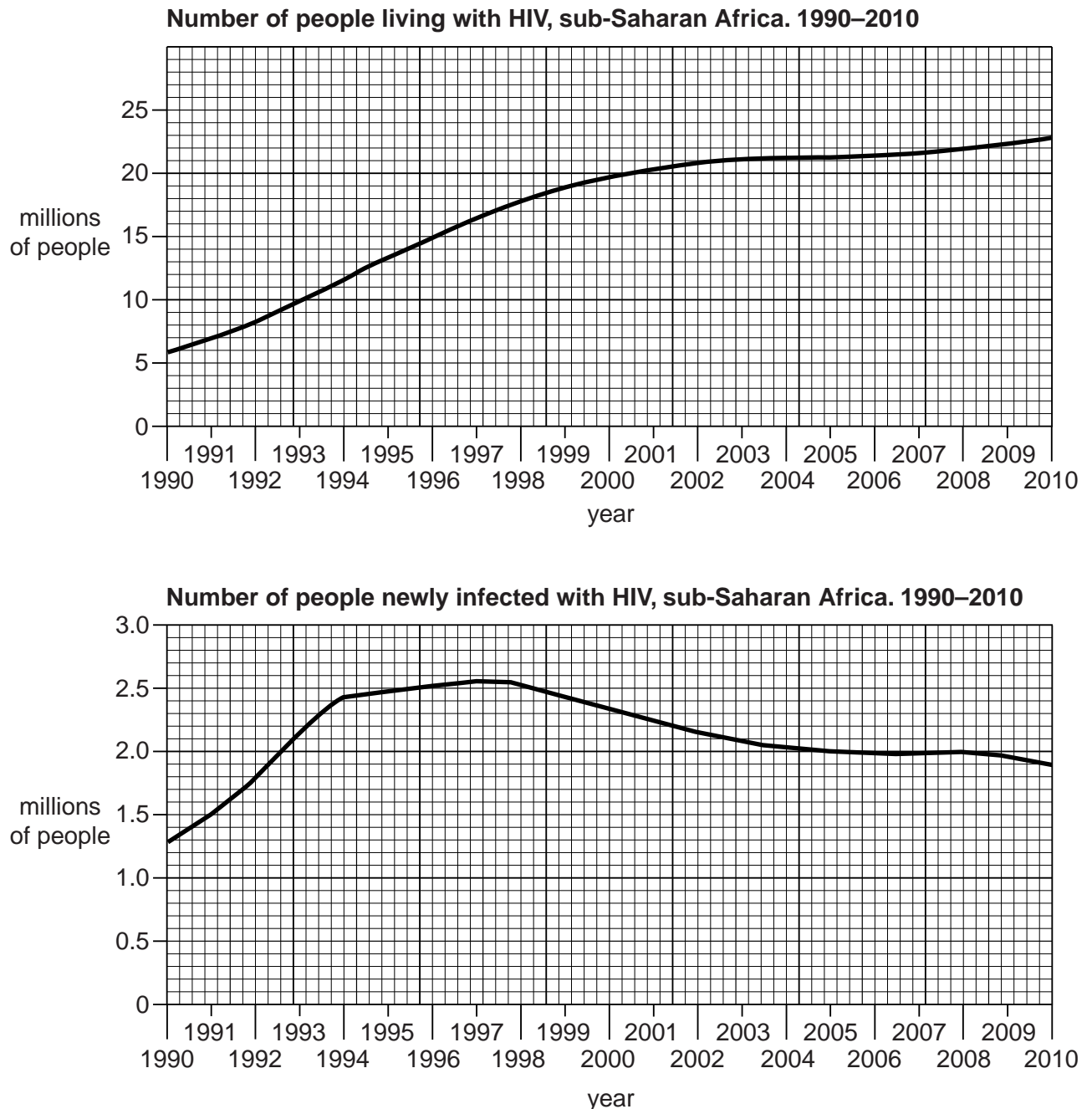


Fig. 5.2

- (i) Summarise the changes between 1990 and 2009 in the number of people living with HIV and the number of people newly infected with HIV.

number of people living with HIV

.....

.....

.....

number of people newly infected with HIV

.....

.....

.....[4]

- (ii) Suggest why in 2010 the number of people living with HIV increased but the number of newly infected people decreased.

.....

.....

.....

.....

.....

.....[2]

- (iii) Describe **three** ways in which HIV is transmitted from infected to uninfected people.

1

.....

2

.....

3

.....[3]

(iv) Describe the effects of HIV on the immune system.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

[3]

[Total: 17]

- 3 (a) Sickle cell anaemia is a genetic disorder that is found among people in certain parts of the world.

A sample of blood was taken from a person with sickle cell anaemia and examined with an electron microscope.

Fig. 4.1 shows some of the red blood cells in the sample.



Fig. 4.1

Explain the problems that may occur as these cells circulate in the blood system.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

[4]

(b) The gene for haemoglobin exists in two alternative forms:

H^A codes for the normal form of haemoglobin;
 H^S codes for the abnormal form of haemoglobin.

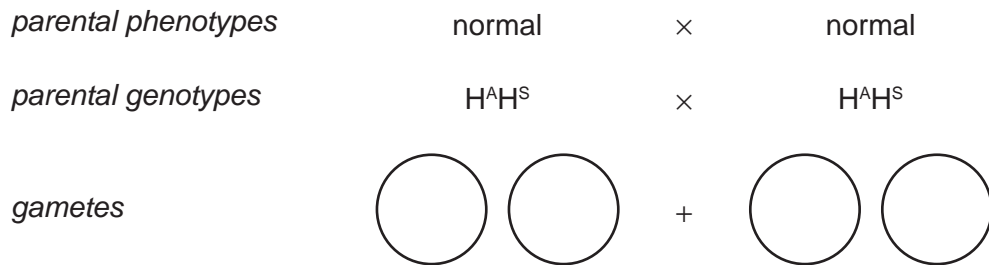
(i) State the name for the alternative forms of a gene.

..... [1]

(ii) A child has sickle cell anaemia. The parents do not have this disorder.

Complete the genetic diagram to show how the child inherited the disorder.

Use the symbols H^A and H^S in your answer.



child's genotype

child's phenotype sickle cell anaemia

[2]

(iii) The parents are about to have another child.

What is the probability that this child will have sickle cell anaemia?

..... [1]

(c) The maps in Fig. 4.2 show the distribution of sickle cell anaemia and malaria in some parts of the world.

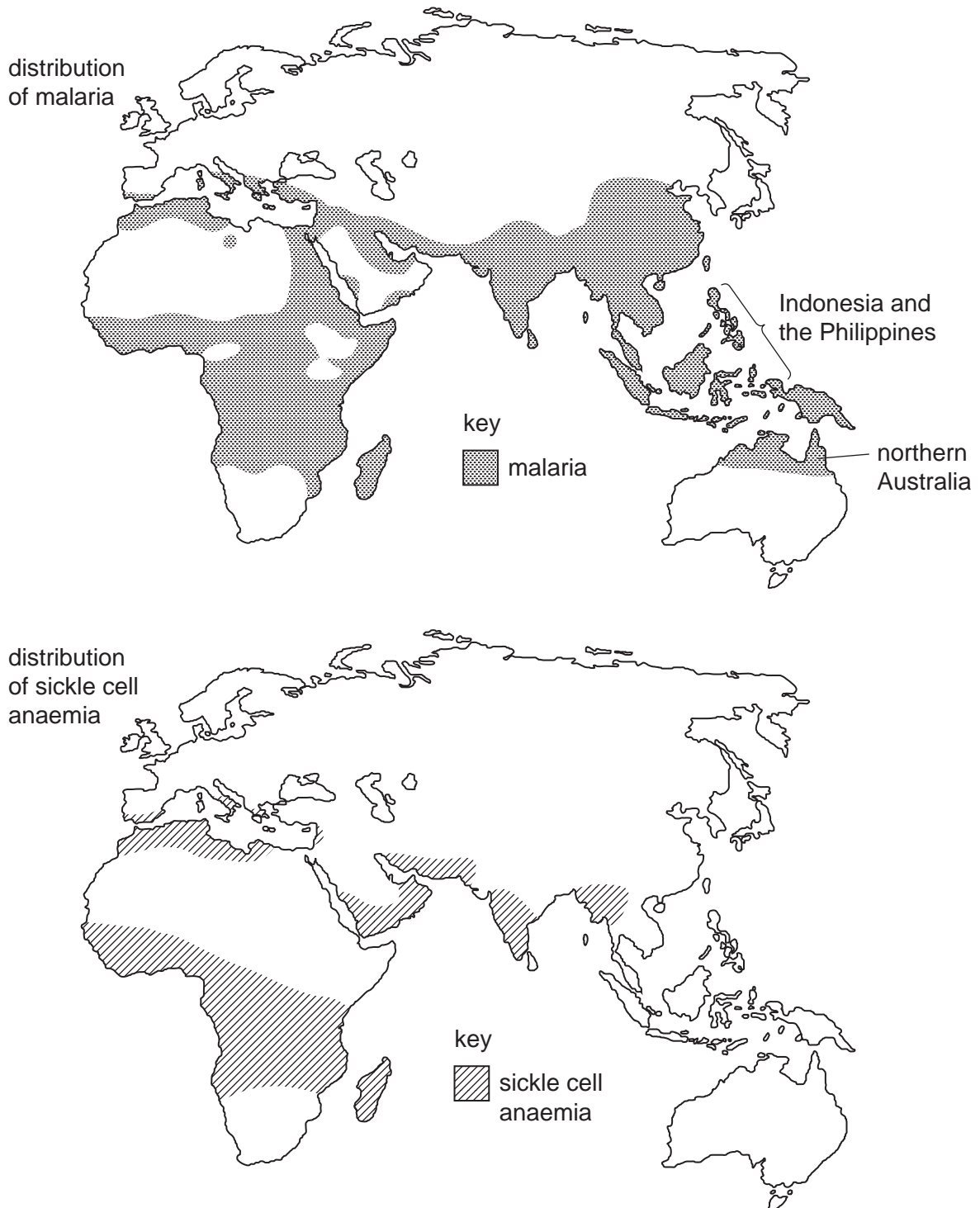


Fig. 4.2

(i) Explain why sickle cell anaemia is common in people who live in areas where malaria occurs.

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [4]

(ii) Suggest why sickle cell anaemia is very rare among people who live in Indonesia and northern Australia.

.....

.....

.....

.....

.....

..... [2]

[Total: 14]