

# Response to Infection

## Question Paper 6

<b>Level</b>	A Level
<b>Subject</b>	Biology
<b>Exam Board</b>	Edexcel
<b>Topic</b>	Microbiology and Pathogens
<b>Sub Topic</b>	Response to Infection
<b>Booklet</b>	Question Paper 6

**Time Allowed:** 27 minutes

**Score:** /23

**Percentage:** /100

**Grade Boundaries:**

A*	A	B	C	D	E	U
>85%	'77.5%	70%	62.5%	57.5%	45%	<45%

1 Tuberculosis (TB) kills approximately three million people every year. Droplets containing the organisms that cause TB are released into the air when a person suffering from TB coughs. Transmission of TB occurs if these droplets are inhaled into the alveoli of the lungs.

In the lungs, the organisms are taken up by macrophages and carried to lymph nodes.

(a) (i) State **one** characteristic symptom of TB other than coughing. (1)

(ii) Place a cross ☒ in the box next to the name of the organism that causes TB. (1)

- A *Macrobacterium tuberculosis*
- B *Microbacterium tuberculosis*
- C *Monobacterium tuberculosis*
- D *Mycobacterium tuberculosis*

(iii) Describe how the organisms that cause TB are taken up by macrophages. (3)

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(iv) Ingesting food containing these organisms is unlikely to lead to the development of TB. Give an explanation for this. (2)

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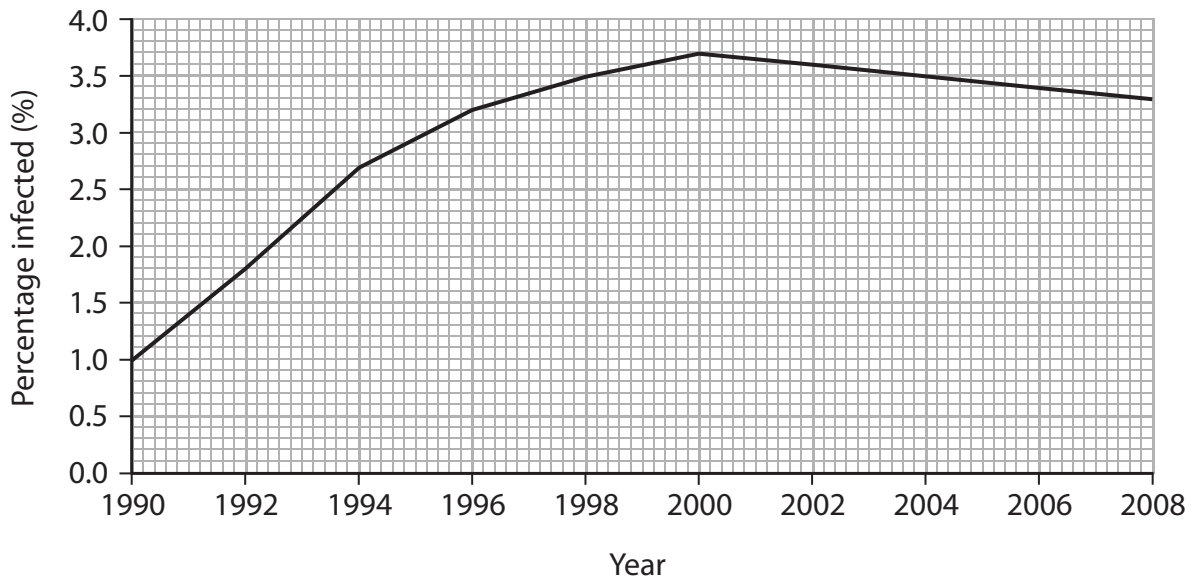
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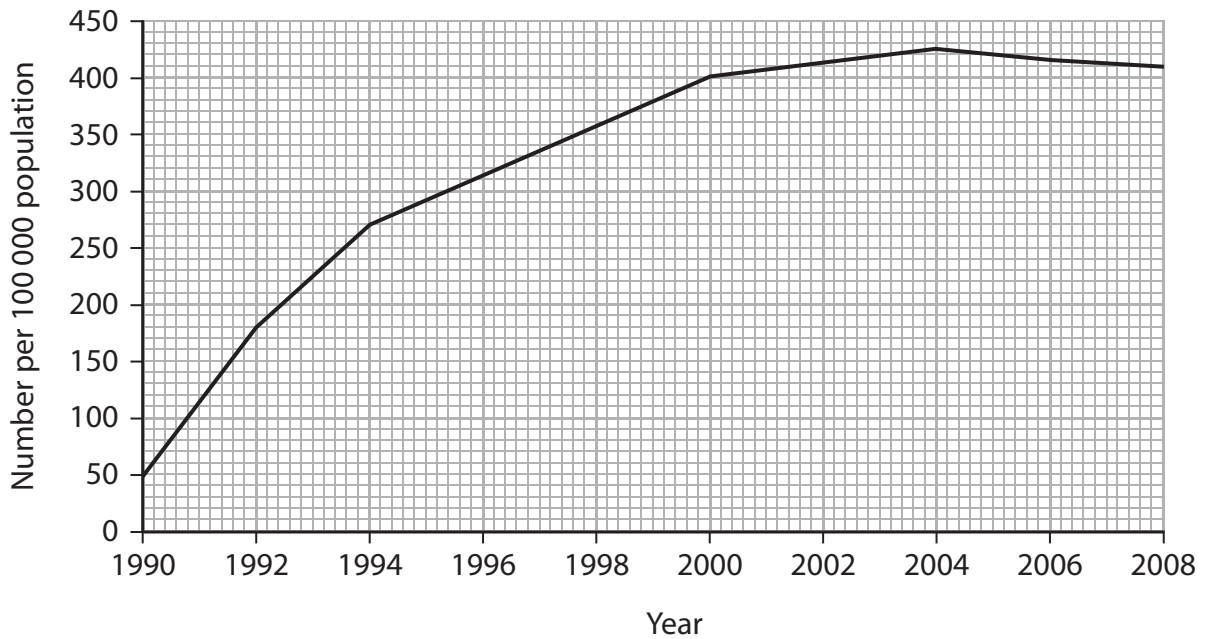
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\*(b) The graphs below show data related to TB and HIV infections in the population of central Africa from 1990 to 2008.

**Graph 1** – The percentage of the population infected by TB

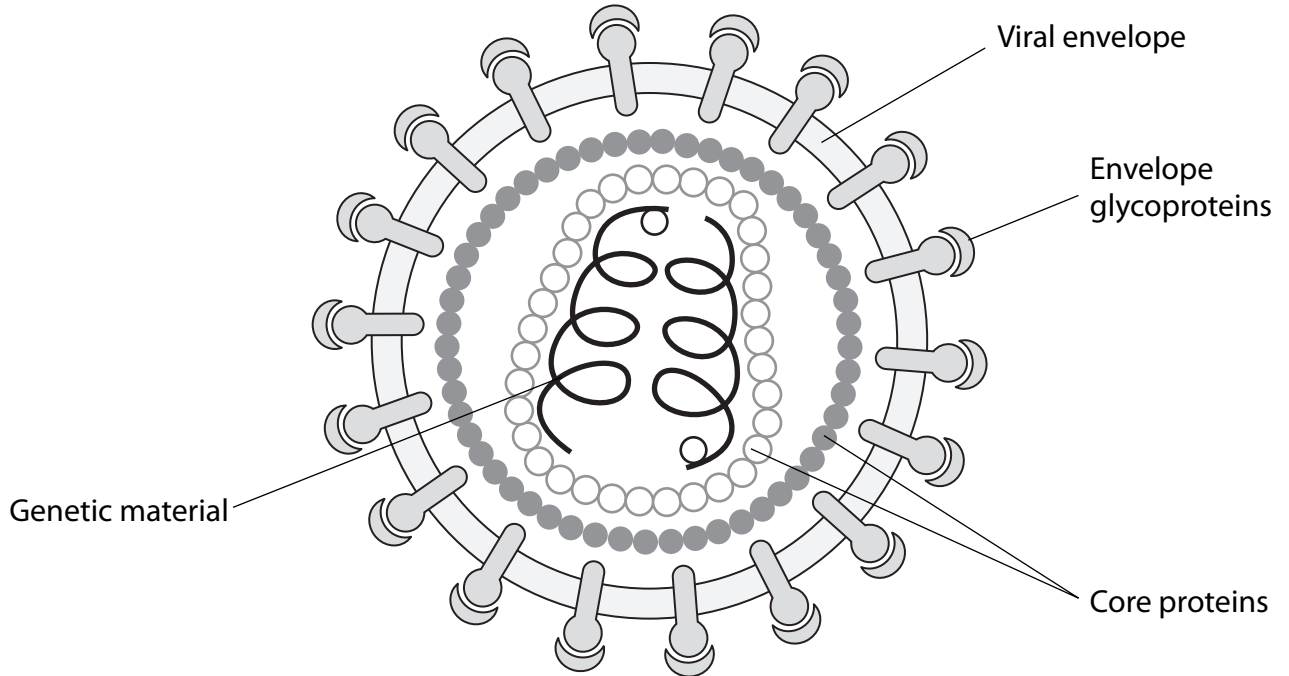


**Graph 2** – The number of cases of HIV infection per 100 000 population





2 The diagram below shows the structure of Human Immunodeficiency Virus (HIV).



(a) State how the genetic material in HIV differs from the genetic material in the bacterium *Mycobacterium tuberculosis* that causes TB.

(2)

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(b) One of the ways in which HIV may enter the blood is through the use of infected needles. Explain why unbroken skin is an effective barrier against HIV infection.

(2)

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(c) The table below shows the changes in the number of CD4 T-lymphocytes in the blood of a person infected with HIV, during the first 10 weeks after infection.

<b>Time after infection / weeks</b>	<b>CD4 T-lymphocyte count / cells per mm<sup>3</sup> of blood</b>
0	1050
1	980
2	810
3	600
4	520
5	490
6	480
7	500
8	530
9	580
10	600

(i) Describe the change in numbers of CD4 T-lymphocytes during the first 6 weeks after infection with HIV.

(2)

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