Diseases and Immunity

Question Paper

Level	IGCSE
Subject	Biology
Exam Board	CIE
Topic	Diseases and Immunity
Paper Type	(Extended) Theory Paper
Booklet	Question Paper

Time Allowed: **44 minutes**

Score: **/37**

Percentage: **/100**

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1 Fig. 4.1 is an electron micrograph of some red blood cells and lymphocytes.

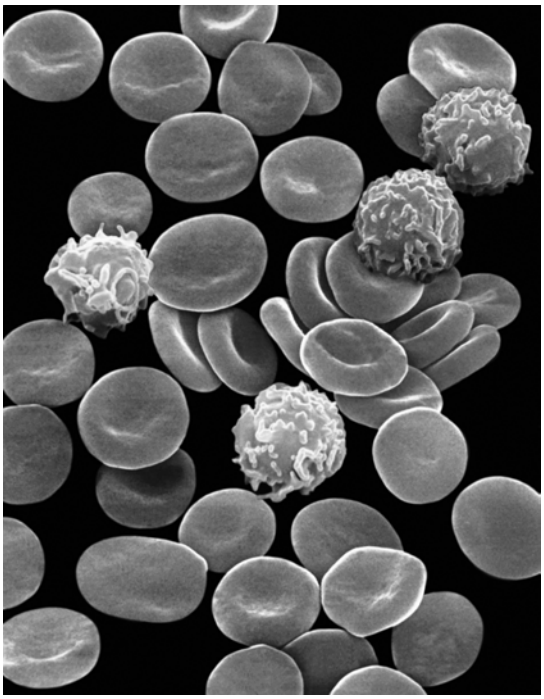

Fig. 4.1

(a) Lymphocytes respond to infection by making and releasing special protein molecules called antibodies.

Describe how antibodies provide protection from diseases caused by viruses and bacteria.

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..... [3]

Red blood cells have special molecules on their cell membranes. These are known as antigens and they stimulate the production of antibodies. These antigens also determine a person's blood group.

Before carrying out kidney transplants, it is important to check that the blood group of the donor matches the blood group of the recipient. This is called blood typing. It is necessary because blood group antigens are present on the inner lining of blood vessels in the kidney.

(b) Explain what would happen if a kidney from a person with blood group A was transferred into the body of a person with blood group O.

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..... [2]

Tissue typing is carried out before transplanting a kidney. This makes sure that there is a close match between the donated kidney and the recipient. However, it is possible to carry out transplants of the cornea without blood typing or tissue typing.

(c) Suggest why it is possible to transplant corneas successfully without carrying out any tissue typing or blood typing.

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..... [1]

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The gene for the ABO blood group has three alleles, I^A, I^B and I^o.

(d) A person with blood group O has parents who have blood groups A and B. Complete the genetic diagram to show how this is possible.

Use the symbols, I^A, I^B and I^o, for the blood group alleles.

parental phenotypes	blood group A	×	blood group B
parental genotypes	.....	×	.....
gametes	....	+	....

offspring genotype	.....
offspring phenotype	blood group O

[3]

(e) Use your answer to **(d)** to give examples of the following. The first one has been completed for you.

term	exa
a dominant allele	I^A
heterozygous genotype	……..
codominant alleles	……..
phenotype	……..

[3]

[Total: 12]

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

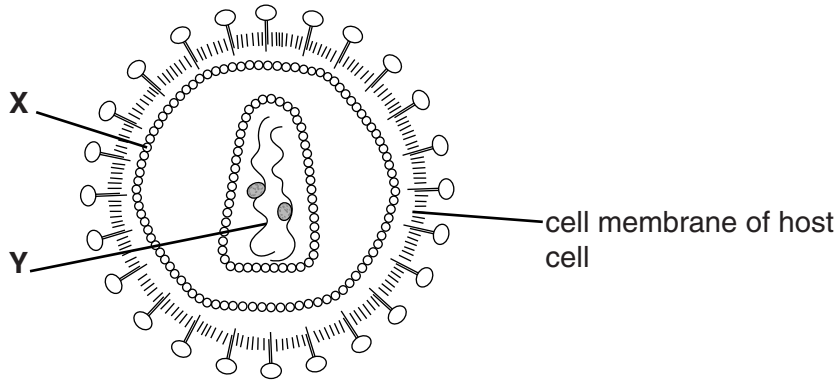

Fig. 5.1

(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]

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(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.

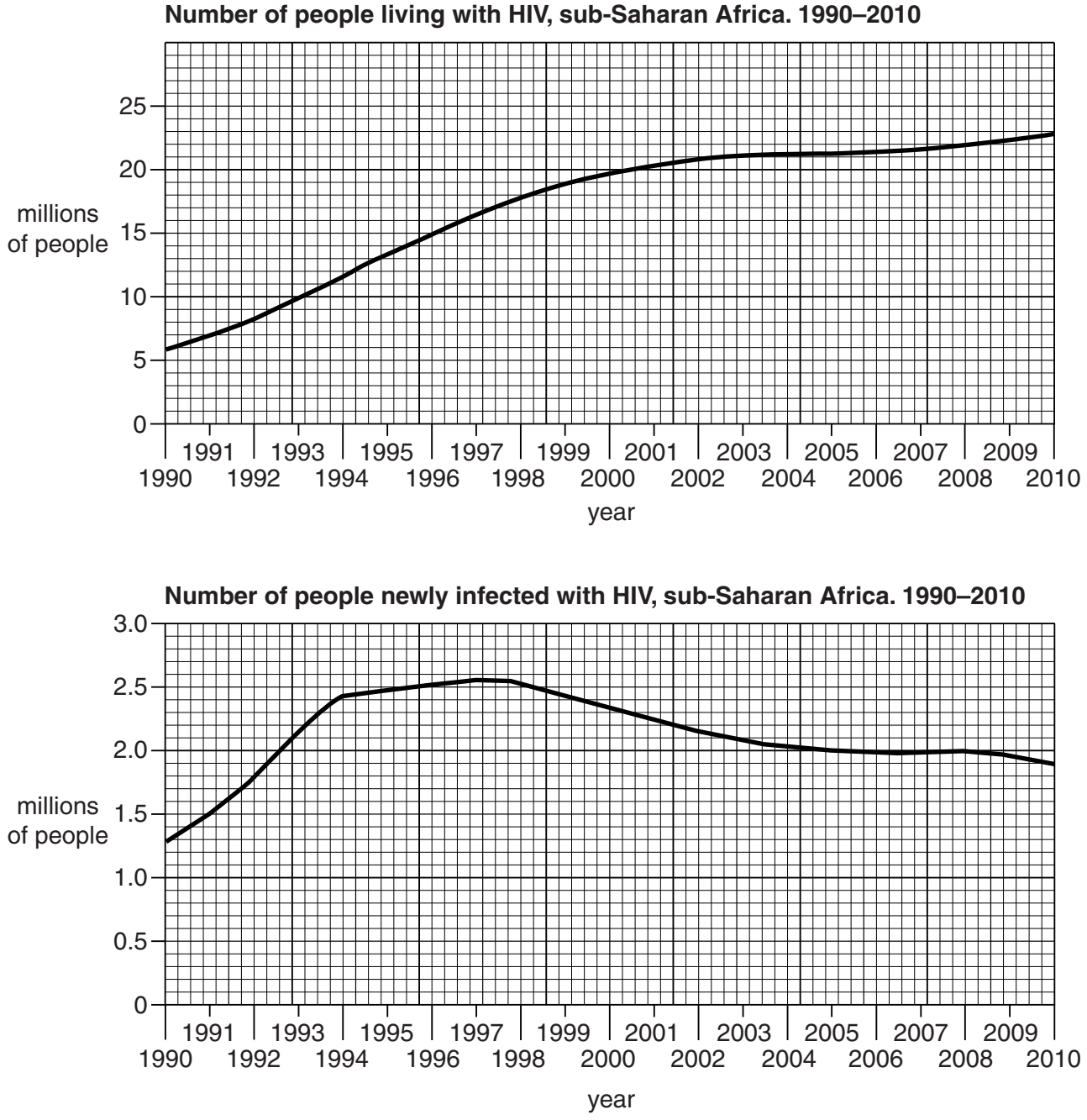

Fig. 5.2

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(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.....

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number of people newly infected with HIV .....

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.....[4]

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

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.....[2]

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

1 .....

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2 .....

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3 .....

.....[3]

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

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.....[3]

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3 The human immunodeficiency virus (HIV) infects white blood cells. The virus is reproduced inside these white blood cells.

(a) Describe what may happen to viruses that leave infected white blood cells.

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..... [2]

(b) Describe the possible long-term effects of HIV on the immune system.

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..... [3]

(c) People with HIV may be treated with a variety of drugs.

(i) Define the term *drug*.

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..... [1]

(ii) Explain why antibiotics cannot be used to control HIV.

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..... [2]

[Total: 8]