

Infectious disease

Question Paper 1

Level	International A Level
Subject	Biology
Exam Board	CIE
Topic	Infectious disease
Sub Topic	Infectious disease
Booklet	Theory
Paper Type	Question Paper 1

Time Allowed : 66 minutes

Score : / 55

Percentage : /100

Grade Boundaries:

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

- 1 (a) Natural immunity and artificial immunity can both be acquired in a passive or in an active manner.

Table 5.1 shows information about immunity acquired by two individuals, **P** and **Q**.

Complete Table 5.1.

Table 5.1

description of event	outcome for the individual	production of memory cells / yes or no	type of immunity acquired by individual
individual P is injected with a live, weakened disease-causing organism	individual P does not become ill from the disease and has long-lasting protection from the disease
individual Q is injected with antibody against a specific disease-causing organism	individual Q does not become ill from the disease but is ill with the disease a year later

[2]

Fig. 5.1 is a light micrograph of a sample of blood. Cell **X** is a phagocyte.

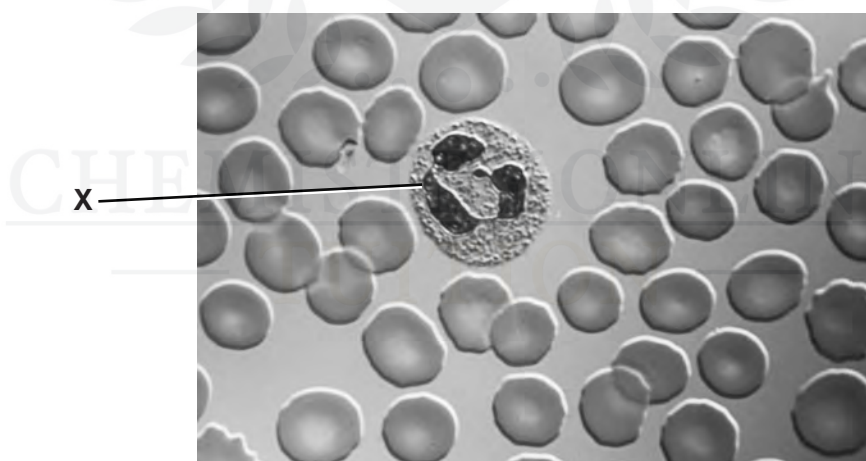


Fig. 5.1

- (b) State the origin of the blood cell labelled **X**.

.....[1]

(c) Phagocytes play an important role when an immune response is initiated against cancerous tumour cells.

(i) Suggest how phagocytes can recognise the difference between healthy body cells and cancerous tumour cells.

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(ii) Outline briefly how a tumour forms.

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.....[2]

[Total: 7]

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2 Table 4.1 shows some information about five infectious diseases.

Table 4.1

infectious disease	name of causative organism(s)	type of causative organism	main mode of transmission
HIV/AIDS	human immunodeficiency virus (HIV)	virus	sexual contact
cholera	<i>Vibrio cholerae</i>		ingestion of contaminated water and food
tuberculosis	<i>Mycobacterium tuberculosis</i>	bacterium	
measles		virus	aerosol / droplet infection
	<i>Plasmodium vivax</i> or <i>P. malariae</i> or <i>P. falciparum</i> or <i>P. ovale</i>		

- (a)** Complete Table 4.1. [3]
- (b)** In 2011, the World Health Organization (WHO) published recommendations to help countries develop plans to prevent the spread of HIV.

Discuss the factors that should be considered when making recommendations concerning the prevention of sexual transmission of HIV.


[illegible]

- The onset of disease, which can occur many years later, coincides with a severely lowered primary and secondary immune response, owing to greatly reduced numbers of T_h cells in the body.

- The following processes occur during one cell cycle:

List the processes in a correct sequence.

- [1]

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3 Fig. 4.1 shows the two base pairs in a DNA molecule.

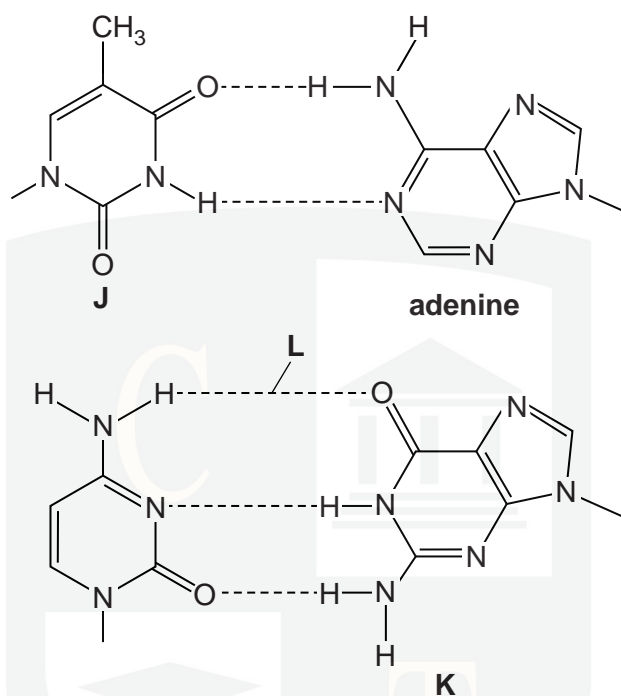


Fig. 4.1

(a) Name the bases labelled **J** and **K** and the bond labelled **L**.

J

K

L [3]

HIV enters T-lymphocytes by a form of endocytosis. Two of the enzymes in HIV are:

- reverse transcriptase, which uses viral RNA as a template to make DNA to incorporate into the chromosomes of the host's cells
- protease, which is used to break a polypeptide into smaller molecules. These molecules are used to make the protein coat of new viral particles, which will infect other cells.

Various drugs have been developed to treat HIV infections. Table 4.1 gives information about some of these drugs.

Table 4.1

drug	enzyme inhibited	mode of action
zidovudine	reverse transcriptase	occupies active site
tenofovir	reverse transcriptase	occupies active site
efavirenz	reverse transcriptase	occupies sites other than the active site
Dr. Asher Rana atazanavir	protease	occupies active site

(b) Explain the difference between the mode of action of zidovudine and efavirenz.

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(c) People who receive drug treatment for HIV take a mixture of drugs that act in different ways.

Suggest the advantage of taking a mix of the drugs shown in Table 4.1.

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(d) Antibiotics are prescribed to people who have HIV/AIDS for the treatment of secondary infections, but not to treat the HIV infection.

Explain why this is so.

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[Total: 11]

- 4 (a) Explain why tuberculosis (TB) is known as an **infectious** disease.

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- (b) Outline the role of antibiotics in the treatment of infectious diseases, such as TB.

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Tobacco smoking is a risk factor for a number of diseases. This means that it increases the risk of developing disease. In 2009, the World Health Organization (WHO) published a factsheet stating that tobacco smoking:

- may be responsible for more than 20% of the new cases of TB globally
- increases the risk of becoming infected and having active TB
- increases the risk of dying from TB
- is a risk factor for TB in all socioeconomic groups.

Projects have been set up in a number of different countries to tackle this health problem. One project involves health workers encouraging TB patients to give up smoking.

- (c) Suggest what epidemiological evidence would lead to the conclusion that tobacco smoking is a risk factor for TB.

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- (d) Suggest **and** explain how the effects of smoking can increase the risk of becoming infected with TB.

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- (e) Many smokers know that tobacco smoking is a risk factor for coronary heart disease, but continue to smoke. Some of these smokers have stated that they expect medical practitioners to cure them if they develop coronary heart disease.

List two treatments used by medical practitioners to treat coronary heart disease.

1.
2. [2]

[Total: 14]

5 Malaria and tuberculosis (TB) are two of the most important infectious diseases.

(a) Define the term *infectious disease*.

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.....[1]

(b) Describe how malaria is passed from an infected person to an uninfected person.

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.....[2]

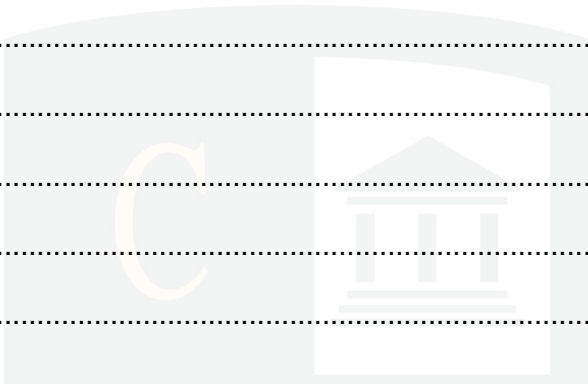
Fig. 4.1 shows the worldwide distribution of malaria.



Fig. 4.1

- (c)** Unlike malaria, TB is found across the whole world.

Explain why malaria shows the distribution pattern shown in Fig. 4.1, but TB is found everywhere.

The logo of the University of Cambridge, featuring a large 'C' and a building illustration.

- (d)** Vaccinations are used to control infectious diseases. They were used as part of the programme to eradicate smallpox and as part of the continuing programmes against diseases such as polio and measles.

Smallpox was eradicated from the world in the 1970s. Polio is likely to be the next infectious disease to be eradicated. TB and malaria continue to be important diseases.

Explain how vaccination provides immunity as an important part of programmes to control and eradicate infectious diseases.

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[5]

[Total: 12]