

# Infectious disease

## Question Paper 3

<b>Level</b>	International A Level
<b>Subject</b>	Biology
<b>Exam Board</b>	CIE
<b>Topic</b>	Infectious disease
<b>Sub Topic</b>	Infectious disease
<b>Booklet</b>	Theory
<b>Paper Type</b>	Question Paper 3

**Time Allowed :** 64 minutes

**Score :** / 53

**Percentage :** /100

**Grade Boundaries:**

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

1 Malaria is an infectious disease that is considered by the World Health Organization to be a disease of worldwide importance.

(a) Explain what is meant by the term *infectious*.

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

(b) Name **one** species of organism that causes malaria.

..... [1]

(c) Explain the significance of the following statements in the control of malaria.

(i) The female *Anopheles* mosquito has been more closely studied with regard to malaria than the male *Anopheles* mosquito.

.....  
..... [1]

(ii) The infective stages of the malarial organism are present in anti-coagulant produced by the mosquito.

.....  
..... [1]

(iii) After circulating in the blood for a short time, the pathogen enters liver cells of the newly infected person and then enters red blood cells.

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

**(d)** Discuss the factors that determine the distribution of malaria worldwide.

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..... [4]

[Total: 11]

- 2 *Pneumocystis jirovecii* is a yeast-like fungus that lives in human lungs. It is the causative agent of one of the opportunistic pneumonia-like infections that may develop during AIDS.

*P. jirovecii* is eukaryotic. Its life cycle is difficult to observe as it has never been cultured in the laboratory. Fig. 5.1 shows its possible life cycle. The numbers on the diagram represent the number of chromosomes in each stage.

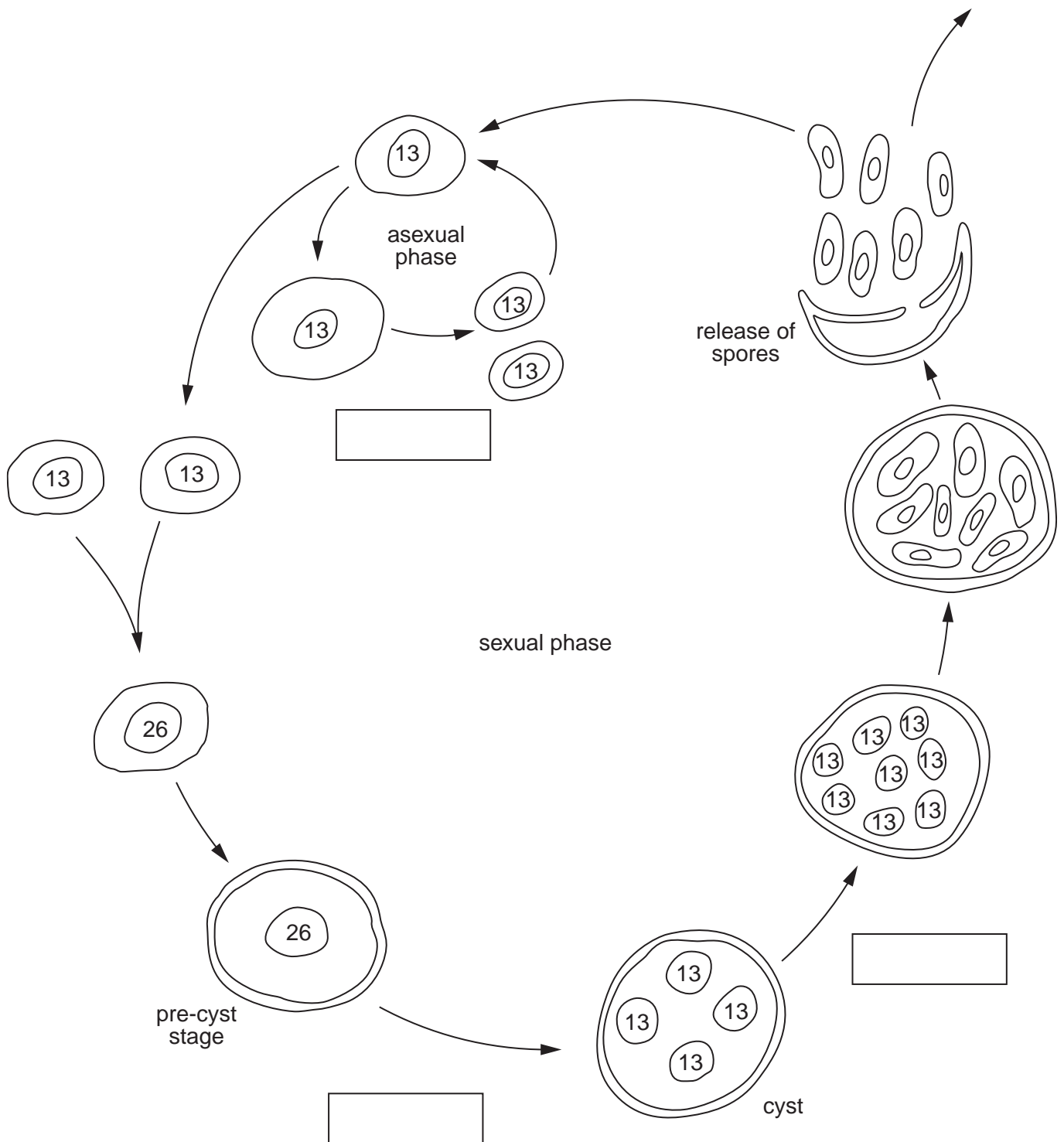


Fig. 5.1

- (a) *P. jirovecii* has a haploid number of 13 chromosomes.

Complete the life cycle by writing either mitosis or meiosis in the boxes in Fig. 5.1. [2]

- (b) State two structural features that you would expect to find in the cytoplasm of *P. jirovecii* that indicate it is a eukaryote and not a prokaryote.

1 .....

2 ..... [2]

- (c) Suggest how *P. jirovecii* is transmitted from one person to another.

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

- (d) Discuss the problems in attempting to control the spread of HIV/AIDS.

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..... [4]

[Total: 10]

- 3 *Candida albicans* is a yeast-like fungus that lives in human lungs. It is the causative agent of one of the opportunistic infections that may develop during AIDS.

*C. albicans* is eukaryotic. Fig. 5.1 shows its structure.

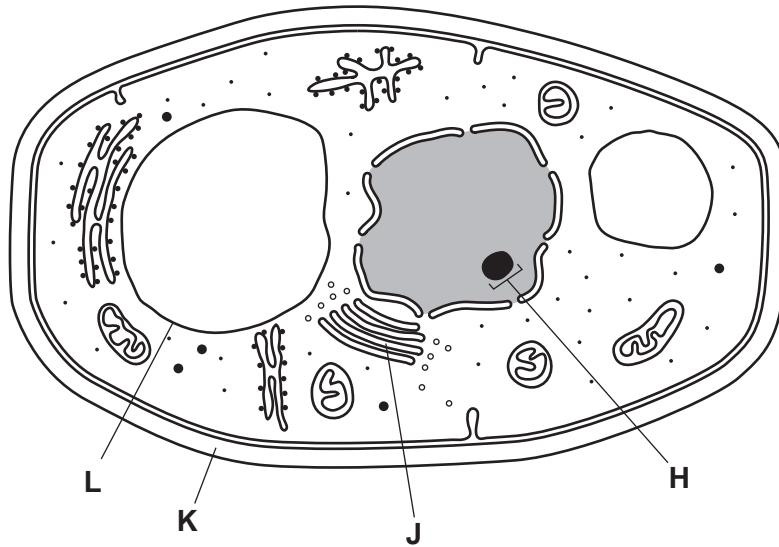


Fig. 5.1

- (a) (i) Name H to L.

H .....

J .....

K .....

L ..... [4]

- (ii) State two ways in which the **structure** of a prokaryotic cell differs from that shown in Fig. 5.1.

1 .....

.....

2 .....

..... [2]



**4** *Plasmodium falciparum* is the causative agent of the most severe form of malaria.

It is distributed throughout the tropics.

**(a)** Explain why malaria is restricted to the tropics.

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..... [2]



The haploid number of *P. falciparum* is 14.

Fig. 5.1 shows the life cycle of *P. falciparum*.

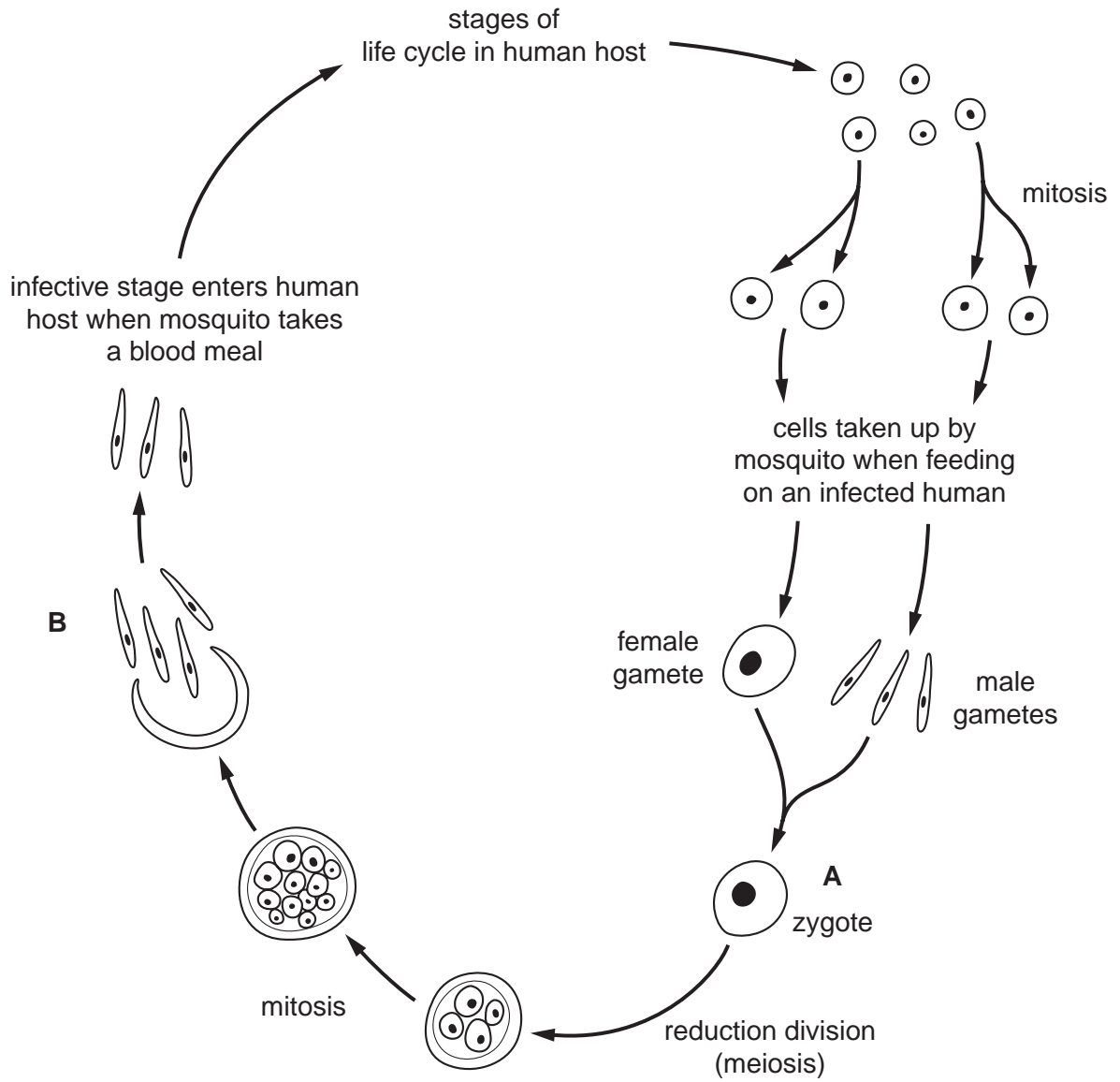


Fig. 5.1

(b) (i) State the number of chromosomes present at stages A and B.

A .....

B ..... [2]

- (ii) Explain why a reduction division (meiosis) occurs during the life cycles of organisms, such as *Plasmodium*, that reproduce sexually.

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..... [2]

- (c) Explain why it has proved difficult to develop a vaccine for malaria.

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..... [4]

[Total: 10]

5 Complete the following passage on cholera.

Cholera is an acute intestinal infection caused by the bacterium ..... . It has a short incubation period, from less than one day to five days, and produces a toxin that causes symptoms, such as ..... that can quickly lead to severe dehydration and death if not treated promptly. Cholera bacteria are transmitted by contaminated ..... . In highly endemic areas, it is mainly a disease of young children, although breastfeeding infants are rarely affected. Limited stocks of two oral cholera vaccines that provide high-level protection for several months against one strain of cholera have recently become available in a few countries. The vaccine stimulates an ..... , involving the lymphocytes in the lining of the gut. The B lymphocytes produce ..... that act against the cholera bacteria, which tend to remain in the intestines during an infection.

[Total: 5]

- 6 (a) Describe how the malarial parasite is normally transmitted from an infected person to an uninfected person.

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.....[2]

Fig. 5.1 is drawn from an electron micrograph of a red blood cell taken from a person suffering from malaria.

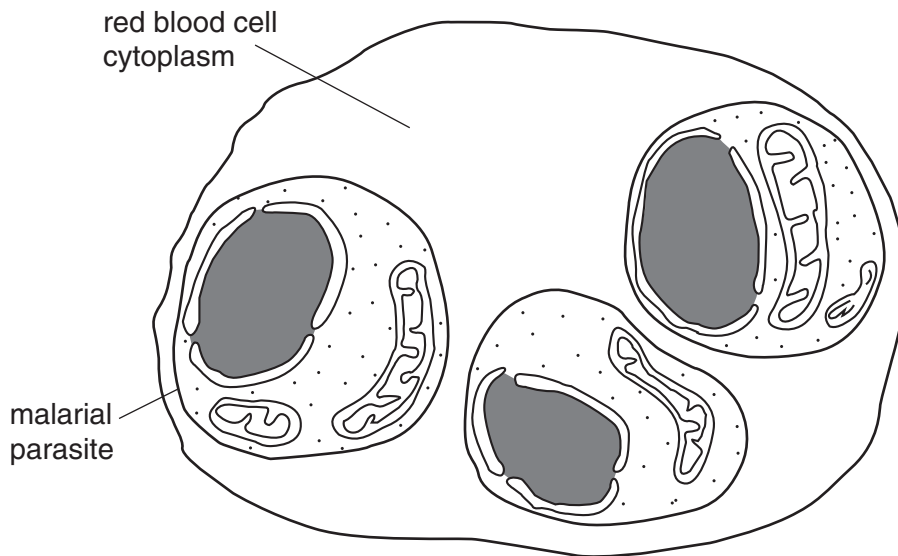


Fig. 5.1

- (b) State two features, **visible in Fig. 5.1**, that indicate that the malarial parasite is eukaryotic.

1. ....

2. ....[2]

- (c) Outline the likely effects on the body of the presence of malarial parasites in red blood cells.

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.....[3]

[Total : 7]