(a)		symptoms of malaria are caused by a single-celled organism belonging to the genus smodium.
	(i)	Plasmodium is described as a parasite.
		Define the term <i>parasite</i> .
		[3]
	(ii)	Explain why the human body's primary defences do not prevent the entry of <i>Plasmodium</i> into the body.
		[2]
	(iii)	Suggest why malaria is much more common in tropical areas than in other parts of the world.
		[1]
	(iv)	Suggest two reasons why governments in parts of the world other than tropical areas, are also becoming increasingly concerned about malaria.
		[2]

Malaria is a disease that is estimated to kill around 80 people every hour worldwide.

1

(b) People with the disease known as iron-deficient anaemia (IDA) are resistant to malaria. This resistance is not well understood but is thought to involve phagocytosis.

Fig. 2.1 shows the process of phagocytosis of a pathogen by a phagocyte.

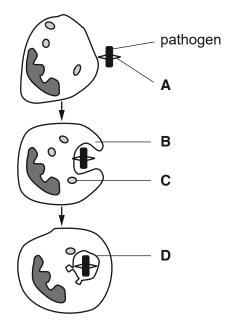


Fig. 2.1

(i)	Identify the structures represented by the letters A, B, C and D.
	A
	В
	c
	D[4]
(ii)	In patients with IDA, anaemia is caused by the destruction of erythrocytes (red blood cells) by phagocytosis.
	Suggest why erythrocytes that contain <i>Plasmodium</i> are more likely to be destroyed by phagocytosis than healthy erythrocytes.
	[1]

Describe collagen	the differ as exampl	rences b es.	etween	globular	and	fibrous	proteins	using	haemoglobin	and
\wedge	In your an		u should	refer to d	collag	en and l	haemoglo	bin.		
B	,	, ,								
	•••••									
		•••••								
	•••••									
										[8]

[Total: 21]

(c) Erythrocytes contain haemoglobin, which is a globular protein.

ntik	oodies ar	re important biological molecules.
)	Describe	e how the structure of antibodies allows them to perform their function.
		In your answer you should clearly link structure to function.
		[7

2

(b)	Antibodies can defend the body against pathogens in a number of ways.
	Outline the mode of action of antibodies in defending the body against pathogens by describing the processes of neutralisation and agglutination .
	neutralisation
	agglutination
	-99
	[4]
	[Total: 11]

active	en(s)	double-helix	men	nbra	mem	ory
mutatio	n pa	ssive	gocytic	recept	or(s)	
species	specific	•	strair	1	blood	
Some vaccines cor	ntain a dea	nd or weakened	form of a	pathogen. ٦	「he	
on the cell surfa	ace of th	e pathogen a	re still al	ble to trig	ger the	production of
	antibo	dies in the	person	being va	ccinated.	Cells called
	cells are	also produced	, which reta	ain the abili	ty to divide	and produce
he antibodies quicl	kly, should	the pathogen re	turn.			
A new	c	of pathogen can	arise if th	ere is a		in the
ONA of the pathoge	en. If this ha	appens, the orig	inal vaccin	e is not like	y to be effe	ective. [5]
he term <i>immunity</i>	is often us	ed when descrik	oing how va	accines wor	k.	
n a piece of schoo	l homework	k a student wrot	e:			
"Bacteria can e	volve quic	kly and many	are now in	mmune to	antibiotic	s."
Explain why the stu	ıdent's use	of the word 'imr	mune' was i	ncorrect.		
	•••••					
	•••••					
						[3]
S	mutation species Some vaccines continue antibodies quick new	species specific some vaccines contain a dea in the cell surface of th	mutation passive species specific Some vaccines contain a dead or weakened in the cell surface of the pathogen a antibodies in the cells are also produced the antibodies quickly, should the pathogen reaction of pathogen can appear of the pathogen. If this happens, the original piece of school homework a student wrote "Bacteria can evolve quickly and many"	mutation passive gocytic species specific strain some vaccines contain a dead or weakened form of a in the cell surface of the pathogen are still at an antibodies in the person cells are also produced, which return antibodies quickly, should the pathogen return. In new	mutation passive gocytic receptors species specific strain Some vaccines contain a dead or weakened form of a pathogen. The cell surface of the pathogen are still able to trigon antibodies in the person being vaccine antibodies are also produced, which retain the abilitine antibodies quickly, should the pathogen return. A new	mutation passive gocytic receptor(s) species specific strain blood some vaccines contain a dead or weakened form of a pathogen. The

Vaccination can provide immunity to disease.

3

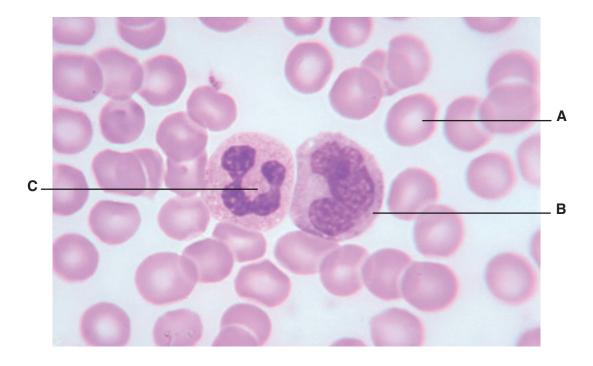


Fig. 3.1

4	(a)	Pha	agocytes form part of the body's non-specific response to disease.	
		Fig.	3.1, on the insert , shows a photograph of some blood cells.	
		(i)	Identify which of the cell(s) labelled A , B and C , are phagocytes.	
		(ii)	Why are phagocytes described as a secondary defence against pathogens?	
		(iii)	Why is the response involving phagocytes regarded as non-specific ?	
				[1]
		(iv)	Explain how phagocytes, such as those shown in Fig. 3.1, are able to pass from the blood into the tissue fluid.	he

	In your answer you should describe clearly the sequence of events the place.

(v) Bacterial pathogens initially attach to receptors on the surface of phagocytes.

(ii)	Describe how the infective another.	e agent that causes TB is trans	smitted from one individua			
The	World Health Organisation	(WHO) collects data about dise	eases worldwide.			
Tah	le 3.1 shows data nublished	I by the WHO about the incidence	ce of TR in the years 2000			
	8 for four different income g		00 01 12 111 1110 your 2000			
	J	•				
		Incidence of TB per 100 000 population				
	Income group	morachice of 1B per	100 000 population			
	Income group	In 2000	In 2008			
Lo	-	<u>.</u>				
	-	In 2000	In 2008			
Lo	w	In 2000 280	In 2008 280			
Lo	wer middle	In 2000 280 150	In 2008 280 150			
Lo	wer middle	In 2000 280 150 100	In 2008 280 150 110			
Lo	wer middle	In 2000 280 150 100	In 2008 280 150 110			
Lo Up Hiş	ow ower middle oper middle gh	In 2000 280 150 100 17 Table 3.1	In 2008 280 150 110 14			
Lo	ower middle oper middle gh Using the information in Ta	In 2000 280 150 100	In 2008 280 150 110 14			
Lo Up Hiş	ow ower middle oper middle gh	In 2000 280 150 100 17 Table 3.1	In 2008 280 150 110 14			
Lo Up Hiş	ower middle oper middle gh Using the information in Tagroups.	In 2000 280 150 100 17 Table 3.1	In 2008 280 150 110 14 00 and 2008 in the four ince			

	[3]
	3
	2
	1
	Suggest three reasons why the incidence of TB is higher in the low income group.
(ii)	The highest incidence of TB is associated with the low income group.
/!!\	The binds of incidence of TD is a second to death the booking own or and the

[Total: 21]