

# Diseases and Immunity

## Mark Scheme

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

Time Allowed: 44 minutes

Score: /37

Percentage: /100

1 (a)	<b>MP1</b> attach to virus / bacteria / antigens ; <b>MP2</b> prevent movement around the body ; <b>MP3</b> prevent entry into <u>cells</u> ; <b>MP4</b> stop division ; <b>MP5</b> combine with / neutralise, toxins ; <b>MP6</b> clump, bacteria / viruses, together ; <b>MP7</b> help phagocytes engulf virus / bacteria ;	[max 3]										
(b)	kidney would be rejected ; (lymphocytes produce anti-A) antibodies ; (antibodies) attach to blood vessels ;	[max 2]										
(c)	no, blood / capillaries / antigens / antibodies / white cells / lymphocytes, in the cornea ;	[max 1]										
(d)	$I^A I^O \times I^B I^O$ ; $I^A I^O + I^B I^O$ ; $I^O I^O$ ;	[3]										
(e)	<table><tr><td>term</td><td>example</td></tr><tr><td>a dominant allele</td><td><b>I<sup>A</sup></b></td></tr><tr><td>heterozygous genotype</td><td><math>I^A I^O / I^B I^O / I^A I^B</math> ;</td></tr><tr><td>codominant alleles</td><td><b>I<sup>A</sup> and I<sup>B</sup></b> ;</td></tr><tr><td>phenotype</td><td>(blood) group, A / B / AB / O ;</td></tr></table>	term	example	a dominant allele	<b>I<sup>A</sup></b>	heterozygous genotype	$I^A I^O / I^B I^O / I^A I^B$ ;	codominant alleles	<b>I<sup>A</sup> and I<sup>B</sup></b> ;	phenotype	(blood) group, A / B / AB / O ;	[3]
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phenotype	(blood) group, A / B / AB / O ;											
		[Total: 12]										

Question	Answer	Marks	Additional Guidance
2 (a) (i)	<b>X</b> – protein (coat /AW)/ capsid / capsomere(s); <b>Y</b> – genetic material / nucleic acid / RNA;	2	<b>A</b> DNA / gene(s) <b>R</b> nuclear material / chromosome
(ii)	cell wall; cell membrane; cytoplasm; loop of DNA; (slime) capsule; flagellum / flagella; plasmids; ribosome(s); AVP;	max 3	<b>R</b> cellulose cell wall  <b>I</b> size / complexity / shape  e.g. pi
(b) (i)	number of people living with HIV: numbers living with HIV increased (from 1990), levelled off / increased slightly, from 2000 / 2001 / 2002; any one correct data quote from vertical axis for numbers living with HIV;  number of people newly infected with HIV: numbers newly infected increased (and levelled off between 1994 and 1998) <b>and</b> decreased since, 1997 / 1998; any one correct data quote from vertical axis for numbers newly infected with HIV;	4	date quotes must have correct year, but <b>A</b> 'starts' for 1990 and 'ends' for 2009 / 2010  <b>A</b> any correct manipulation of the data, e.g. increased by / percentage increase, etc.  <b>A</b> $\pm \frac{1}{2}$ a square for data quotes

2	(ii) people living with HIV are living longer; success of (named) treatment for HIV/AIDS; success in reducing transmission; reference to, education/information/funding, about HIV/AIDS;	max 2	e.g. drugs/antivirals/AZT/nursing care  <b>A</b> ref. to barrier contraception / condom/femidom
	(iii) from mother to fetus/across the placenta; from mother to baby at birth; in breast milk; unprotected / unsafe sex; sharing, needles/syringes; in blood products/ blood for transfusion/transplants/ blood to blood contact; AVP;	max 3	<b>R</b> saliva <b>R</b> other sharps, e.g. razors unless qualified by blood contact <b>R</b> using contaminated/dirty/used, needles unqualified <b>A</b> intravenous drug use/AW <b>R</b> donating blood <b>R</b> blood unqualified <b>A</b> 'blood exchange' <b>I</b> body fluids unqualified
	(iv) weakens the immune system / reduces capacity of body to respond to disease/AW;  <u>lymphocytes</u> are, damaged/destroyed/killed/not functional; (B/T) lymphocytes/white blood cells, stop making antibodies;  any <b>two</b> roles of antibodies or lymphocytes or phagocytes which will not happen or not happen very well;;	max 3	<b>R</b> 'no immune system' / 'destroys immune system' <b>A</b> 'fight' disease  antibodies stop, pathogens spreading (in the body) antibodies cause pathogens to, clump/agglutinate antibodies kill bacteria antibodies make it easier for phagocytes to ingest pathogens antibodies, neutralise toxin(s)/make toxins harmless phagocytes, ingest/AW, pathogens lymphocytes kill infected cells
		[Total: 17]	

Question	Answers	Marks	Additional Guidance
3 (a)	<p>1 enter, blood / plasma / lymph ;</p> <p>2 infect / enter, white blood cell / lymphocyte / phagocyte / AW ;</p> <p>3 infect, brain / liver / lungs / skin / reproductive system / kidney / gut ;</p> <p>4 cannot reproduce ;</p> <p>5 may be transmitted to another person ;</p> <p>6 e.g. of method of transmission ; R excreted, die</p>	[max 2]	<p>A ref. to antibodies combining with virus</p> <p>A 'attack' / 'invade' white blood cells</p> <p>A 'attack' / 'invade' / enter</p> <p>MP6 A sexual intercourse / in blood / in breast milk / across placenta / needle stab</p>
(b)	<p>1 infects / destroys / kills, phagocytes ;</p> <p>2 destroys / kills / disables, <u>lymphocytes</u> ;</p> <p>3 fewer antibodies produced ;</p> <p>4 ref. to, T lymphocytes / T cells ;</p> <p>5 slow / no / weaker, immune response / response by immune system ;</p> <p>6 <i>idea of increased susceptibility to</i> disease / infection / (named) pathogens ; A viruses / bacteria cancers ;</p> <p>7 fungal infections / TB / pneumonia / named disease linked with HIV ; R common cold</p> <p>9 develop AIDS ;</p> <p>10 AVP ;</p>	[max 3]	<p>A no phagocytosis</p> <p>A fewer lymphocytes R 'attacks' / 'damages'</p> <p>A 'immune system not working'</p> <p>A suppresses / damages, immune system</p> <p>A 'can't fight disease'</p> <p>MP3–8 A <i>answers that give role(s) of immune system followed by 'this doesn't happen'</i></p>
(c) (i)	(substance) changes / modifies / affects, (chemical) reactions in the body / how the body works ;	[1]	I category of drug, medicine, specific effects of named drug, etc.
(ii)	<p><i>antibiotics</i> if 'antibodies' written rather than antibiotic – mark to max 1</p> <p>are not effective against viruses / only effective against bacteria ;</p> <p><i>idea that</i> nothing for them to act on ; e.g. cell wall / protein synthesis / cellular structure / capsule</p>	[2]	<p>I viruses inside cells</p> <p>A do not work against viruses</p> <p>A <b>ORA</b></p> <p>R 'life processes'</p>
<b>[Total: 8]</b>			