01. 0610_m19_MS_42 Q: 6

	Answer	Mark	Partial Marks
(a)(i)	***X*** protein (coat) / AW ; ***Y*** genetic material ;	2	
(a)(ii)	cell wall ; cell membrane ; cytoplasm ; loop of DNA ; (slime) capsule ; flagella ; plasmid ; ribosome ;	2	
(b)(i)	food ; contaminated surfaces ; animals ; air ; water ; soil ;	2	
(b)(ii)	skin / epidermis ; hairs in nose ; mucous membrane ; mucus ; ear wax ;	2	
(c)	a pathogen has antigens (on their surface) ; ref. to specificity / antibodies have complementary shape (to antigen) ; lock onto (specific) antigens / pathogen ; destroy pathogens ; marking for destruction / phagocytosis ; AVP ;	4	
(d)	long-term / ref. to permanent / protects against some recurring diseases ; produces memory cells ; antibodies are produced (by the body) ; slower response ;	3	

<table>
<tr><th></th><th>Answer</th><th>Mark</th><th>Partial Marks</th></tr>
<tr><td>(a)</td><td>length of DNA ;

that codes for a protein ;</td><td>2</td><td></td></tr>
<tr><td>(b)</td><td>1 antibodies lock on to antigens ;
2 ref to antigens are on pathogens ;
3 antibodies / antigens, are specific ;
4 antibodies (have shape) complementary to antigen ;
5 antibodies destroy pathogens (directly) ;
6 antibodies, mark / AW, pathogens for destruction by phagocytes / phagocytosis ;
7 AVP ;
8 AVP ;</td><td>4</td><td>R same shape
A description</td></tr>
<tr><td>(c)</td><td>one mark per row
<table><tr><th>function</th><th>name of structure</th><th>letter from Fig. 2.1</th></tr><tr><td>absorption of amino acids to make antibodies</td><td>cell membrane</td><td>A</td></tr><tr><td>stores genetic information as DNA</td><td>nucleus</td><td>B ;</td></tr><tr><td>provides energy for making antibodies</td><td>mitochondrion</td><td>E ;</td></tr><tr><td>site of production of antibodies</td><td>ribosome / endoplasmic reticulum / ER</td><td>C / G ;</td></tr><tr><td>transport of antibody molecules for release into blood</td><td>vesicle(s) / vacuole</td><td>F ;</td></tr></table></td><td>4</td><td>A mitochondrion and E</td></tr>
<tr><td>(d)</td><td>phagocyte ;
ingests / engulfs / digests / destroys, pathogens / bacteria / viruses ;

platelet(s) ;
release substances to promote / AW, blood clotting ;

epithelial cells ;
provide a barrier / AW ;

goblet cells ;
produce mucus ;

ciliated (epithelial) cells ;
move, mucus / pathogens, away from gas exchange surface / AW ;

acid-secreting cells (in stomach) ;
make hydrochloric acid (to kill bacteria / pathogens) ;</td><td>2</td><td>A lachrymal (gland) cells ; secretes lysozyme ;</td></tr>
</table>

03. 0610_w17_MS_41 Q: 6

	Answer	Mark	Partial Marks
(a)(i)	genetic material ; protein coat ; parasitic / pathogenic ; only reproduce in a host / do not show (other) features of living organisms / AW ; very small ; they are not cellular / absence of named organelle; AVP ; cannot be killed / cannot be treated, with antibiotics.	2	**A** DNA / RNA **A** virus are non-living.
(a)(ii)	active immunity ; harmless / dead / weakened / attenuated pathogen / microorganisms ; injected / ingested ; ref. to antigens ; (antigen) triggers antibody production ; by lymphocytes ; memory cells (are produced) ; rapid response to reinfection ; long-term immunity ; prevention of spread person to person e.g. no host for pathogen / herd ref to programmes of mass vaccination ; AVP ;	5	.
(b)	shape / size / AW ; genetic material (sequence / type) ; host species / type of disease it causes ; AVP ;	1	

04. 0610_w17_MS_42 Q: 5

	Answer	Mark	Partial Marks
(a)	*Helicobacter* ;	1	
(b)	circular DNA / chromosome ; plasmid(s) ; cell membrane ; cell wall (not made of cellulose) ; cytoplasm ; capsule ; (small) ribosomes ; flagella ; AVP ;	2	**A** naked, DNA / chromosome **I** cilia e.g. pili
(c)(i)	antibiotic(s) ;	1	
(c)(ii)	(stomach / hydrochloric / gastric) acid / HCl / mucus ;	1	
(d)	*active immunity* 1 exposure to antigen ; **ora** 2 after, infection by pathogen / vaccination ; 3 immune response occurs / antibodies produced ; *passive immunity* 4 antibodies acquired from another individual ; 5 e.g. by breast milk / injection of antibodies ; 6 active is, permanent / long-term (immunity) ; **ora** 7 ref to memory cells, in active / not in passive ; 8 response is slow on first exposure in active ; **ora**	4	

	Answer	Mark	Partial Marks
(a) (i)	single celled / unicellular ; no (true) nucleus / no nuclear membrane ; loop of DNA ; no, (membrane-bound) organelles ; e.g. no mitochondria / chloroplasts (peptidoglycan / murein) cell wall ; reproduce by binary fission ; small(er) / 70S, ribosomes ; plasmids ;	[max 2]	**I** DNA strand unqualified **A** naked DNA **I** flagella, capsule, pili, cilia **R** cellulose cell wall
(ii)	swim / movement / AW ;	[1]	
(b)	harmless / attenuated / dead / AW, form of, (named) pathogen / antigen used ; (vaccine) injected / swallowed ; ref to specific / unique / AW, antigen ; lymphocytes make antibodies ; ref to memory cells ; ref to active immunity ; rapid, immune response / AW, if exposure to same pathogen ; herd immunity ; AVP ; e.g. detail of active immunity / smallpox became extinct	[max 4]	**A** long term immunity
(c) (i)	12 – 0.4 ; 11.6, au / arbitrary units ;	[2]	
(ii)	large / rapid / immediate increases ; peaks at, 50 s / 12 AU ; then decrease to, around 5 – 4.6 AU / by 125 –150 s ; fluctuates / stays (fairly) constant, between 125 – 150 s and 250 s / 4.4 and 4.8 ± 0.2 AU ;	[max 3]	**I** comparisons to 'without toxins' on graph **A** increases and decreases from 50 s
(iii)	active transport; (through) protein (molecules / gates / pumps / AW) ; (protein) in cell membrane ; using, energy / ATP (from respiration) ; (movement) against a concentration gradient / AW ;	[max 3]	
(d) (i)	(small) intestine ;	[1]	**A** large intestine / duodenum / jejunum / ileum / rectum / colon
(ii)	oral rehydration (therapy / salts / treatment / solution) ; drink mixture of, sugar / nutrients and, salt / ions ; replace lost, water / fluids ; water must be, uncontaminated / boiled / sterilised / clean / AW ; antibiotics ;	[2]	**A** receive intravenous fluids **I** drink more water
		[Total: 18]	

06. 0610_w16_MS_41 Q: 4

	Answer	Mark	Partial Marks
(a)(i)	pancreas;	1	
(a)(ii)	recognize a specific, pathogen / antigen; lock on antigens / antibody-antigen complex; agglutination / clumping; destruction by, phagocytes / white blood cells / lymphocytes; AVP; e.g. neutralise / inhibit toxins;	2	**A** bacteria / fungus / virus / parasite
(b)(i)	lack of sun(light) / dark skin AW; lack of fish (oils) / egg (yolk) / liver; unbalanced diet; kidney / liver / digestive, disease;	1	
(b)(ii)	muscle cramps; soft / bent, bones / rickets; stunted growth; prone to infections; fatigue; reduced ability to absorb calcium (ions);	2	
(c)	lack of vitamin D leads to more cases of type 1 diabetes in mice / ora; there is no difference in cases / same number of cases (wrt normal mice) until after 50 days; at 100 days there are more cases (in vitamin D mice); (vitamin D mice) levels off before normal mice / levels off after 150 days; comparative data use ;e.g. 20% more cases at day 200 **or** at 250 days normal mice is 46% , deficient mice is 65%;	3	
(d)	frequent urination; thirst / AW; hunger; fatigue; weight loss; itchy skin; wounds heal slowly / more susceptible to infection; blurred vision / AW; vomiting; glucose in urine; high blood, glucose/sugar;	4	**A** nausea **A** hyperglycaemia.
(e)	insulin; by injection / insulin pump; regular blood sugar tests; regular meals; AVP; exercise / restrict carbohydrate content of diet	3	
		Total: 16	