

Test Name: 4.1 Communcable Diseases End-of-Topic Test Mark Scheme

Marking Guides

Question: 1 (2361483)

Question		Answer	Marks	Guidance
(a)	(i)	B and C ;	1	Both need to be given for the mark to be awarded. DO NOT CREDIT if A also given.
(a)	(ii)	(involved) after , pathogen / AW , has entered the body ;	1	IGNORE ref to primary defence without the clear idea that the pathogen has <u>entered the body</u> IGNORE refs to mechanisms of action, e.g. 'phagocytes do not make antibodies' ACCEPT attacking foreign bodies after they have <u>passed through</u> the skin
(a)	(iii)	(phagocytes) able to, digest / break down / engulf / target / deal with, a range of / many different , pathogens ; ora	1	ACCEPT bacteria or virus as synonym for pathogen if the idea of a variety is clearly present ACCEPT phagocytes can break down <u>any</u> pathogen ACCEPT phagocytes do not have (antigen-)specific receptors IGNORE phagocytes do not make memory cells IGNORE antigen if used as synonym for pathogen
(a)	(iv)	<p>1 lobed / narrow , nucleus ;</p> <p>2 (cells) can change shape ;</p> <p>3 can squeeze / move / fit / AW , between cells / through pores , in (walls of) capillaries ;</p> <p>4 histamine makes , capillary walls / endothelium , leaky ;</p>	2	<p>2 ACCEPT in context of cell or nucleus</p> <p>2 ACCEPT cells , are plastic / have flexible structure / have flexible membrane</p> <p>2 IGNORE squashable / stretch</p> <p>3 ACCEPT holes / gaps / fenestrations</p>

Question		Answer	Marks	Guidance
(a)	(v)	<p>1 (pathogen) engulfed / enveloped / surrounded by cytoplasm (from phagocyte) ;</p> <p>2 <u>endocytosis</u> / <u>phagocytosis</u> ;</p> <p>3 (formation of) <u>phagosome</u> / <u>phagocytic vacuole</u> / <u>phagocytic vesicle</u> ;</p> <p>4 (phago) <u>lysosomes</u> ;</p> <p>5 (lysosomes / phagosome) move towards / fuse with (each other) ;</p> <p>6 (named) enzyme(s) / lysins / hydrogen peroxide / free radicals (in lysosomes) ;</p> <p>7 (pathogen) digested / broken down / hydrolysed ;</p> <p>8 (to) amino acid / sugar / glucose / fatty acid / glycerol ;</p> <p>9 (break down products) absorbed / AW (into cytoplasm) or unwanted products removed (by exocytosis) ;</p> <p>10 cytoskeleton involved in (endocytosis / movement of vesicles) ;</p>	6	<p>ACCEPT phonetic spellings throughout</p> <p>1 ACCEPT 'pseudopodia / cytoplasm / cell membrane , extend from phagocyte'</p> <p>1 DO NOT CREDIT eaten. ACCEPT ingested</p> <p>3 CREDIT in correct context only</p> <p>5 ACCEPT attracted to / joins</p> <p>7 IGNORE destroyed / broken up / killed</p> <p>9 IGNORE refs to antigen presentation 9 ACCEPT enter cytoplasm</p>
		QWC key points in sequence ;	1	Award if the following mark points have been awarded: mp 1 or 2 followed by mp 6 or 7

Question	Answer	Marks	Guidance
(b) (i)	<i>Mycobacterium IM. tuberculosis / M. bovis</i> ;	1	ACCEPT phonetic spellings IGNORE case of initial letter No need to underline
(b) (ii)	droplets (containing pathogen) ; (released by) coughing / sneezing ; inhaled by (uninfected) , individual / AW ;	2	IGNORE airborne IGNORE laughing / talking / kissing / breathed out

Question	Answer	Marks	Guidance
(c) (i)	<p>1 <u>in both years</u> incidence (of TB) , decreases / AW , as income , increases / AW ; ora</p> <p>2 no change in, low / lower middle, (income groups) ;</p> <p>3 increase in upper middle (income group) ;</p> <p>4 decrease in high (income group) ;</p> <p>5 <i>idea of overall very little change between 2000 and 2008 ;</i></p> <p>6 calculated difference in figures with units to support points 3 to 5 ;</p>	3	<p>Mark points 1-5 cannot be inferred from figures</p> <p>1 ACCEPT 'incidence is higher in low income group and lower in high income group, in both years / always'</p> <p>3 ACCEPT upper middle less in 2000</p> <p>4 ACCEPT high (group) more in 2000</p> <p>6 ACCEPT any increase or decrease e.g., high group has gone down by 3 per 100000</p> <p>6 ACCEPT also</p> <ul style="list-style-type: none"> <li>• 10% increase in upper middle group</li> <li>• 17.6% / 18% , decrease in high income group</li> <li>• 1% / 1.3% , increase overall</li> <li>• high income group in 2008 is , 82.4% / 82% / 0.824 / 0.82 , of original value</li> </ul> <p>6 IGNORE 0% increase in low / lower middle income groups</p> <p>There is no need to refer to years as only 2 are shown</p>

Question	Answer	Marks	Guidance
(c) (ii)	<p>1 overcrowded / AW (living space) ;</p> <p>2 poorly ventilated (living space) ;</p> <p>3 poor diet / malnourished ;</p> <p>4 poor health ;</p> <p>5 homelessness ;</p> <p>6 <i>idea that more likely to consume , meat / milk, from infected cattle ;</i></p> <p>7 <i>idea of vaccination / medical treatment , more difficult to access ;</i></p>	3	<p>IGNORE prompt lines and mark as prose</p> <p>1 ACCEPT cramped</p> <p>4 ACCEPT poor immune system</p> <p>4 IGNORE hygiene / standard of living</p> <p>7 CREDIT healthcare more expensive</p> <p>7 ACCEPT poor healthcare</p> <p>7 IGNORE less aware of the risks</p>
Total		21	

Question: 2 (298147)

Question		Expected Answers	Mark	Additional Guidance
(a)	(i)	<p>1 the elderly / older people ;</p> <p>2 'at risk' children / young people ;</p> <p>3 pregnant women ;</p> <p>4 those with compromised immune systems ;</p> <p>5 those with chronic diseases ;</p> <p>6 health workers ;</p> <p>7 poultry workers / pig farmers ;</p>	2 max	<p>Mark the first answer on each numbered line.</p> <p>1 ACCEPT ref to any age over 50</p> <p>2 ACCEPT the young / infants / babies IGNORE refs to age</p> <p>4 ACCEPT weak ACCEPT e.g. with AIDS / HIV / on immunosuppressant drugs / ref cancer</p> <p>5 ACCEPT e.g. heart conditions / lung conditions / asthma / diabetes</p> <p>7 ACCEPT other professions working with animals, e.g. vets</p>
(a)	(ii)	<p>different <u>strains</u> of the <u>virus</u> / <u>virus</u> mutates (each year) ;</p> <p>(new strains have) different <u>antigens</u> ; <i>idea that antibody</i> produced , needs to match new strain / antigen ; <b>ora</b></p>	2 max	<p>IGNORE 'different types' or 'virus changes' or 'different strands' ACCEPT (influenza) pathogen</p> <p>CREDIT antigenic shift / drift <b>ora</b> original antibody does not match new antigen</p>

Question		Expected Answers	Mark	Additional Guidance
(a)	(iii)	<p>secondary response , starts earlier / has shorter delay before response ; <b>ora</b></p> <p>secondary response , more rapid / faster ; <b>ora</b></p> <p>secondary response , higher / produces more antibodies ; <b>ora</b></p>	2 max	<p>Mark the first <u>two</u> differences</p> <p>IGNORE answers, e.g. 'size of response' or 'response is faster' that do not refer to a feature of the secondary or primary response</p> <p>CREDIT 'shorter lag time'</p> <p>ACCEPT steeper ACCEPT bigger</p> <p>IGNORE 'secondary response lasts longer' as this is not clear from graph</p>
(a)	(iv)	<p>1 recognise , virus / antigen / pathogen ;</p> <p>2 produce a clone ;</p> <p>3 can , change to / form , plasma cells (on infection) ;</p> <p>4 make antibodies (against influenza , virus / antigen) ;</p> <p>5 responsible for secondary response / destroy virus before symptoms appear ;</p> <p>6 can , change to / form , named T-cell ;</p>	3 max	<p>1 ACCEPT description of recognition IGNORE find / detect</p> <p>2 ACCEPT ref to clonal expansion ACCEPT 'divide by mitosis to produce large numbers'</p> <p>4 IGNORE 'reproduce antibodies' IGNORE 'release antibodies'</p> <p>5 IGNORE refs to speed of response unqualified</p>

Question	Expected Answers	Mark	Additional Guidance
(b) (i)	(antibiotics) are, not effective against <u>viruses</u> / effective (only) against bacteria (and fungi / protozoa) ;	1	<b>ACCEPT</b> antibiotics do not kill viruses <b>IGNORE</b> viruses are resistant to antibiotics <b>ACCEPT</b> correct ref to detail of antibiotic action, e.g. 'antibiotics attack cell wall which is not present in influenza (virus)'
(b) (ii)	<p>1 Tamiflu<sup>®</sup> is, competitive / non-competitive inhibitor ;</p> <p>2 correct detail of inhibition method that does not contradict stated type of inhibition ;</p> <p>3 prevents, substrate binding to active site / formation of enzyme-substrate complex / formation of ESC ;</p>	2 max	<p>2 e.g. fits or binds to <u>active site</u> / complementary shape to <u>active site</u> / competes for the <u>active site</u></p> <p><b>OR</b></p> <p>fits into allosteric site or site other than active site / changes shape of <u>active site</u></p> <p>3 <b>IGNORE</b> substrate binding to enzyme</p>
(b) (iii)	fewer, viruses / pathogens, produced ; fewer, viruses / pathogens, (in droplets) when, sneezing / coughing ; (as) viruses / pathogens, cannot leave cell ; (so) cannot, infect / spread to, <u>other cells</u> ; <i>idea of treating</i> , large / proximate, population ;	2 max	<b>IGNORE</b> herd immunity / ring vaccination
(c)	(plants) already identified as likely to have, medicinal properties / few side effects / AW ; reduces, time / effort, in finding, plants / active chemicals ; (possibly) reduces cost ;	2 max	<b>ACCEPT</b> 'known / proven to work' <b>ACCEPT</b> reduced time for testing
<b>Total</b>		<b>[16]</b>	

Question: 3 (297535)

Question	Answer	Marks	Guidance												
(a)	<table border="1"> <tr> <td>form part of cellular response</td> <td><i>both</i></td> </tr> <tr> <td>mature in thymus</td> <td>(only) T (lymphocytes) ;</td> </tr> <tr> <td>secrete substances which kill infected cells</td> <td>(only) T (lymphocytes) ;</td> </tr> <tr> <td>manufacture antibodies</td> <td>(only) B (lymphocytes) ;</td> </tr> <tr> <td>undergo clonal expansion</td> <td>both / B and T ;</td> </tr> <tr> <td>activate other lymphocytes</td> <td>(only) T (lymphocytes) ;</td> </tr> </table>	form part of cellular response	<i>both</i>	mature in thymus	(only) T (lymphocytes) ;	secrete substances which kill infected cells	(only) T (lymphocytes) ;	manufacture antibodies	(only) B (lymphocytes) ;	undergo clonal expansion	both / B and T ;	activate other lymphocytes	(only) T (lymphocytes) ;	5	
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(b) (i)	<p>no antibodies detected before 4 days / antibodies appear at 4 days ;</p> <p>increase then decrease / peak ;</p> <p>figures for peak with time <b>and</b> antibody concentration ;</p> <p>decrease less steep than increase / AW ; <b>ora</b> antibody concentration returns to zero <u>at 27</u> days ;</p>	3 max	<p><b>ACCEPT</b> 'around 4 days'</p> <p><b>ACCEPT</b> upper limit of 4.5 days for first appearance of antibodies</p> <p><b>IGNORE</b> 'before 5 days'</p> <p><b>IGNORE</b> references to increase at 4 days, answers must imply none to begin with</p> <p><b>ACCEPT</b> 13 days <math>\pm</math> 0.5 day, 25 units <math>\pm</math> 0.5 units</p> <p><b>ACCEPT</b> 25 au <math>\pm</math> 0.5 au 9 days <math>\pm</math> 0.5 day after initial appearance</p>												

Question		Answer	Marks	Guidance												
(b)	(ii)	<p><i>the drawn line should show</i> higher peak <b>and</b> steeper initial increase ;</p> <p>antibodies appear between days 30 and 34 <b>and</b> concentration at 60 days above peak for primary response ;</p>	2	<p>Peak must be at least 30 au Compare gradient with initial increase up to day 10 <b>NBOD</b> if gradients are similar <b>ACCEPT</b> ruled line close to vertical</p> <p><b>DO NOT CREDIT</b> vertical <b>ACCEPT</b> a line that starts to rise at 30 or 34 days</p>												
(c)		<table border="1"> <thead> <tr> <th>region</th> <th>name</th> <th>function</th> </tr> </thead> <tbody> <tr> <td><b>A</b></td> <td>hinge (region) ;</td> <td>flexibility / binding of <u>more than one</u> antigen ;</td> </tr> <tr> <td><b>B</b></td> <td><u>constant</u> / Fc (region) ;</td> <td>attachment / binding , to phagocytes ;</td> </tr> <tr> <td><b>C</b></td> <td>variable / hypervariable / Fab (region) ;</td> <td>binding / attachment , to <u>antigens</u> ;</td> </tr> </tbody> </table>	region	name	function	<b>A</b>	hinge (region) ;	flexibility / binding of <u>more than one</u> antigen ;	<b>B</b>	<u>constant</u> / Fc (region) ;	attachment / binding , to phagocytes ;	<b>C</b>	variable / hypervariable / Fab (region) ;	binding / attachment , to <u>antigens</u> ;	6	<p><b>Marks for name and function should be awarded independently.</b> <b>DO NOT CREDIT</b> if incorrect answer appears in same box <b>ACCEPT</b> hinges / hinged</p> <p><b>ACCEPT</b> neutrophils / macrophages / granulocytes <b>ACCEPT</b> monocytes</p> <p><b>IGNORE</b> recognise antigens</p>
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