

Mark Scheme for January 2012

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.












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Any enquiries about publications should be addressed to:

OCR Publications
PO Box 5050
Annesley
NOTTINGHAM
NG15 0DL

Telephone: 0870 770 6622
Facsimile: 01223 552610
E-mail: publications@ocr.org.uk

Annotations

Annotation	Meaning
	Correct answer
	Incorrect response
	Benefit of Doubt
	Not Benefit of Doubt
	Error Carried Forward
	Given mark
	Underline (for ambiguous/contradictory wording)
	Omission mark
	Ignore
	Correct response (for a QWC question)
	QWC* mark awarded

Question			Answer	Marks	Guidance
1	(a)	(i)	<u>N</u> ;	1	IGNORE nitrogen DO NOT CREDIT n or N ₂
1	(a)	(ii)	polypeptide / protein ;	1	Mark the first answer. If the answer is correct and an additional answer is given that is incorrect or contradicts the correct answer then = 0 marks IGNORE peptide
1	(a)	(iii)	<p><i>name</i></p> <p><u>peptide</u> (bond / link) ;</p> <p>plus any two from ...</p> <p><i>description of formation</i></p> <p>between, amine group (of one amino acid) and carboxyl group (of another) ;</p> <p>H (from amine) combines with OH (from carboxyl) ;</p> <p>condensation (reaction)</p> <p>OR</p> <p>water, lost / eliminated / produced / created / AW ;</p>	3 max	<p>Maximum two marks for description. Name must be given to award 3 marks.</p> <p>ACCEPT marking points from diagram where amine and carboxyl groups are clearly labelled.</p> <p>Mark writing first then look at diagram.</p> <p>If diagram contradicts creditable text award maximum one mark for description.</p> <p>DO NOT CREDIT dipeptide</p> <p>ACCEPT phonetic spellings of amine and carboxyl</p> <p>ACCEPT 'carboxylic acid' and 'amino'</p> <p>DO NOT CREDIT amide / carbonyl</p>

Question			Answer	Marks	Guidance
1	(b)	(i)	<p>V1 <u>high latent heat</u> of vaporisation / large amount of energy required to change from liquid to gas / AW ;</p> <p>V2 <u>evaporation</u> is (efficient) cooling mechanism / AW ;</p> <p>V3 example of cooling in living organism ;</p> <p>H1 high specific heat capacity / large amount of energy needed to, raise / change, temperature ;</p> <p>H2 (thermally) stable environment for, aquatic / named aquatic, organisms ;</p> <p>H3 (aquatic) organisms use less <u>energy</u> on temperature control ;</p> <p>H4 (internal) temperature of organisms changes only slowly ;</p> <p>H5 (biological) reactions / enzymes / metabolism, function(s) correctly ;</p> <p>F1 ice, is less dense than water / floats ;</p> <p>F2 (surface of) ice provides habitat for, organisms / named organism ;</p>	8 max	<p>Annotate property (number 1) marks with <input checked="" type="checkbox"/> 1 symbol to help distinguish marks for QWC</p> <p>All marks are stand alone</p> <p>V1 ACCEPT 'large amount of heat needed...'</p> <p>V1 ACCEPT 'high latent heat of evaporation'</p> <p>V2 ACCEPT 'evaporation removes heat from body'</p> <p>V3 e.g. sweating, panting, transpiration (as cooling)</p> <p>'high latent heat of evaporation means sweat cools you down' = 3 marks</p> <p>H1 ACCEPT 'water / it, is thermally stable'</p> <p>H1 ACCEPT 'water is slow to change temperature'</p> <p>H1 CREDIT 'the temperature of the sea does not change much'</p> <p>H2 'thermally' can be inferred from previous statement</p> <p>H5 IGNORE 'organisms function correctly'</p> <p>F1 ACCEPT 'maximum density is at 4°C'</p> <p>F2 e.g. 'polar bears on ice'</p>

Question	Answer	Marks	Guidance
	<p>I1 water (beneath ice), insulated / remains liquid / doesn't freeze ;</p> <p>I2 (aquatic) organisms, do not freeze / can still swim ;</p> <p>S1 (effective) solvent ;</p> <p>S2 medium for reactions / (internal) transport medium / able to dilute toxic substances ;</p> <p>C1 cohesion / adhesion ;</p> <p>C2 example of cohesion / adhesion, in living organism ;</p> <p>T1 surface tension ;</p> <p>T2 habitat for (named) invertebrates ;</p> <p>P1 transparent ;</p> <p>P2 allows underwater photosynthesis ;</p> <p>D1 idea of high density ;</p> <p>D2 allows flotation / support ;</p> <p>U organisms can still obtain, oxygen / (named) minerals / food / carbon dioxide, from water ;</p>		<p>I2 IGNORE unqualified references to survival</p> <p>I2 ACCEPT gametes / AW, can be dispersed</p> <p>C2 e.g. transpiration stream / apoplast movement</p> <p>C2 ACCEPT descriptions</p> <p>T2 ACCEPT insects IGNORE animals</p> <p>P2 ACCEPT other example of transparency linked to survival, e.g. eyes</p> <p>D1 IGNORE references to viscosity</p> <p>U not linked to a single property and so cannot contribute to QWC</p> <p>U IGNORE nutrients / nutrition</p>

Question	Answer	Marks	Guidance
	QWC: a property mark (with number 1) and a survival mark with the same letter seen twice.	1	e.g. H1 and H3 and S1 and S2

Question			Answer	Marks	Guidance
1	(b)	(ii)	<p>1 protein <u>secondary</u> structure / α-helix / β-pleated sheet ;</p> <p>2 (protein) <u>tertiary</u> structure ;</p> <p>3 between polypeptide chains in (named) quaternary structure ;</p> <p>4 (between chains of) cellulose ;</p> <p>5 (between, strands of / bases in) DNA ;</p> <p>6 AVP ; ; ;</p>	3 max	<p>Mark the first answer on each prompt line.</p> <p>3 e.g. between adjacent chains in collagen</p> <p>CREDIT 'protein / named protein / enzyme' OR 'between amino acid R-groups' once ONLY if <u>none</u> of mps 1-3 have been awarded</p> <p>4 IGNORE macrofibrils</p> <p>6 e.g. between mRNA and tRNA binding between enzyme and substrate (coiling of) amylose between DNA and mRNA during transcription</p>
			Total	17	

Question		Answer	Marks	Guidance
2	(a)	<p>1 nucleus / nuclei ;</p> <p>2 other named organelle / membrane bound organelles ;</p> <p>3 linear chromosomes ;</p> <p>4 DNA, associated with / AW, histones / protein ;</p> <p>5 80S / 22nm / large, ribosomes ;</p> <p>6 large cells / AW ;</p> <p>7 no cell wall ;</p>	2 max	<p>Mark the first answer on each prompt line. ACCEPT ora throughout</p> <p>1 ACCEPT 'DNA not free'</p> <p>2 e.g. mitochondria / Golgi / etc 2 ACCEPT compartmentalized organelles 2 ACCEPT don't have a mesosome</p> <p>4 ACCEPT 'DNA not naked'</p>
2	(b)	<p>capital letter on, specific name / Vivax ;</p> <p>not italicised / not underlined ;</p>	1 max	<p>Mark the first answer</p> <p>ACCEPT ora for what student should have typed</p> <p>ACCEPT 'the parasite is Plasmodium falciparum / malariae / ovale' if candidate uses capital 'P' and lower case 'f / m / o'</p>
2	(c)	(i)	3 max	<p>IGNORE references to stages of life-cycle</p> <p>Max 2 if virus / bacterium appears anywhere</p> <p>3 IGNORE case of initial 'P'</p> <p>3 Must be in context of transmission from mosquito to human</p> <p>4 'blood' can be inferred, e.g. from refs to anticoagulant</p> <p>4 IGNORE ref to parasite in blood after liver</p>

Question			Answer	Marks	Guidance
2	(c)	(ii)	destruction of a species is, morally / ethically, wrong ; might cause unintended health problems in humans ; might harm, other / unintended, species ; <i>idea of bioaccumulation / biomagnification ;</i>	1 max	Mark the first suggestion IGNORE 'might enter human food' unqualified Answers must imply idea of harm

Question			Answer	Marks	Guidance
2	(c)	(iii)	<p><i>Field investigation</i></p> <p>F1 (sampling) before and after insecticide treatment ;</p> <p>F2 <i>idea of</i> , unbiased / random, sampling of population ;</p> <p>F3 example of sampling technique ;</p> <p>F4 (sampling in) different, times / weather ;</p> <p>F5 <u>large</u> number of samples taken ;</p> <p>F6 <i>idea of</i> standardised sampling procedure ;</p> <p>F7 <i>idea of</i> preventing counting same individual more than once ;</p> <p>F8 <i>idea of</i> capture – recapture ;</p> <p>F9 calculate mean / calculate standard deviation / apply statistical test ;</p>	5 max	<p>Award marks for either a field or laboratory investigation – must read whole answer before beginning to mark to decide if field or laboratory.</p> <p>If candidates answer in terms of incidence of malaria award no marks as question states population of mosquitoes but read whole question in case mosquito study described in addition.</p> <p>If the investigation is in the both field and laboratory mark the investigation which gives candidate most marks.</p> <p>F1 IGNORE refs to treated and untreated areas as stem refers to ‘a population’</p> <p>F3 e.g. sweep net, pond net, light trap F3 ACCEPT insect net F3 IGNORE ‘net’ or ‘trap’ unqualified</p> <p>F4 IGNORE intervals unqualified. Answers must refer to time or weather</p> <p>F5 Must imply large number or state five or more</p> <p>F6 ACCEPT <i>idea of</i> counting by the <u>same method</u></p>

Continued.....

Question			Answer	Marks	Guidance
			<p>OR</p> <p><i>Laboratory investigation</i></p> <p><i>idea of:</i></p> <p>L1 with and without insecticide exposure ;</p> <p>L2 measuring <u>mosquito</u> survival / count surviving mosquitoes ;</p> <p>L3 controlling one named key variable ;</p> <p>L4 controlling second named key variable ;</p> <p>L5 <i>idea of using a range of insecticide <u>concentrations</u> ;</i></p> <p>L6 replicates ;</p> <p>L7 calculate <u>mean</u> / calculate standard deviation / apply statistical test ;</p>		<p>Laboratory investigation could be done outside</p> <p>L1 is for changing the independent variable</p> <p>L2 is for measuring the dependent variable ACCEPT count the number of dead ones</p> <p>L3 and L4 <i>award up to 2 marks for</i></p> <ul style="list-style-type: none"> exposure time species of mosquito stage of mosquito life cycle sex of mosquito number of mosquitos insecticide type insecticide concentration volume of insecticide temperature <p>L6 Minimum of 3 in total, i.e. original plus two</p> <p>L7 IGNORE average</p>
			Total	12	

Question			Answer	Marks	Guidance
3	(a)		<p>regulates fluidity of / stabilises / AW, membranes / phospholipid bilayer ;</p> <p>(converted to) steroid / named steroid, hormone(s) ;</p> <p>waterproofing the skin ;</p> <p>making Vitamin D ;</p> <p>making bile (salts) ;</p>	2 max	<p>Mark the first answer on each prompt line.</p> <p>ACCEPT decreases / maintains, fluidity</p> <p>ACCEPT supports structure of membranes</p> <p>DO NOT CREDIT makes membrane rigid</p> <p>DO NOT CREDIT allows / increases fluidity</p>
3	(b)	(i)	<p>contains C and H and O ;</p> <p>has, OH / hydroxyl, groups ;</p> <p>hex / 6-membered, ring ;</p>	1 max	<p>Mark the first answer. If the answer is correct and an additional answer is given that is incorrect or contradicts the correct answer then = 0 marks</p> <p>DO NOT CREDIT C, H and O molecules</p> <p>DO NOT CREDIT hexose</p> <p>ACCEPT pent ring</p> <p>IGNORE 6C ring</p> <p>IGNORE branched</p>
3	(b)	(ii)	<p>(saturated) lipids / fats / triglycerides ;</p> <p>protein / polypeptide ;</p>	2	<p>Mark the first two suggestions</p> <p>DO NOT CREDIT unsaturated (fats)</p> <p>IGNORE fatty acids / glycerol</p> <p>IGNORE amino acids / peptides</p>

Question	Answer	Marks	Guidance
(iii)	<p><i>LDL</i></p> <p>L1 (carry cholesterol) from liver to, tissues / cells ;</p> <p>L2 receptors on (tissue) <u>cells</u> ;</p> <p>L3 raise / AW, <u>blood</u> cholesterol ;</p> <p>L4 increase / cause, deposition of, fats / lipids / triglycerides / cholesterol, <u>in</u> artery wall / under endothelium ;</p> <p>L5 form, plaques / atheromas ;</p> <p><i>HDL</i></p> <p>H1 (carry cholesterol) from, tissues / body / blood, to liver ;</p> <p>H2 receptors on, hepatocytes / liver <u>cells</u> ;</p> <p>H3 lower / reduce / decrease, (blood) cholesterol ;</p> <p>H4 reduce deposition, of fats / lipids / triglycerides / cholesterol ;</p> <p>H5 decrease, formation / risk, of, plaques / atheromas ;</p>	6 max	<p>If it is clear that candidates get LDL and HDL the wrong way round do not award L1 or H1 or QWC and then apply ECF</p> <p>L3 IGNORE deposits cholesterol</p> <p>L4 IGNORE LDL / fatty acids L4 ACCEPT under epithelium</p> <p>H1 ACCEPT back to liver</p> <p>H3 ACCEPT remove from blood</p> <p>H4 IGNORE LDL / fatty acids</p> <p>H5 IGNORE removing atheromas</p>
	QWC – Award if you award an L mark and an H mark with the same number twice	1	e.g. L1 and H1, and L3 and H3

Question		Answer	Marks	Guidance
	(c) (i)	(red) meat <u>contains</u> (large amounts of) <u>saturated</u> , fat / fatty acids ; (meat / saturated fat) associated with / leads to, increased / large amounts of, LDLs ;	2	ACCEPT ora throughout for consequences of non-red meat diet No ECF from 3 (b) (iii) ACCEPT animal fat is saturated fat CREDIT high LDL/HDL ratio IGNORE makes LDLs unqualified answer must imply increased amount
	(ii)	(type 2) diabetes ; angina / coronary heart disease / CHD / stroke / hypertension / high blood pressure / obesity ;	1	Mark the first answer. If the answer is correct and an additional answer is given that is incorrect or contradicts the correct answer then = 0 marks DO NOT CREDIT type 1 diabetes IGNORE conary DO NOT CREDIT chronic
		Total	15	

Question		Answer	Marks	Guidance
4	(a)	taxonomy / taxonomic ; hierarchy ; phylogeny / phylogenetic ;	3	Mark the first answer. If the answer is correct and an additional answer is given that is incorrect or contradicts the correct answer then = 0 marks ACCEPT phonetic spelling throughout ACCEPT hierarchical system
	(b)	(i)	2 max	Mark the first answer on each prompt line. 1 DO NOT CREDIT absence of a qualified cell wall, e.g. 'no cellulose cell wall' 2 ACCEPT phonetic spelling 3 ACCEPT named eukaryotic cell feature 4 IGNORE references to tissues 6 DO NOT CREDIT unqualified references to movement ACCEPT refs to mobility during part of life cycle IGNORE cilia / flagella
		(ii)	1	Mark the first answer. If the answer is correct and an additional answer is given that is incorrect or contradicts the correct answer then = 0 marks IGNORE case of initial letter
		Eukaryota(e) / Eukarya / eukaryote(s) ;		

Question		Answer	Marks	Guidance
	(iii)	<p>1 <u>all</u> are in same <u>family</u> as all, are closely related ;</p> <p>2 kea and kaka are both, same genus / <i>Nestor</i> ; ora for kakapo</p> <p>3 kea and kaka, are more closely related / share more recent common ancestor, (than with kakapo) ;</p> <p>4 kea and kaka have <u>more</u> genes in common / AW (than with kakapo) ;</p> <p>5 example of genetic similarity (between kaka and kea) evident from Fig 4.1 ;</p> <p>6 differences between, kea and kaka / all three, are great enough for each to be described as a different <u>species</u> ;</p>	4 max	<p><i>Candidates may refer to individual species using common or scientific names. ACCEPT use of either or both. IGNORE case of initial letter</i></p> <p>1 idea of link between family and close relationship must be made</p> <p>3 ACCEPT ora for less close relationship between kakapo and others</p> <p>4 ACCEPT ora</p> <p>4 Answers must refer to genes / genetics / DNA</p> <p>4 IGNORE cytochrome c</p> <p>5 E.g. kaka and kea both brown / kaka and kea both have similar shaped beaks</p> <p>5 IGNORE unqualified references to appearance</p>
(c)	(i)	<p>differences ;</p> <p><u>in / within / between</u>, species ;</p>	2	ACCEPT within a population

Question		Answer	Marks	Guidance
(c)	(ii)	genetic differences / different alleles / inherited differences ; environment / diet / disease ;	2	Mark the first suggestion on each prompt line. ACCEPT different genes ACCEPT mutation ACCEPT sex IGNORE 'different habitat'
(c)	(iii)	only small number have been sampled / AW ; <i>idea that</i> individuals sampled may not be representative of population ; data collected when population was larger / smaller population may mean range has changed ;	2	Mark the first two reasons – ignore prompt lines. ACCEPT 'whole population has not been sampled' IGNORE rare unqualified ACCEPT larger ones more likely to be caught / measured ACCEPT individuals sampled from one area might be different from average of whole population

Question		Answer	Marks	Guidance
4	(d)	<p><i>Name</i></p> <p>1 <u>speciation</u> ;</p> <p><i>Mechanism – max 2 marks</i></p> <p>2 <u>isolation / separation</u>, (of populations) ;</p> <p>3 further detail of isolating mechanism ;</p> <p>4 mutation / genetic variation ;</p> <p>5 natural selection / description of natural selection ;</p> <p>6 different <u>selection pressure</u>(s) (in different environment) ;</p> <p>7 (enough) time to allow changes in population to prevent interbreeding / AW ;</p>	3 max	<p>1 IGNORE ‘natural selection’ on name line</p> <p>2 IGNORE barrier</p> <p>3 e.g. river, mountain, reproductive, geographical, temporal, polyploidy, qualified barrier</p> <p>3 IGNORE allopatric / sympatric unqualified</p> <p>5 description must mention differential survival and genes being passed on</p> <p>6 IGNORE selection pressure unqualified</p> <p>6 ‘different’ can be described using an example</p>
		Total	19	

Question		Answer	Marks	Guidance
5	(a)	41 667 ; ;	2	<p>Award 2 marks for a correct answer, even if no working shown.</p> <p>ALLOW 1 mark for 41 666.666, 41 666.7, 41 666.67, 41 666.667, 41 670, 41 700, 41 666, 41668 or 42 000.</p> <p>If the answer is incorrect ALLOW 1 mark for $\frac{2500 \times 100}{6}$</p>
	(b)	<p>1 part of <u>ecosystem</u> / <u>habitat</u> for other organisms ;</p> <p>2 part of food, chain / web ;</p> <p>3 wood useful for specific purpose ;</p> <p>4 (potential) source of medicine ;</p> <p>5 genetic resource ;</p> <p>6 aesthetic value / give pleasure / beautiful trees ;</p> <p>7 ethical reason / moral responsibility ;</p> <p>8 resource for (non-medical) scientific research ;</p>	3	<p>Mark the first three reasons regardless of lines</p> <p>1 IGNORE maintains biodiversity</p> <p>2 ACCEPT food source</p> <p>2 IGNORE home</p> <p>3 e.g. making , fences / furniture / boundary marker</p> <p>5 ACCEPT description or example but must refer to genes</p> <p>6 ACCEPT tourism</p> <p>7 ACCEPT <i>idea that</i> they have a right to existence</p> <p>7 DO NOT CREDIT 'playing God'</p>

Question		Answer	Marks	Guidance	
	(c)	(i)	not in, natural / normal, <u>habitat</u> / <u>environment</u> ;	1	
		(ii)	<p>1 most plants produce an excess ;</p> <p>2 (so) can be collected (from wild) without damaging (wild) , plants / organisms / population / habitat ;</p> <p>3 take up little space ; ora</p> <p>4 able to store, large numbers / more species ; ora</p> <p>5 easy / cheaper, to transport / AW ; ora</p> <p>6 <i>idea of remaining viable for long periods</i> ; ora</p> <p>7 less susceptible to, disease / pests / environmental change ; ora</p>	4 max	<p>5 ACCEPT can easily be sent where wanted</p> <p>6 Answers must have some reference to survival, not just 'can be stored for a long time'</p> <p>7 IGNORE recovery / survival , from disease</p> <p>7 CREDIT answers that describe (greater) disease resistance as a property of the seeds themselves</p> <p>or that the seed bank is a (more) protected environment for the seeds</p> <p>IGNORE cheaper unqualified</p>

Question			Answer	Marks	Guidance
5	(c)	(iii)	<p>1 (maintain / increase) genetic variation / <u>gene pool</u> ;</p> <p>2 reduced chance of (future), disease / environmental change, affecting (whole) population ;</p> <p>3 reduces chance of <u>inbreeding</u> ;</p> <p>4 maintain, <u>geographical</u> variation / <u>varieties</u> / races / strains / subspecies ;</p>	3 max	<p>1 ACCEPT different alleles</p> <p>1 DO NOT CREDIT different genes</p> <p>2 ACCEPT 'so if one dies from a disease some might survive'</p> <p>2 ACCEPT 'to get some plants that are resistant to different diseases'</p> <p>4 IGNORE variation unqualified</p>
			Total	13	

Question		Answer	Marks	Guidance	
6	(a)		3	<p>DO NOT CREDIT if letter is unclear</p> <p>DO NOT CREDIT if more than one letter is given</p> <p>DO NOT CREDIT if an incorrect letter is given</p> <p>DO NOT CREDIT if an incorrect letter is given</p>	
		Characteristics are passed on to the next generation			W ;
		There is a struggle for existence			Y and Z ;
		Individuals with beneficial characteristics are among the few who survive			X and Y and Z ;
	(b)	<p>MRSA / it, is harder to treat / may become untreatable ;</p> <p>potential for, disease outbreak / epidemic / pandemic / killing many people ;</p> <p>developing new / more powerful, <u>antibiotics</u>, is expensive / takes time ;</p>	2 max	<p>ACCEPT MRSA / it, can't be killed (by antibiotics)</p> <p>ACCEPT antibiotics will no longer work on, MRSA / it</p> <p>IGNORE new antibiotics are hard to discover</p>	

Question		Answer		Marks	Guidance
6	(c)	1	fossils show that organisms have changed over time ;	3	1 CREDIT many fossil organisms dissimilar from modern organisms
		2	<i>idea that</i> fossils or rocks can be dated ;		2 ACCEPT idea of fossils in chronological order
		3	<i>idea of</i> fossils showing intermediate forms / sequences ;		3 e.g. <i>Archaeopteryx / Tiktaalik / horse</i> 3 general trend from, small / simple, to, large / complex
			Total	8	

Question		Answer	Marks	Guidance												
7	(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 and antibody concentration ;</p> <p>decrease less steep than increase / AW ; ora</p> <p>antibody concentration returns to zero <u>at 27</u> days ;</p>	3 max	<p>ACCEPT 'around 4 days'</p> <p>ACCEPT upper limit of 4.5 days for first appearance of antibodies</p> <p>IGNORE 'before 5 days'</p> <p>IGNORE references to increase at 4 days, answers must imply none to begin with</p> <p>ACCEPT 13 days \pm 0.5 day, 25 units \pm 0.5 units</p> <p>ACCEPT 25 au \pm 0.5 au 9 days \pm 0.5 day after initial appearance</p>												

Question			Answer	Marks	Guidance												
7	(b)	(ii)	<p><i>the drawn line should show</i> higher peak and steeper initial increase ;</p> <p>antibodies appear between days 30 and 34 and 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 NBOD if gradients are similar ACCEPT ruled line close to vertical</p> <p>DO NOT CREDIT vertical ACCEPT a line that starts to rise at 30 or 34 days</p>												
7	(c)		<table border="1"> <thead> <tr> <th>region</th> <th>name</th> <th>function</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>hinge (region) ;</td> <td>flexibility / binding of <u>more than one</u> antigen ;</td> </tr> <tr> <td>B</td> <td><u>constant</u> / Fc (region) ;</td> <td>attachment / binding , to phagocytes ;</td> </tr> <tr> <td>C</td> <td>variable / hypervariable / Fab (region) ;</td> <td>binding / attachment , to <u>antigens</u> ;</td> </tr> </tbody> </table>	region	name	function	A	hinge (region) ;	flexibility / binding of <u>more than one</u> antigen ;	B	<u>constant</u> / Fc (region) ;	attachment / binding , to phagocytes ;	C	variable / hypervariable / Fab (region) ;	binding / attachment , to <u>antigens</u> ;	6	<p>Marks for name and function should be awarded independently. DO NOT CREDIT if incorrect answer appears in same box ACCEPT hinges / hinged</p> <p>ACCEPT neutrophils / macrophages / granulocytes ACCEPT monocytes</p> <p>IGNORE recognise antigens</p>
region	name	function															
A	hinge (region) ;	flexibility / binding of <u>more than one</u> antigen ;															
B	<u>constant</u> / Fc (region) ;	attachment / binding , to phagocytes ;															
C	variable / hypervariable / Fab (region) ;	binding / attachment , to <u>antigens</u> ;															
Total				16													

OCR (Oxford Cambridge and RSA Examinations)
1 Hills Road
Cambridge
CB1 2EU

OCR Customer Contact Centre

Education and Learning

Telephone: 01223 553998

Facsimile: 01223 552627

Email: general.qualifications@ocr.org.uk

www.ocr.org.uk

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Facsimile: 01223 552553

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