

**Biology**

Advanced Subsidiary GCE

Unit **F212**: Molecules, Biodiversity, Food and Health

**Mark Scheme for June 2011**

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Mark schemes should be read in conjunction with the published question papers and the Report on the Examination.

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F212

Mark Scheme

June 2011

Question		Expected Answers	Mark	Additional Guidance
1	(a)	<p>photosynthesis ; starch ; nucleic acids ; monomers ; cellulose ;</p>	5	<p><b>Mark the first answer in each space.</b> If the answer is correct and an additional answer is given that is incorrect or contradicts the correct answer then = <b>0 marks</b> <b>ACCEPT</b> minor mis-spellings</p>
1	(b)	<p>1 without fertiliser <u>yield</u> falls (over time) / fertiliser maintains <u>yield</u> / AW ;</p> <p>2 application of fertiliser replaces lost , nitrogen / nitrates ;</p> <p>3 nitrogen / N, required for , amino acids / (named) protein / growth / (named) nucleic acids / (named) nitrogenous base ;</p> <p>4 <i>idea that</i> nitrogen / N / nitrate / <math>\text{NO}_3^{(-)}</math>, removed (from soil / system) by , plant / harvesting ;</p> <p>5 <i>idea of</i> denitrification ;</p> <p>6 nitrates / <math>\text{NO}_3^{(-)}</math>, are soluble ;</p> <p>7 nitrates / <math>\text{NO}_3^{(-)}</math>, are , leached / washed from soil ;</p>	3 max	<p><b>IGNORE</b> 'nutrients/ minerals' throughout</p> <p>1 <b>ACCEPT</b> it / nitrate / nitrogen as AW for fertiliser <b>ACCEPT</b> fertiliser increases yield</p> <p>2 <b>ACCEPT</b> it / nitrate / nitrogen as AW for fertiliser</p> <p>3 <b>IGNORE</b> 'development' <b>IGNORE</b> fertiliser / nitrate / <math>\text{N}_2</math></p> <p>4 Answers must refer to depletion (from soil) 'used' alone does not imply depletion</p>

Question		Expected Answers		Mark	Additional Guidance
1	(c)	1	<u>natural selection</u> ;	4 max	<p><b>ACCEPT</b> 'tolerance' as AW for resistance If candidates write 'immunity' penalise once and then ecf</p> <p><b>3 DO NOT CREDIT</b> idea of insecticide or natural selection <i>causing</i> mutation <b>DO NOT CREDIT</b> variation that could be environmental</p> <p><b>5 ACCEPT</b> AW for resistant, e.g. 'the ones with the mutation'</p> <p><b>6 ACCEPT</b> gene for resistance <b>IGNORE</b> 'pass on resistance / trait'</p> <p><b>7 CREDIT</b> refs to increased allele / gene frequency <b>ACCEPT</b> 'the whole population becomes resistant'</p>
		2	insecticide is the , selective agent / selection pressure ;		
		3	<i>idea of</i> mutation / (genetic) variation ;		
		4	random / naturally occurring ;		
		5	resistant survive / non-resistant die ;		
		6	(resistants will) pass on , allele / mutation , for resistance (to offspring) ;		
		7	higher proportion of / more , resistant individuals in population ;		
		8	<i>idea that</i> resistance <u>allele</u> confers resistance only to a small dose of insecticide ;		
<b>Total</b>				<b>[12]</b>	

F212

Mark Scheme

June 2011

Question		Expected Answers	Mark	Additional Guidance
2	(a)	(enzymes are) proteins / used in metabolism / used in named metabolic pathway ;  alter rate of (chemical) reaction / lowers activation energy / provides alternative route for reaction / is not changed / is not used up ;	2	<b>ACCEPT</b> 'used in reactions , in organisms / in the body' <b>IGNORE</b> 'biological / enzyme / in nature'  <b>ACCEPT</b> does not take part in reaction  <b>Note</b> 'speed up metabolic reactions' = <b>2 marks</b>
2	(b) (i)	time ;	1	<b>Mark the first answer.</b> If the answer is correct and an additional answer is given that is incorrect or contradicts the correct answer then = <b>0 marks</b>  <b>IGNORE</b> 'how long' <b>IGNORE</b> correct units
2	(b) (ii)	<b>P1</b> <i>idea of</i> different samples have different concentrations of, catalase / enzyme ;  <b>One of</b> <b>M1</b> source the extract for the whole experiment from a single source ; <b>M2</b> thorough , mixing , required before use ; <b>M3</b> filter / purify , extract ; <b>M4</b> <i>idea of</i> using , known / standard , <u>concentration of</u> enzyme ; <b>M5</b> commercial source of catalase ;	2	The M mark can be awarded without a correct P mark  <b>P1</b> Look for the idea of variation within the sample (e.g. different amounts) <b>CREDIT</b> examples of lack of uniformity such as: breakage of cells / surface area / mixing / disruption of lysosomes / changes to enzyme shape (caused by blending process) / presence of other substances interfering with reaction  <b>IGNORE</b> refs to celery being a poor source of catalase  <b>M1 ACCEPT</b> 'from same plant'

F212

Mark Scheme

June 2011

Question			Expected Answers	Mark	Additional Guidance
2	(b)	(iii)	repeat / replicate ; compare replicate values / identify anomalous results ;  mean / range / standard deviation / error bars / % error ;  compare results with , others / book / internet , values / results ;	2 max	e.g compare replicates with Table 2.1  <b>IGNORE</b> average  Must contain the idea of other investigators <b>ACCEPT</b> 'look up normal values on the internet'
2	(c)	(i) 1 2  3  4  5  6	<u>rate</u> , rises / increases , initially ; peak at / maximum at / highest at / decrease after, <u>40</u> (°C) ;  (overall) fall more rapid than rise ;  <i>idea that</i> before peak / after peak , temperature increase has increasing effect on rate ;  comparative figures to support any point ;  no , reaction / oxygen produced , at 60(°C) ;	4 max	<b>IGNORE</b> explanations <b>1 DO NOT CREDIT</b> if 'rate' not stated for this mp only <b>2 ACCEPT</b> optimum  <b>3</b> Look for a comparative statement  <b>4 ACCEPT</b> , e.g., line is steeper between 30 and 40 than between 10 and 20. <b>5</b> Two temperatures and two rates, <b>with units</b> . Or calculated difference with appropriate units, e.g. rate doubles between 10 and 20°C <b>or</b> $Q_{10} = 2$ <b>6 ACCEPT</b> rate is 0 at 60
2	(c)	(ii)	2 ;	1	<b>IGNORE</b> units
2	(c)	(iii)	temperature ; maximum / peak / $V_{max}$ ; <u>denatured</u> ; <u>active</u> ;	4	<b>Mark the first answer for each letter.</b> If the answer is correct and an additional answer is given that is incorrect or contradicts the correct answer then = <b>0</b> <b>marks</b>  <b>ACCEPT</b> kinetic energy / KE <b>ACCEPT</b> optimum / optimum temperature <b>IGNORE</b> descriptions
<b>Total</b>				<b>[16]</b>	

F212

Mark Scheme

June 2011

Question			Expected Answers	Mark	Additional Guidance
3	(a)	(i)	D ; A ; F ;	3	<b>Mark the first answer for each letter.</b> If an additional answer is given then = <b>0 mark</b>
3	(a)	(ii)	B ; E ; F ; F ;	4	<b>Mark the first answer for each letter</b> If an additional answer is given then = <b>0 marks</b>
3	(b)		<p><b>1</b> insoluble ;</p> <p><b>2</b> does not , change / affect , water potential / <math>\Psi</math> , of cell ;</p> <p><b>3</b> can be , broken down / hydrolysed / built up , quickly / easily ;</p> <p><b>4</b> lots of branches for <u>enzymes</u> to attach ;</p> <p><b>5</b> compact ;</p> <p><b>6</b> (therefore) high energy content for mass / energy dense / AW ;</p>	<b>3 max</b>	<p><b>2</b> <b>ACCEPT</b> osmotically inactive / AW</p> <p><b>3</b> Answers must contain the idea of ease or speed of breakdown <b>IGNORE</b> broken up</p> <p>Answers must imply density, e.g. 'it is compact and so stores a lot of energy' = 2 marks</p>

F212

Mark Scheme

June 2011

Question			Expected Answers	Mark	Additional Guidance
3	(c)	(i)	$\alpha$ / <u>alpha</u> , glucose ;	1	<b>Mark the first answer.</b> If the answer is correct and an additional answer is given that is incorrect or contradicts the correct answer then = <b>0 marks</b>  <b>ACCEPT</b> 'a'
3	(c)	(ii)	<p>1 respiratory substrate / used for respiration ;</p> <p>2 source of / releases / provides, energy ;</p> <p>3 formation of ATP ;</p> <p>4 conversion into named compound ;</p>	1 max	<p><b>Mark the first answer.</b> If the answer is correct and an additional answer is given that is incorrect or contradicts the correct answer then = <b>0 marks</b></p> <p><b>DO NOT CREDIT</b> any answer that clearly states that glucose <b>is</b> energy, <b>makes</b> energy, <b>produces</b> energy or <b>creates</b> energy</p> <p>1 <b>ACCEPT</b> used in respiration <b>ACCEPT</b> 'releases energy for respiration'</p> <p>2 <b>IGNORE</b> used for energy</p> <p>4 e.g. starch / cellulose / polysaccharide / disaccharide / glycogen / protein / lipid / sucrose / maltose / fructose / fat</p>
3	(c)	(iii)	D ;	1	<p><b>Mark the first answer.</b> If the answer is correct and an additional answer is given that is incorrect or contradicts the correct answer then = <b>0 marks</b></p> <p><b>ACCEPT</b> F <b>IGNORE</b> triglyceride / fat / lipid / haemoglobin</p>



F212

Mark Scheme

June 2011

Question		Expected Answers	Mark	Additional Guidance																		
3	(d)	<table border="1"> <thead> <tr> <th>glycogen</th> <th>cellulose</th> </tr> </thead> <tbody> <tr> <td><i>no hydrogen bonding</i></td> <td><i>hydrogen bonding</i></td> </tr> <tr> <td><math>\alpha</math> / alpha , glucose</td> <td><math>\beta</math> / beta , glucose</td> </tr> <tr> <td>1,4 <u>and</u> 1,6-glycosidic bonds <b>or</b> 1,6-glycosidic bonds present</td> <td>1,4-glycosidic bonds (only) <b>or</b> 1,6-glycosidic bonds not present</td> </tr> <tr> <td>branched</td> <td>not branched / linear / straight</td> </tr> <tr> <td>no , fibres / fibrils</td> <td>fibres / fibrils</td> </tr> <tr> <td>granules</td> <td>no granules</td> </tr> <tr> <td>all glucose units in same orientation</td> <td>adjacent glucose units in opposite orientation</td> </tr> </tbody> </table>	glycogen	cellulose	<i>no hydrogen bonding</i>	<i>hydrogen bonding</i>	$\alpha$ / alpha , glucose	$\beta$ / beta , glucose	1,4 <u>and</u> 1,6-glycosidic bonds <b>or</b> 1,6-glycosidic bonds present	1,4-glycosidic bonds (only) <b>or</b> 1,6-glycosidic bonds not present	branched	not branched / linear / straight	no , fibres / fibrils	fibres / fibrils	granules	no granules	all glucose units in same orientation	adjacent glucose units in opposite orientation		<p>Comparative statements must be made on the same line Award 1 mark for each correct side by side comparison. <b>ALLOW</b> two valid comparisons in the same pair of boxes, e.g</p> <table border="1"> <tr> <td><math>\alpha</math>-glucose in a branched chain</td> <td><math>\beta</math>-glucose in a straight chain</td> </tr> </table> <p>= 2 marks</p> <p><b>ACCEPT</b> 'a' and 'b'</p> <p><b>ACCEPT</b> helical / spiral / coiled vs linear / straight <b>DO NOT CREDIT</b> <math>\alpha</math>-helix</p>	$\alpha$ -glucose in a branched chain	$\beta$ -glucose in a straight chain
glycogen	cellulose																					
<i>no hydrogen bonding</i>	<i>hydrogen bonding</i>																					
$\alpha$ / alpha , glucose	$\beta$ / beta , glucose																					
1,4 <u>and</u> 1,6-glycosidic bonds <b>or</b> 1,6-glycosidic bonds present	1,4-glycosidic bonds (only) <b>or</b> 1,6-glycosidic bonds not present																					
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all glucose units in same orientation	adjacent glucose units in opposite orientation																					
$\alpha$ -glucose in a branched chain	$\beta$ -glucose in a straight chain																					
<b>Total</b>			<b>3 max</b> <b>[16]</b>																			

F212

Mark Scheme

June 2011

Question			Expected Answers	Mark	Additional Guidance
4	(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><b>Mark the first answer on each numbered line.</b></p> <p>1 <b>ACCEPT</b> ref to any age over 50</p> <p>2 <b>ACCEPT</b> the young / infants / babies <b>IGNORE</b> refs to age</p> <p>4 <b>ACCEPT</b> weak <b>ACCEPT</b> e.g. with AIDS / HIV / on immunosuppressant drugs / ref cancer</p> <p>5 <b>ACCEPT</b> e.g. heart conditions / lung conditions / asthma / diabetes</p> <p>7 <b>ACCEPT</b> other professions working with animals, e.g. vets</p>
4	(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 <u>antibody</u> produced , needs to match new strain / antigen ; ora</i></p>	2 max	<p><b>IGNORE</b> 'different types' or 'virus changes' or 'different strands'</p> <p><b>ACCEPT</b> (influenza) pathogen</p> <p><b>CREDIT</b> antigenic shift / drift <b>ora</b> original antibody does not match new antigen</p>

F212

Mark Scheme

June 2011

Question			Expected Answers	Mark	Additional Guidance
4	(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><b>Mark the first <u>two</u> differences</b></p> <p><b>IGNORE</b> 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><b>CREDIT</b> 'shorter lag time'</p> <p><b>ACCEPT</b> steeper</p> <p><b>ACCEPT</b> bigger</p> <p><b>IGNORE</b> 'secondary response lasts longer' as this is not clear from graph</p>
4	(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 <b>ACCEPT</b> description of recognition</p> <p><b>IGNORE</b> find / detect</p> <p>2 <b>ACCEPT</b> ref to clonal expansion</p> <p><b>ACCEPT</b> 'divide by mitosis to produce large numbers'</p> <p>4 <b>IGNORE</b> 'reproduce antibodies'</p> <p><b>IGNORE</b> 'release antibodies'</p> <p>5 <b>IGNORE</b> refs to speed of response unqualified</p>

F212

Mark Scheme

June 2011

Question			Expected Answers	Mark	Additional Guidance
4	(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)'
4	(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>
4	(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
4	(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>	

F212

Mark Scheme

June 2011

Question			Expected Answers	Mark	Additional Guidance
5	(a)	(i)	<p><u>both rise</u> (between 1920 and 1960) ;</p> <p>men started smoking before, ca. 1900 / women's smoking started increasing after 1920 - 1925 ;</p> <p>similar levels of smoking (in men and women) by 1990 ;</p> <p>smoking in men , levelled off / plateaued</p> <p><b>OR</b></p> <p>smoking in women continues to rise ;</p>	2 max	<p>Needs direct comparison in single statement</p> <p><b>ACCEPT</b> comparative statement, e.g. 'women started smoking later than men'</p> <p><b>ACCEPT</b> 5000 in both by the end of the 1980s</p> <p><b>DO NOT CREDIT</b> if plateau described before 1940</p>
5	(a)	(ii)	<p>(positive) correlation / similar pattern , between smoking and lung cancer ;</p> <p><i>idea that</i> increase in incidence of lung cancer lags behind increase in smoking ;</p> <p><i>idea of</i> once smoking has levelled off there is a corresponding levelling off in incidence of lung cancer ;</p> <p><i>idea of</i> men always smoking more and men having higher rates of cancer ; <b>ora</b></p>	2	<p><b>ACCEPT</b> similar shaped graphs</p> <p><b>IGNORE</b> 'as smoking increases, so does lung cancer'</p> <p><b>ACCEPT</b> followed by</p> <p><b>ACCEPT</b> if answer implies levelling off at same time</p>

F212

Mark Scheme

June 2011

Question		Expected Answers	Mark	Additional Guidance
5	(b)	<p>1 tar / (cigarette) smoke , contains <u>carcinogens</u> / is <u>carcinogenic</u> ;</p> <p>2 benzopyrene / formaldehyde / other e.g. ;</p> <p>3 enters , lung / epithelial , <u>cells</u> ;</p> <p>4 <i>idea that</i> destroyed cilia prevent removal of , carcinogens / tar , which then have greater contact time with epithelial cells ;</p> <p>5 enters nucleus / in contact with DNA ;</p> <p>6 causes <u>mutation</u> ;</p> <p>7 proto-oncogenes to oncogenes ;</p> <p>8 uncontrollable , cell division / mitosis ;</p> <p>9 formation of , tumour / mass of cells ;</p> <p>10 no , programmed cell death / apoptosis ;</p>	5 max	<p>1 <b>IGNORE</b> cigarettes</p> <p>5 'contact with DNA' needs to be stated not implied</p> <p>6 <b>IGNORE</b> description</p> <p>7 <b>ACCEPT</b> switching on (proto)oncogenes</p> <p>8 <b>ACCEPT</b> cell multiplication <b>IGNORE</b> growth <b>IGNORE</b> ref to speed of cell division</p> <p>9 <b>ACCEPT</b> lump (of cells)</p>
		QWC ~ showing link between smoking and lung cancer ;	1	1 mark awarded from mps 1 to 5 <b>and</b> 1 mark awarded from mps 6 to 10

F212

Mark Scheme

June 2011

Question		Expected Answers	Mark	Additional Guidance
5	(c)	<p>1 mouth / tongue / throat / oesophageal , cancer ;</p> <p>2 <u>chronic</u> bronchitis / COPD ;</p> <p>3 emphysema / COPD ;</p> <p>4 <u>a</u>therosclerosis ;</p> <p>5 thrombosis ;</p> <p>6 coronary heart disease / CHD / angina / heart attack / myocardial infarction / MI ;</p> <p>7 stroke ;</p> <p>8 peripheral vascular disease / <u>a</u>rteriosclerosis ;</p>	max 3	<p><b>Mark the first answer on each numbered line.</b></p> <p>1 <b>ACCEPT</b> <u>secondary</u> cancers</p> <p>2 <b>DO NOT CREDIT</b> smoker's cough</p> <p>3 <b>CREDIT</b> COPD once only</p> <p>5 <b>IGNORE</b> thrombus</p> <p>6 <b>IGNORE</b> cardiovascular disease / hypertension / chronic heart disease</p>
		<b>Total</b>	<b>[13]</b>	

F212

Mark Scheme

June 2011

Question			Expected Answers	Mark	Additional Guidance
6	(a)	(i)	<p>3 parts to body ;</p> <p>head + thorax + tail ;</p> <p>segmented ;</p> <p>lateral spines / spines from both sides of head ;</p> <p>thorax / tail , similar shape ;</p>	3 max	<p><b>Mark the first answer on each numbered line.</b></p> <p><b>ACCEPT</b> wherever seen</p> <p><b>ACCEPT</b> 'a lateral spine'</p> <p><b>ACCEPT</b> description of thorax / tail shape</p>
6	(a)	(ii)	<p>anterior spine (from head) on A ;</p> <p>longer lateral spines on B ;</p> <p>less rounded / AW , head on B ;</p> <p>any other reasonable difference ; ;</p>	2 max	<p><b>Mark the first answer on each numbered line.</b></p> <p>Answers must state either species A or species B</p> <p><b>ACCEPT</b> ora throughout</p> <p>e.g. (greater) fusion of tail segments in B</p> <p>grooves around edge of head in B</p> <p>outline of tail section (more) curved in A</p> <p>A has more segments</p> <p><b>CREDIT</b> any clear description of a difference</p>
6	(b)		<p><b>1</b> <i>idea of fossils</i> show changes over time ;</p> <p><b>2</b> <i>idea that</i> there are methods to date fossils ;</p> <p><b>3</b> <i>idea of simplest / most different from modern , species /</i> AW , in oldest rocks ;</p> <p><b>4</b> <i>idea of showing , links / relationships , between , groups /</i> species / organisms / taxa ;</p> <p><b>5</b> many fossils organisms no longer exist ;</p> <p><b>6</b> <i>idea of compare DNA</i> extracted from some fossils ;</p>	2 max	<p><b>2 ACCEPT</b> it is possible to date fossils</p> <p><b>4 ACCEPT</b> ref to common ancestor of two species</p> <p>Answers could refer to links between species A and species B</p>
<b>Total</b>				<b>[7]</b>	



F212

Mark Scheme

June 2011

Question		Expected Answers	Mark	Additional Guidance
7	(a)	<p>X phosphate ;</p> <p>Y <u>deoxyribose</u> ;</p> <p>Z <u>thymine</u> ;</p>	3	<p><b>Mark the first answer for each letter.</b> If the answer is correct and an additional answer is given that is incorrect or contradicts the correct answer then = <b>0 marks</b></p> <p><b>DO NOT CREDIT</b> PO<sub>4</sub> or 'phosphate , molecule / backbone' <b>IGNORE</b> group</p> <p><b>DO NOT CREDIT</b> deoxyribulose <b>IGNORE</b> (pentose) sugar</p> <p><b>DO NOT CREDIT</b> incorrect spelling <b>IGNORE</b> (nitrogenous) base / T</p>

F212

Mark Scheme

June 2011

Question		Expected Answers	Mark	Additional Guidance
7	(b)	1 <u>semi-conservative</u> (replication) ;	6 max	<b>CREDIT</b> answers from clearly labelled diagram <b>IGNORE</b> anything after it becomes clear that a candidate is <b>describing</b> transcription
		2 (double) <u>helix</u> , untwists / uncoils / unwinds / unravels ;		2 <b>IGNORE</b> straightens <b>DO NOT CREDIT</b> $\alpha$ -helix
3 hydrogen bonds (between bases) break ;	3 <b>IGNORE</b> unzips			
4 each strand acts as the <u>template</u> (for the formation of a new molecule) ;				
5 free (DNA) <u>nucleotides</u> (align with exposed bases) ;	5 <b>IGNORE</b> in cytoplasm			
6 complementary base pairing / purine to pyrimidine ;	6 <b>IGNORE</b> A to T / C to G (as given in Q) <b>ACCEPT</b> base pair rule			
7 hydrogen bonds (re)form ;				
8 sugar-phosphate backbone forms / adjacent nucleotides join ;	8 <b>CREDIT</b> formation of phosphodiester bond			
9 <u>DNA</u> polymerase joins , backbone / strands ;	9 <b>ACCEPT</b> in context of H bonds forming			
10 each new molecule has 1 old and 1 new strand ;	10 <b>DO NOT CREDIT</b> half old and half new strand			
11 AVP ;	11 e.g. correct ref to , (DNA) helicase (in context of unwinding or unzipping) / (DNA) ligase ( in context of joining Okazaki fragments or role in backbone formation) / leading or lagging strand / 3' / 5' / antiparallel / activation of free nucleotides / 3 H bonds between C and G / 2 H bonds between A and T / Okazaki fragments / proof reading			
		<b>QWC</b> ~ events in correct sequence so long as no ref to transcription / translation , seen ;	1	1 mark from mps 2 to 4 <b>then</b> 1 mark from mps 5 to 7 <b>then</b> mp 8 or 9
<b>Total</b>			<b>[10]</b>	

F212

Mark Scheme

June 2011

Question		Expected Answers	Mark	Additional Guidance
8	(a)	1 different species ; 2 different genus ; 3 genetically incompatible ;  4 (may have) different number of chromosomes ;  5 physical / behavioural , reason for reproductive incompatibility ;	2 max	3 <b>ACCEPT</b> 'DNA sufficiently different' <b>IGNORE</b> refs to meiosis  4 <b>IGNORE</b> refs to meiosis  5 e.g. eggs remain unfertilised / different incubation patterns <b>IGNORE</b> refs to fertility of offspring
8	(b) (i)	Convention (on) <u>International Trade</u> (in) <u>Endangered Species</u> ;	1	<b>ACCEPT</b> Commission / Conference / Congress <b>ACCEPT</b> Trading <b>DO NOT CREDIT</b> Conservation / Countries
8	(b) (ii)	1 regulate / monitor , <u>trade</u> in selected , species / animals / plants / animal products ;  2 <i>idea of ensuring <u>trade</u> does not put <u>wild populations</u> at risk ;</i> 3 <i>idea of prohibiting <u>commercial trade</u> in wild plants ;</i> 4 <i>idea of allowing <u>trade</u> in <u>artificially</u> propagated plants ;</i> 5 <i>idea of allowing <u>trade</u> in less endangered species subject to permit ;</i>	2 max	<b>Mark the first two answers only.</b> <b>IGNORE</b> trafficking throughout (as in stem)  1 <b>ACCEPT</b> idea of species being on a list <b>ACCEPT</b> endangered <b>ACCEPT</b> prevent <b>IGNORE</b> illegal <b>IGNORE</b> animals / plants unqualified  3 <b>ACCEPT</b> endangered plants

F212

Mark Scheme

June 2011

Question		Expected Answers	Mark	Additional Guidance
8	(c)	<p>unrelated / AW, individuals ;</p> <p>health ; of reproductive age ; selecting individuals of opposite sex (for breeding) ; select higher proportion of females ;</p>	2 max	<p><b>ACCEPT</b> idea of individuals with sufficiently different genes</p> <p><b>ACCEPT</b> 'whether they are healthy (or not)' <b>ACCEPT</b> fertility of individuals</p>
8	(d)	<p>1 bird(s) healthy / quarantine before release ;</p> <p>2 adequate (natural) food supply / provide food (if necessary) ;</p> <p>3 protected reserve / no hunting / no poaching / legal protection ;</p> <p>4 <u>method</u> to monitor population ;</p> <p>5 raise public awareness / educate local population / educate collectors ;</p> <p>6 <u>method</u> to prepare animals for survival in wild ;</p> <p>7 <i>idea of gradual introduction, e.g via semi-wild habitat ;</i></p>	3 max	<p>1 <b>IGNORE</b> refs to ongoing health monitoring</p> <p>3 <b>ACCEPT</b> ref to controlling predators</p> <p>4 e.g. tag birds</p> <p>5 <b>ACCEPT</b> involve local population</p> <p>6 e.g. raise with minimal human contact, predator awareness training <b>ACCEPT</b> teaching it to find food</p>
<b>Total</b>			<b>[10]</b>	

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