

CHERRY HILL TUITION EDEXCEL (B) BIOLOGY A2 PAPER 20 MARK SCHEME

Question Number	Answer	Additional guidance	Mark
1(a)(i)	1. reference to {death / killing / destroying / eq } (of bacteria cells) ; 2. idea that {bacteria / cells} burst ;	1. Ignore reference to stopping growth 2. Accept lysis, loss of osmotic control	(2)

Question Number	Answer	Additional guidance	Mark
1(a)(ii)	1. reference to cells cannot {reproduce / increase in number / produce new cells / multiply / replicate / eq} ; 2. idea of no (cell) division ;	2. Accept no binary fission	(2)

Question Number	Answer	Additional guidance	Mark
1(b)(i)	1. (A and C resistant as) no {clear zone / zone of inhibition / eq} around A and C ; 2. idea that {clear zone / eq} indicates where antibiotic {inhibits growth / kills bacteria / eq} ; 3. {clear zone / eq} around B {smaller/ eq} than clear zone around D ; 4. idea of {size / diameter / width / eq} of clear zone indicates {effectiveness / eq} ; [check diagram for appropriate labels]	1. Accept a clear description of this area around the disc 2. Accept converse 3. Accept converse	(3)

Question Number	Answer	Mark
1(b)(ii)	C reliability ;	(1)

Question Number	Answer	Mark
1(b)(iii)	D validity;	(1)

Question Number	Answer	Additional guidance	Mark
1(c)	<ol style="list-style-type: none"> 1. reference to hospitals {having / changing / eq } a {code of practice / protocol / policy / standards / eq} (for dealing with hospital acquired infections) ; 2. idea of clothing rules for hospital workers ; 3. reference to <u>improved</u> laundry of bed linen e.g. {<u>increased</u> frequency / higher washing temperature / eq} ; 4. reference to use of special {pillow cases / treatment of pillow cases} e.g. microfilters, treated with antibacterials, sterilisation, disposable pillow cases ; 5. reference to use of special procedures when carrying {pillow cases / bed linen} to laundry e.g. sealed plastic bags ; 6. screening of patients / isolation of infected patients / eq ; 7. idea of hand washing regimes / eq ; 	<p>1. Allow references to pillows for pillow cases throughout</p> <p>3. Allow pillow cases should be washed daily</p> <p>7. Allow hands should always be washed</p>	(3)

Question Number	Answer	Mark
2(a)(i)	C T helper cells ;	(1)

Question Number	Answer	Mark
2(a)(ii)	D reverse transcriptase ;	(1)

Question Number	Answer	Additional guidance	Mark
2(b)(i)	<ol style="list-style-type: none"> 1. reference to glycoprotein ; 2. credit detail of structure e.g. specific (3D) shape, L and H regions, Y-shape, 4 (peptide) chains, disulphide bridges between peptides, hinge region ; 3. reference to { antigen-binding site / variable region / Fab (region) / eq } ; 4. idea of antibodies have a { similar / constant / Fc / eq } region; 5. produced by plasma cells / present on B cells ; 6. role of antibody described e.g. opsonisation, immobilisation, agglutination, lysis ; 	<p>1. Accept protein, chains of amino acids</p> <p>2. Ignore active site Accept a Y-shaped drawing</p> <p>3. Accept references to { binding to specific antigen / antigen-specific / antigen receptors }</p> <p>5. Accept present on B effector cells</p>	(2)

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Question Number	Answer	Additional guidance	Mark
<p>2* (b) (ii)</p>	<p>(QWC – answer must be organised in a clear, logical sequence)</p> <ol style="list-style-type: none"> 1. reference to artificial (active) immunity ; 2. reference to {vaccine / vaccination } ; 3. containing {synthetic molecule / (synthetic) antigen / (synthetic) glycoprotein } ; 4. ref to stimulation of the {specific / humoral} immune response (to the synthetic antigen) ; 5. credit detail of process of producing effector B cells e.g. clonal expansion of B cells, involvement of cytokines, T helper cells activate B cells ; 6. reference to (production of B) memory cells ; 7. idea that (2G12) antibodies are produced {faster / in greater concentration} on {reinfection / eq} ; 	<p>Mps are awarded if the statements are clearly expressed</p> <p>5. Ignore references to production of activated T killer cells</p> <p>6. Ignore references to production of T memory cells</p> <p>7. Accept ref to secondary immune response</p>	<p>(5)</p>

Question Number	Answer	Additional guidance	Mark
2(c)	<ol style="list-style-type: none"> 1. idea that HIV infection does not always produce symptoms ; 2. reference to {provirus / latency } ; 3. reference to test needed to detect (symptomless) HIV ; 4. idea that only people who suspect they may have contracted HIV would have a test ; 5. idea that {some people would not want to be tested / impossible to test everyone} ; 6. idea that symptoms are common to other diseases ; 7. {new cases arising/ patients dying} all the time / eq ; 8. idea of new strains of virus arising ; 	2. Accept virus is dormant	(2)

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Question Number	Answer	Additional guidance	Mark
3(a)(i)	<ol style="list-style-type: none"> reference to {polymerase chain reaction / PCR} ; polymerase (enzyme) {added / eq} ; idea of need for primers and nucleotides ; {90-98} (°C) → {50-65} (°C) → {70-75} (°C) ; idea that cycle needs to be repeated {several times / to make several copies of DNA / eq} ; 	1. Accept as a ref to PCR machine	(4)

Question Number	Answer	Additional guidance	Mark
3(a)(ii)	(DNA) {profiling / fingerprinting / (gel) electrophoresis} ;	Ignore Southern blotting, PCR Accept DNA profile / DNA fingerprint	(1)

Question Number	Answer	Additional guidance	Mark
3(b)	<ol style="list-style-type: none"> idea of work appearing in a (Scientific) journal or being presented at a conference ; idea that validity or reliability is considered ; by other scientists / ref to peer review ; 	1. Accept publishing a paper, scientific meeting	(2)

Question Number	Answer	Additional guidance	Mark
3(c)(i)	<ol style="list-style-type: none"> reference to different {conditions / environments /eq} (in each region) ; idea of different selection pressures ; idea of {restricted gene flow / separate gene pools} ; reference to reproductive isolation; 	1. Accept appropriate named factor e.g. temperature 3. Ignore different allele frequency	(2)

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Question Number	Answer	Additional guidance	Mark
3(c)(ii)	1. idea of different {alleles/ gene pool} ; 2. idea that this leads to {new / different} phenotypes ; 3. idea of new {allele / gene} can be {advantage / disadvantage} ; 4. reference to (advantageous) { (mutated) gene / (new) allele} passed onto offspring ;	1. Ignore allele frequency 2. Accept traits / characteristics / features	(2)

Question 4: N/A

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Question Number	Answer	Additional guidance	Mark
5(a)	<ol style="list-style-type: none"> idea that products of light-dependent stage are {needed for / used in / eq} {light-independent stage / Calvin cycle} ; reference to (products of light-dependent stage) are {reduced NADP / eq} and ATP ; reference to use of {reduced NADP / eq} for {reduction / eq} of {carbon dioxide / GP / eq} ; reference to use of ATP as source of energy ; 	<p>3. Accept source of hydrogen ions for GALP Ignore ref to ATP</p>	(3)

Question Number	Answer	Mark
5(b)(i)	D volume of oxygen produced ;	(1)

Question Number	Answer	Additional guidance	Mark
5(b)(ii)	<ol style="list-style-type: none"> (minimum temperature) is {between 0 °C and 10 °C / above 0 °C but less than 10 / 10 °C} ; idea of no photosynthesis at 0°C but photosynthesis is taking place at 10 °C ; reference to no {data / readings / measurements / evidence / eq} between 0 °C and 10 °C ; idea that at 0 °C water is frozen ; 	<p>3. Accept if correct temp range has been given already</p>	(2)

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Question Number	Answer	Additional guidance	Mark
5(b)(iii)	<ol style="list-style-type: none"> reference to abiotic factors {are non-living / non-biological / do not involve organisms / eq} ; idea that other factors need to be kept constant ; 	2. Ignore controlled	(2)

Question Number	Answer	Additional guidance	Mark
5(b)(iv)	<p>Supporting conclusion:</p> <ol style="list-style-type: none"> idea that shape of graph is typical of an enzyme-temperature graph ; rate increases (up to 30 °C) because more {enzyme-substrate complexes / collisions between enzymes and substrates} / eq ; rate decreases (after 30°C) due to enzyme denaturation / eq ; <p>Not supporting conclusion:</p> <ol style="list-style-type: none"> idea that other factors could be affecting photosynthesis ; idea of {gas / oxygen / carbon dioxide} solubility changing with temperature ; idea of {correlation / not causation} ; 	1. idea that rate of photosynthesis is affected by temperature in a similar way to enzymes	(4)

Question 6: N/A

Question Number	Answer	Additional guidance	Mark
7(a)	<ol style="list-style-type: none"> 1. idea of less { stress / trauma / discomfort / depressed / eq} (for the animals) ; 2. idea that animals are more likely to breed in natural environment ; 3. idea that animals may require large areas ; 4. idea that problems of releasing animals back into the wild is avoided eg habituation ; 5. idea that {disease is less likely / disease will not wipe out population} ; 6. idea of allowing (natural) {interspecific relationships / communities} to exist ; 7. idea of allowing (natural) {intraspecific relationships / family / social / eq} {structure/ behaviour} ; 8. (because) large numbers of animals needed / wider gene pool / eq ; 9. idea that (natural) {diet / food / eq} available ; 	<p>Accept converse argument throughout</p> <p>6. Accept reference to maintaining their niche</p>	(3)

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Question Number	Answer	Additional guidance	Mark
7* (b)	<p>(QWC– Spelling of technical terms (<i>in italics</i>) must be correct)</p> <ol style="list-style-type: none"> 1. reference to <i>succession</i> ; 2. reference to (<i>forensic</i>) <i>entomology</i> ; 3. example of {insect / eq} e.g. <i>fly, beetle, wasp</i> ; 4. idea that the {types / <i>species</i> / life cycle stages} (of insects) are used ; 5. reference to {<i>decomposition</i> / <i>decay</i> / eq} ; 6. idea that there are different stages of {<i>decomposition</i> / <i>decay</i> / eq} ; 7. detail of {<i>decomposition</i> / <i>decay</i> / eq} e.g. production of <i>gases, liquefaction of tissue, bloating, discolouration</i> ; 8. reference to rate of {<i>succession</i> / <i>insect development</i> / <i>decomposition</i>} influenced by {external factor / appropriate named factor} ; 9. idea that insect and decomposition information is used to determine time of death ; 	<p>Penalise spelling once</p> <p>1. Accept in context of either insects or decomposition</p> <p>3. Named insect must be spelt correctly</p> <p>6. Accept if 2 or more stages listed</p> <p>8. Named <i>factor</i> must be spelt correctly</p>	(5)

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Question Number	Answer	Additional guidance	Mark
8(a)(i)	<ol style="list-style-type: none"> idea that interferon involved in viral infections, lysozyme affects bacteria; idea of interferon produced by infected cells, lysozyme present in {secretions / phagocytes / neutrophils / macrophages / eq }; interferon {inhibits / eq} {replication / eq} of viruses, lysozyme {kills / destroys} bacteria; 	<p>Piece together throughout Accept lysosome throughout Ignore pathogen throughout</p> <p>2. Accept named secretion {produced / released}</p> <p>3. Accept a reference to lysozyme destroying cell walls</p>	(3)

Question Number	Answer	Additional guidance	Mark
8(a)(ii)	<ol style="list-style-type: none"> reference to (lysozyme) is an enzyme ; idea that {proteins / active sites / enzymes} have a specific shape ; idea that lysozyme acts on cell wall ; of bacteria ; 	<p>Accept lysosome in this context</p>	(4)

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Question Number	Answer	Additional guidance	Mark
8(b)(i)	<ol style="list-style-type: none"> reference to histamine released as a result of damaged {tissue / cells} ; (histamine released from) {basophils / mast cells / platelets} ; detail of effect of histamine e.g arterioles dilate, vasodilation, increased blood flow, capillaries more permeable ; named effect of inflammation e.g. {oedema / swelling /redness / heat / pain / eq} ; 	<p>2. Accept white blood cells, macrophages and neutrophils</p> <p>4. Accept raises temperature</p>	(3)

Question Number	Answer	Additional guidance	Mark
8(b)(ii)	<ol style="list-style-type: none"> idea of (only) {a local reaction produced / histamines produced around bite area} ; idea that cream {has been applied to actual site of production of histamine} ; idea of {effect / treatment / relief / eq} {more rapid / immediate / eq} ; idea of higher concentration of antihistamine at site ; idea that the antihistamines will not be {digested (by enzymes) / destroyed (by acid / enzymes) / eq} ; idea that tablets may lower immune response generally / lead to side-effects ; 	2-6 Accept converse	(3)