

CHERRY HILL TUITION EDEXCEL (B) BIOLOGY A2 PAPER 25 MARK SCHEME

Question Number	Answer	Mark
1(a)	D ;	(1)

Question Number	Answer	Mark
1(a)	B ;	(1)

Question Number	Answer	Mark
1(a)	C ;	(1)

Question Number	Answer	Mark
1(a)	A ;	(1)

Question Number	Answer	Mark
1(b)	<ol style="list-style-type: none"> 1. reference to (electrical) insulation / eq ; 2. reference to depolarisation at nodes ; 3. impulse jumps from node to node / eq ; 4. saltatory conduction ; 5. reference to faster conduction ; 	(4)

Question Number	Answer	Mark
1(c)	<ol style="list-style-type: none">1. idea that phospholipid restricts ion movement / eq ;2. proteins span the membrane / eq ;3. idea that sodium potassium pump moves ions / eq ;4. (protein) {gates / channels} allow {diffusion / movement} of ions / eq ;	(3)

Question Number	Answer	Mark
2(a)	shoot bends to right /eq ;	(1)

Question Number	Answer	Mark
* 2(b) QWC	<p>(QWC - Spelling of technical terms (<i>shown in italics</i>) must be correct and the answer must be organised in a logical sequence)</p> <ol style="list-style-type: none"> 1. reference (photo)tropism ; 2. light causes {redistribution / eq} of {auxin / IAA / eq} ; 3. high concentration {away from light / in block B} / eq ; 4. (auxin / eq) diffuses (down) into shoot ; 5. stimulates cell elongation / eq ; 6. description of change in cell e.g. fewer cross links in cellulose, cell wall more plastic, acidification, stimulation of enzyme production, vacuolation ; 7. {side away from / eq} light longer / eq ; 	(4)

Question Number	Answer	Mark
2(c)	<ol style="list-style-type: none"> 1. both chemical / eq ; 2. both transported away from production site / eq ; 3. comparison of mechanism of transport described e.g. diffusion in plants, blood system in animals ; 4. speed of action compared e.g. slower in plants, some animal hormones are faster ; 5. duration of effect compared e.g. some animal hormones have a shorter term effect ; 6. idea that this plant response involves {growth / cell elongation} only e.g. animal hormones do not just affect growth ; 7. comparison of stimuli ; 	(4)

Question Number	Answer	Mark
3(a)(i)	<ol style="list-style-type: none"> 1. breath identified ; 2. reference to time (for one / several peaks) ; 3. ref method for tidal volume e.g. height from peak to trough on trace ; 4. reference to calibration for volume ; 	(3)

Question Number	Answer	Mark
3(a)(ii)	breathing rate x tidal volume / eq ;	(1)

Question Number	Answer	Mark
3(b)(i)	stroke volume / strength of (cardiac) muscle contraction / blood viscosity / size {atria/ventricles/chambers} / adrenaline / eq ;	(1)

Question Number	Answer	Mark
3(b)(ii)	<ol style="list-style-type: none"> 1. there is little difference in ventilation rate / does not increase as much / eq ; 2. oxygen uptake increases / eq ; 3. credit use of manipulated figures ; 	(3)

Question Number	Answer	Mark
3(b)(iii)	<ol style="list-style-type: none"> 1. idea that there is more blood passing through (lungs) / eq ; 2. oxygen diffuses into blood / eq ; 3. {diffusion/eq} gradient being maintained / eq ; 4. oxygen (diffuses) in faster / eq ; 	(3)

Question Number	Answer	Mark
3(b)(iv)	<ol style="list-style-type: none"> 1. increased heart rate (from 50-100) {increases oxygen uptake / increases ventilation rate less} / eq ; 2. idea that heart rate has a greater effect on oxygen uptake than on ventilation rate ; 	(2)

Question Number	Answer	Mark
4(a)	C ; A ; D ;	(3)

Question Number	Answer	Mark
4(b)(i)	<ol style="list-style-type: none"> 1. high frequency of impulses / eq ; 2. {depletes /eq} neurotransmitter / eq ; 3. calcium ion channels do not open / are less responsive / eq ; 4. reference to synapse / synaptic {membrane / knob / eq } ; 5. (post synaptic) membrane not depolarised / eq ; 6. impulses do not reach gill / eq ; 	(3)

Question Number	Answer	Mark
4(b)(ii)	<ol style="list-style-type: none"> 1. avoids wasted {effort / time / resources / eq} / eq ; 2. to {non-threatening / unimportant / eq} stimulus / eq ; 3. reference to natural frequent stimuli e.g. wave action ; 	(2)

Question 5: N/A

Question Number	Answer	Mark
6(a)	<ol style="list-style-type: none"> 1. more {muscle contraction / respiration} / eq ; 2. idea that heat energy released ; 3. idea that more heat produced than lost ; 	(2)

Question Number	Answer	Mark
6(b)	<ol style="list-style-type: none"> 1. ref to {detection of temperature change / temperature receptors} ; 2. reference hypothalamus ; 3. more sweating / eq ; 4. loss of heat due to evaporation (of water) / eq ; 5. vasodilation (of arterioles) / eq ; 6. loss of radiant heat / eq ; 7. heat gained equal heat lost / eq ; 8. reference negative feedback ; 9. behavioural heat loss mechanism described / eq ; 	(5)

Question Number	Answer	Mark
6(c)	<ol style="list-style-type: none"> 1. idea of dehydration ; 2. no longer sweating / eq ; 3. cooling mechanisms failing / eq ; 4. heat production greater than heat loss / eq ; 5. increase of pace / eq ; 	(2)

Question Number	Answer	Mark
7(a)	<ol style="list-style-type: none">1. reference to epo receptor ;2. (gene) transcription stops / eq ;3. reference to role of {transcription factors / repressors} ;4. no mRNA produced / eq ;5. no translation (of mRNA) / eq ;	(3)

Question Number	Answer	Mark
*7(b) QWC	<p>(QWC - Spelling of technical terms (<i>shown in italics</i>) must be correct and the answer must be organised in a logical sequence)</p> <p>General:</p> <ol style="list-style-type: none"> reference <i>antigens</i> (on the virus) ; reference to <i>antigen</i> presentation ; {stimulation / activation / eq} of {<i>lymphocytes</i> / T cell / B cell} / eq ; proliferation (of <i>lymphocytes</i>) qualified / eq ; leads to {<i>cell mediated</i> / <i>humoral</i>} response ; <p>Cell mediated:</p> <ol style="list-style-type: none"> reference T killer cells ; causes virus-infected cell lysis / eq ; <p>Humoral :</p> <ol style="list-style-type: none"> reference to {<i>plasma</i> cells / B <i>effector</i> cells}; {produce / release / eq} (<i>antigen</i> specific) <i>antibodies</i> ; description of <i>antibody</i> action ; reference to {<i>phagocytosis</i> / <i>macrophage</i> action} ; Reference to <i>interferon</i> action ; 	(5)

Question Number	Answer	Mark
7(c)	<ol style="list-style-type: none"> {DNA / eq} degrades / eq ; (modified) cells die / eq ; reference to (modified) cells removed by immune response ; reference to {DNA / eq} lost from cells ; 	(2)

Question Number	Answer	Mark
7(d)	<ol style="list-style-type: none"> 1. reference to effect on artery walls / eq ; 2. damages endothelium / eq ; 3. triggers inflammation / eq ; 4. starts formation of atheroma / eq ; 5. idea that artery narrows leading to (further) increase in blood pressure ; 	(3)

Question Number	Answer	Mark
7(e)	arterioles / arteries ;	(1)

Question Number	Answer	Mark
7(f)	post transcription modification of RNA / mutation / eq ;	(1)

Question Number	Answer	Mark
7(g)	<p>Any 3 from the following:</p> <p>Drugs: epo, steroids, IGF, insulin, velcade, astemizole, other growth factors, antibodies to myostatin, to block atrogen 1 protein</p> <p>Gene therapy: {epo, IGF, MGF} gene</p> <p>Atrophy treatment to block out any of the following: Foxo, Atrogens, {Atrogen 1/MAFbx}, muRF1, Ubiquitin ligase, UPP pathway, erg1(a) ; ; ;</p>	(3)

Question Number	Answer	Mark
7(h)	<ol style="list-style-type: none"> 1. prevent unfair advantage / eq ; 2. prevent risk to their health / eq ; 	(2)

Question Number	Answer	Mark
7(i)	<ol style="list-style-type: none"> 1. enzymes ; 2. break peptide bonds / eq ; 3. ref hydrolysis ; 	(2)

Question Number	Answer	Mark
7(j)	<ol style="list-style-type: none"> 1. redistribution of ions / eq ; 2. across the cell membrane /eq ; 3. causes {change in / different} potential difference / return to resting potential ; 	(2)

Question Number	Answer	Mark
7(k)	<ol style="list-style-type: none"> 1. {provide / eq} ATP ; 2. reference to aerobic respiration / eq ; 3. for contraction / (pumping) Ca²⁺ back into sarcoplasmic reticulum / eq ; 	(2)

Question Number	Answer	Mark
7(l)	<ol style="list-style-type: none">1. mother has heterozygous genotype / eq ;2. father has heterozygous genotype / eq ;3. correct gametes ;4. genotype of boy identified as homozygous / eq ;5. reference to mutation arising in sperm / fathers germ cell ;	(4)

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Question Number	Answer	Mark
8(a)	<ol style="list-style-type: none"> 1. idea that individuals of a species can {interbreed / eq} ; 2. to produce fertile {offspring / eq} ; 3. the {hybrids / offspring} can flower and produce viable seeds / eq ; 	max (3)

Question Number	Answer	Mark
8(b)(i)	<ol style="list-style-type: none"> 1. {variety / eq} of alleles ; 2. in a gene pool / eq ; 	(2)

Question Number	Answer	Mark
8(b)(ii)	<ol style="list-style-type: none"> 1. different alleles in each of the two {populations / eq} ; 2. each {population / species} is adapted to live {in different environmental conditions / at different altitudes / eq} ; 3. there will have been different mutations in each population ; 4. reference to alleles from different {species / eq } will mix / hybrids receive alleles from both { species / eq} ; 	max (2)

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*8(c) QWC	<p>(QWC - Spelling of technical terms must be correct and the answer must be organised in a logical sequence)</p> <ol style="list-style-type: none">1. reference to original population increasing in size and spreading into a wider diversity of {habitats / eq} ;2. reference to mutations ;3. leading to diversity in flowering times / eq ;4. (and) other plant features / eq ;5. reference to reproductive isolation ;6. restriction in gene flow / eq ;7. between extremes of population / eq ;8. reference to different environmental factors in each region ;9. each region has different selection pressures / eq ;10. idea of plants adapted to a region ;11. reference to survival and breeding ;12. reference to change in allele frequencies (over time) ;13. (leads to) differences between gene pools / eq ;	max (6)

Question Number	Answer	Mark
9(a)(i)	(the total of) all the alleles in a {population / eq} ;	(1)

Question Number	Answer	Mark
(a)(ii)	the {proportion of / number of times occurring / eq} for one allele within a {gene pool / population / eq} ;	(1)

Question Number	Answer	Mark
9(b)(i)	<ol style="list-style-type: none">1. if allowed to interbreed / eq ;2. sub-species could (probably) produce fertile offspring / eq ;	(2)

Question Number	Answer	Mark
9(b)(ii)	<p>(QWC - Spelling of technical terms must be correct and the answer must be organised in a logical sequence)</p> <ol style="list-style-type: none"> 1. reference to a few (<i>ancestral</i>) boar reaching the island ; 2. reference to (two populations) {<i>geographical</i> separation / separated by the sea / volcanic eruptions / eq} ; 3. populations {cannot <i>interbreed</i> / eq} ; 4. idea of gene flow between populations {prevented / restricted} ; 5. only a small number (on island) of other boar for breeding / reference to <i>founder</i> effect / eq ; 6. reference to {restricted / limited / eq} variety of <i>alleles</i> / eq ; 7. reference to <i>mutations</i> ; 8. different {<i>environmental</i> conditions / <i>selection pressures</i> / eq} on island different from mainland ; 9. reference to changes in <i>allele frequencies</i> ; 10. (leads to) {<i>phenotypic</i> / <i>physiological</i> / <i>physical</i> / <i>behavioural</i>} changes ; 11. reference to possibility of (<i>allopatric</i>) <i>speciation</i> ; 	max (5)

Question Number	Answer	Mark
9(b)(iii)	<ol style="list-style-type: none">1. reference to {bands / eq} produced ;2. reference to {bands / eq} at certain {positions / eq} ;3. common {bands / eq} contain similar {DNA fragments / eq} ;4. idea that the more similar the patterns the {closer the relationship / more likely to have {recent / eq} common ancestor} ;5. idea that very few differences if still a sub-species ;	max (3)