

CHERRY HILL TUITION EDEXCEL (B) BIOLOGY A2 PAPER 30 MARK SCHEME

Question number	Answer	Mark
1(a)(i)	C	(1)

Question number	Answer	Mark
1(a)(ii)	A	(1)

Question number	Answer	Mark
1(a)(iii)	D	(1)

Question number	Answer	Mark
1(b)(i)	<ol style="list-style-type: none"> 1. Idea that lack of (visual) stimulation limits brain development ; 2. Idea that this due to of lack of connections ; 3. within the {visual cortex / eq} / eq ; 4. Idea that the brain cannot interpret this visual information correctly / eq ; 5. reference to critical {period / window} ; 6. idea that mice are different from humans ; 	(3)

Question number	Answer	Mark
1(b)(ii)	<ol style="list-style-type: none"> 1. Idea that embryo supplies cells ; 2. Idea that some people have {ethical / eq} objections to the use of embryonic cells / eq ; 3. Idea of objections to the use of animals ; 4. Idea of risk of stem cells becoming cancerous ; 	(2)

Question number	Answer	Mark
1(c)(i)	<ol style="list-style-type: none">1. Idea that (cerebral hemisphere) is the site of vision perception ;2. reference to visual cortex / eq ;3. idea that stem cells differentiate ;4. this treatment will help to establish (neurone) connections / eq ;5. Idea that can not get stem cells to this location any other way (than injection) ;	(2)

Question number	Answer	Mark
1(c)(ii)	<ol style="list-style-type: none">1. reduce number of variables / to keep all variables constant / eq ;2. so that only the effect of the {treatment / eq} is measured / eq ;	(2)

Question 2: N/A

Question number	Answer	Mark
3(a)(i)	<ol style="list-style-type: none"> 1. idea that sample size is enough ; 2. comment on the accuracy of measurement / eq ; 3. standard deviations are small / eq ; 	(2)

Question number	Answer	Mark
3(a)(ii)	<ol style="list-style-type: none"> 1. $(9.35 \div 10.22)$; 2. $(0.91487) \times 100 = 91.5$ (%) ; 	(2)

Question number	Answer	Mark
3(a)(iii)	<ol style="list-style-type: none"> 1. men are faster than women / eq ; <p>Any one from:</p> <ol style="list-style-type: none"> 2. idea of differences in body structure e.g. men have more muscle, longer legs, more fast twitch fibres ; 3. idea of differences in physiology e.g. testosterone ; 	(2)

Question number	Answer	Mark
3(b)	<ol style="list-style-type: none">1. marathon distance greater / eq ;2. Idea that more aerobic respiration is needed ;3. to {reduce / eq} production of lactate ;4. anaerobic respiration not efficient enough / eq ;5. {oxygen debt / lactate levels} cannot be sustained over this distance / eq ;6. idea that marathon runners use slow twitch fibres ;	(3)

Question number	Answer	Mark
4(a)(i)	<ol style="list-style-type: none"> 1. idea that people are more likely to have obsessive compulsive disorder if they have a close relative with the condition ; 2. credit manipulation of figures i.e. 100 times more likely ; 3. therefore they may also have the {genes / alleles / genotype / eq} for this condition / eq ; 	(2)

Question number	Answer	Mark
4(a)(ii)	<ol style="list-style-type: none"> 1. idea that if they have a close relative with this illness, the risk {ought to be higher than / is only} 10% ; 2. therefore other factors must be involved as well / eq ; 3. named example of environmental influence e.g. learnt behaviour ; 	(2)

Question number	Answer	Mark
4(a)(iii)	<ol style="list-style-type: none"> 1. neurotic depression ; 2. {little / eq} difference between {population as a whole / females} and close relative data / eq ; 	(2)

Question 5 & 6 : N/A

Question number	Answer	Mark
7 (a)	<ol style="list-style-type: none"> Idea that animals are being mistreated e.g. caused stress, pain ; idea that it is not ethical ; research topic might not be regarded as essential / eq ; 	(2)

Question number	Answer	Mark
7 (b)(i)	<ol style="list-style-type: none"> effect on heart described e.g. increase heart rate / increased cardiac output ; idea of acts as neurotransmitter/ effect on sites of control e.g. increased SAN activity, excitatory centre, sympathetic nerves ; idea of vasodilation ; increase in blood pressure / eq ; 	(2)

Question number	Answer	Mark
7 (b)(ii)	<ol style="list-style-type: none"> (increased blood flow) provides more {glucose / oxygen} / enables more {respiration/ energy release} ; for muscle used in "food hunt" / eq ; 	(2)

Question number	Answer	Mark
8 (a)	<ol style="list-style-type: none"> 1. {stiffness / rigidity} (of muscles) / eq ; 2. tremor (of muscles) / eq ; 3. slowness of movement / bradykinesia / eq ; 4. poor balance / postural instability / eq ; 5. walking problems / akinesia / eq ; 6. depression / eq ; 7. speech problems / eq ; 8. swallowing difficulty / dysphagia / eq ; 	(2)

Question number	Answer	Mark
8 (b)	<ol style="list-style-type: none"> 1. dopamine agonists {mimic/ eq} dopamine / eq ; 2. they bind to dopamine receptors at {synapses / eq} / eq ; 3. they trigger action potentials / eq ; 	(2)

Question number	Answer	Mark
8 (c)	<ol style="list-style-type: none"> 1. L-Dopa can pass into the brain / eq ; 2. L-Dopa is converted into dopamine / eq ; 3. dopamine triggers action potentials at synapses / eq ; 4. {alleviates / eq} symptoms / eq ; 	(3)

Question number	Answer	Mark
8 (d)	<ol style="list-style-type: none"> 1. can help to {reduce / manage / eq} symptoms / eq ; 2. idea of no side effects ; 3. prevention of {decline / eq} ; 4. idea of effects immediate ; 5. economic benefits qualified e.g. return to work ; 6. social benefit qualified e.g. better quality of life ; 	(3)

Question number	Answer	Mark
8 (e)	<ol style="list-style-type: none"> 1. stereotactic frame allows {more accuracy / less damage / eq} / eq ; 2. almost any area of the brain can now be {stimulated / eq} ; 3. {more / stated} disorders can be treated e.g. cluster headaches, phantom pains ; 	(2)

Question number	Answer	Mark
8 (f)	<ol style="list-style-type: none"> 1. brain cells have a potential difference across their membrane / eq ; 2. electrical stimulation above a threshold level / eq ; 3. causes {depolarisation / action potentials} / eq ; 4. the membrane is then repolarised / eq ; 	(3)

Question number	Answer	Mark
8 (g)	<ol style="list-style-type: none"> 1. brain has no pain receptors / eq ; 2. {local anaesthetic / eq} used / pain receptors de-sensitised ; 3. sense organs are elsewhere e.g. skin, scalp ; 	(2)

Question number	Answer	Mark
8 (h)	(Jamie) can give feedback during the operation / eq ;	(1)

Question number	Answer	Mark
8 (i)	<ol style="list-style-type: none"> 1. {neurotoxin / MPTP} destroys the dopaminergic cells / eq ; 2. in the {basal ganglia / substantia nigra} ; 3. creating Parkinsonian symptoms (in monkeys) / eq ; 	(2)

Question number	Answer	Mark
8 (j)	<ol style="list-style-type: none"> 1. connection means that {both / globus pallidus external segment} could be related to Parkinson's / eq ; 2. stimulation of either could be beneficial / eq ; 3. idea of larger target area ; 4. greater chance of success of treatment / eq ; 	(2)

Question number	Answer	Mark
8 (k)	<ol style="list-style-type: none"> 1. haemoglobin (without oxygen) absorbs the signal / oxyhaemoglobin does not / eq ; 2. fMRI measures oxygen {uptake / change / eq} ; 3. More brain activity /eq ; 4. lower signal means higher brain activity / eq ; 	(3)

Question number	Answer	Mark
8 (l)	<ol style="list-style-type: none"> 1. fMRI can only measure events every 0.25 seconds (250ms) ; 2. DBS involves (transient) {events / effects / changes / neural activity / eq} that last a few milliseconds / eq ; 3. idea that fMRI is not fast enough to pick up changes due to DBS ; 	

Question number	Answer	Mark
8 (m)	<ol style="list-style-type: none"> 1. person taking the placebo does respond / eq ; 2. idea that placebo should produce no effect ; 	(2)

Question number	Answer	Mark
8 (n)	DBS produces an immediate observable effect / no other cause of the effect / eq ;	(1)

Question Number	Answer	Mark
9(a)(i)	<ol style="list-style-type: none"> 1. reference to {metabolism / named example / eq} {stops / is slow / eq} ; <p>(below 0°C)</p> <ol style="list-style-type: none"> 2. enzymes are inactive / cells disrupted / eq ; <ol style="list-style-type: none"> 3. reference to cause of {inactivity / cell disruption} e.g. water freezes, lower kinetic energy ; <p>(above 40°C)</p> <ol style="list-style-type: none"> 4. enzymes {denature / change 3D shape / eq} ; 5. reference to consequences of denaturation e.g. fewer enzyme-substrate complexes possible, change in active site, change in bonding ; 	(2)

Question Number	Answer	Mark
9(a)(ii)	<ol style="list-style-type: none"> 1. (carbon dioxide and / or methane) are greenhouse gases / eq ; 2. which {absorb / trap / eq} {heat / infra red / IR / long wave} (radiation) / eq ; 3. {reflected / (re)radiated} from the Earth's surface / eq ; 4. prevent {heat / infra red / IR / long wave / eq} (radiation) escaping ; 5. idea of temperatures maintained higher (than they would be) ; 	(3)

Question Number	Answer			Mark
9(a)(iii)	Technique	Could provide evidence	Would not provide evidence	
	Amniocentesis		✓	
	Dendrochronology	✓		
	Peat-bog pollen analysis	✓		
	Potassium-argon dating		✓	
				(2)

Question Number	Answer	Mark
* 9(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. carbon dioxide produced {by using / in production of / eq} fossil fuels / eq ; 2. no (direct) evidence that increased carbon dioxide leads to global warming / eq ; 3. reference to carbon dioxide released from {other processes / named process} ; 4. idea of removal of {carbon sinks / named example / eq} (also) leads to increase in carbon dioxide ; 5. stated example of any other greenhouse gas released from another source e.g. CFC, water vapour, methane ; 6. description of source e.g. ruminant animals, paddy fields, melting ice, clearance of peat land ; 7. idea of natural {cycles / events / phenomena / eq} may be involved (in global warming) e.g. solar, volcanoes ; 8. idea of evidence from past is being used ; 9. idea of {(past evidence) is not in indicator of future events / limitations of (climatic) models} ; 10. idea that scientists may be biased ; 11. description of bias e.g. employed by {company / country} with vested interest, self promotion ; 12. specific example of problem with / disadvantage of} alternative source of energy ; 	(6)

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

Question Number	Answer	Mark
10(b)	D ;	(1)

Question Number	Answer	Mark
*10 (c) 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>succession described:</p> <ol style="list-style-type: none"> 1. reference to lichens and mosses as <u>pioneer</u> community ; 2. able to grow in {little / no} soil / eq ; 3. (that) breaks up (rock) fragments / forms {thin / shallow / eq} soil; 4. reference to {plants / eq} with {small / short / eq} roots ; 5. (able to) grow in {thin / shallow / eq} soil / eq ; 6. idea that changes in soil structure enable {trees / shrubs} to grow / eq ; <p>general points:</p> <ol style="list-style-type: none"> 7. reference to soil able to {hold / retain / contain / eq} {water / minerals} ; 8. as plants {lose leaves / die / decay / eq} ; 9. reference to {organic matter / humus / eq} {increases / released / eq} ; 10. reference to competition effects ; 	(5)

Question Number	Answer	Mark
10 (d)	<p>1. climax (community) ;</p> <p>Any three from:</p> <p>2. includes (both) animals and plants / has many species / has high biodiversity / eq ;</p> <p>3. reference to {interaction / eq} between species / eq ;</p> <p>4. idea of balanced equilibrium of species ;</p> <p>5. reference to {dominant / codominant} (plant or animal) species ;</p> <p>6. reference to stable if no {change to environment / human influence} ;</p>	(4)

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

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

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

Question Number	Answer	Mark
11(b)(i)	<ol style="list-style-type: none"> 1. humans more closely related to chimp (than to orang utan and gorilla) / eq ; 2. reference to humans and chimps more closely related to orang utan than gorilla ; 3. reference to similarity of sequence indicates closeness of ancestral relationship / eq ; 4. human and chimp sequence identical / eq ; 5. orang utan has one difference, gorilla has two differences / eq ; 6. reference to {number 19 for orang utan / number 9 and 19 for gorilla} different ; 	(4)

Question Number	Answer	Mark
11(b)(ii)	<ol style="list-style-type: none"> 1. reference to similarity (of DNA) indicates closeness of relationship ; 2. because genes are sections of DNA / eq ; 3. genes are the codes for protein / eq ; 	(2)

Question Number	Answer	Mark
11(b)(iii)	<ol style="list-style-type: none"> 1. reference to source of DNA sample, e.g. blood, saliva, semen ; 2. reference to small samples of DNA can be amplified by PCR ; 3. reference to use of (restriction / eq) enzymes to {break / eq} DNA ; 4. reference to use of {electro potential / potential difference / eq} ; 5. reference to {treatment / staining / eq} ; 6. show up as {bands / bars / eq} ; 7. reference to the {number of bands / eq} that match indicates similarity of the DNA ; 	(3)