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Mark Scheme (Results)

January 2012

GCE Biology (6BI05) Paper 01
Energy, Exercise and Coordination

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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)	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)	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)

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Question number	Answer	Mark
1(c)(i)	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)	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)

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Question number	Answer	Mark
2 (a)* QWC	**(QWC – Spelling of technical terms** *(shown in italics)* **must be correct and the answer must be organised in a logical sequence)** 1. idea that energy obtained from ATP ; 2. idea that ATP already in muscle cells e.g. ATP store ; 3. ATP from {*glycolysis*/ substrate level *phosphorylation*/ eq} ; 4. idea that *glycolysis* produces ATP {rapidly / eq} ; 5. idea that some {*aerobic respiration* / eq} due to some oxygen present ; 6. *glycolysis* occurs in *cytoplasm* / eq ; 7. idea of need to recycle NAD^+ ; 8. idea that *pyruvate* is converted to *lactate* ; 9. reference to *anaerobic respiration* ; 10. idea of *lactate* tolerance ; 11. reference to fast *twitch* {muscle / fibres} ; 12. reference to {*creatine phosphate* / eq} ;	(6)

Question number	Answer	Mark
2 (b)(i)	1. (lactate build up) causes {drop in pH / more acidic / increase H^+ /eq} ; 2. idea of this affects enzyme {activity / shape / eq} ; 3. this slows down {glycolysis / ATP production / anaerobic respiration / eq} ; 4. reference to muscle contractions being affected ;	(2)

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Question number	Answer	Mark
2 (b)(ii)	1. reference to lactate in the blood / eq ; 2. {transported to / broken down in / eq} liver ; 3. lactate is {converted to pyruvate / eq} ; 4. this involves {oxidation / production of reduced NAD / eq} ; 5. pyruvate is then {oxidised / eq} ; 6. reference to Krebs cycle ; 7. {this requires extra oxygen / reference oxygen debt} / eq ; 8. idea that carbon dioxide and water are produced ;	(4)

Question number	Answer	Mark
3(a)(i)	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)	1. (9.35 ÷10.22) ; 2. (0.91487) × 100 = 91.5 (%) ;	(2)

Question number	Answer	Mark
3(a)(iii)	1. men are faster than women / eq ; Any **one** from: 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)

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Question number	Answer	Mark
3(b)	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)	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)	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)	1. neurotic depression ; 2. {little / eq} difference between {population as a whole / females} and close relative data / eq ;	(2)

Question number	Answer	Mark
5(a) (i)	Any **one** from: 1. reduces {volume / pressure of gas} / eq ; 2. allows {measurement of oxygen used / movement of liquid / eq} ;	(1)

Question number	Answer	Mark
5(a) (ii)	1. returning the coloured liquid back to zero / eq ; 2. idea of calibration ; 3. repetition / eq ;	(2)

Question number	Answer	Mark
5(b)* QWC	**(QWC – Spelling of technical terms** *(shown in italics)* **must be correct and the answer must be organised in a logical sequence)** 1. reference to constant temperature ; 2. use of water bath / eq ; 3. reference to {suitable / stated / fixed time / eq} ; 4. Reference to measuring {volume / distance} ; 5. description of how to obtain volume ; 6. calculation of rate described / eq ; 7. reference to replicates ; 8. description of control e.g. no woodlice ; 9. idea of welfare of animals important ; 10. reference to {mass / eq} of woodlice ;	(6)

Question number	Answer	Mark
6(a)(i)	D	(1)

Question number	Answer	Mark
6(a)(ii)	B	(1)

Question number	Answer	Mark
6(a)(iii)	B	(1)

Question number	Answer	Mark
6(a)(iv)	D	(1)

Question number	Answer	Mark
6(a)(v)	A	(1)

Question number	Answer	Mark
6(a)(vi)	C	(1)

Question number	Answer	Mark
7 (a)	1. Idea that animals are being mistreated e.g. caused stress, pain ; 2. idea that it is not ethical ; 3. research topic might not be regarded as essential / eq ;	(2)

Question number	Answer	Mark
7 (b)(i)	1. effect on heart described e.g. increase heart rate / increased cardiac output ; 2. idea of acts as neurotransmitter/ effect on sites of control e.g. increased SAN activity, excitatory centre, sympathetic nerves ; 3. idea of vasodilation ; 4. increase in blood pressure / eq ;	(2)

Question number	Answer	Mark
7 (b)(ii)	1. (increased blood flow) provides more {glucose / oxygen} / enables more {respiration/ energy release} ; 2. for muscle used in “food hunt”/ eq ;	(2)

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Question number	Answer	Mark
8 (a)	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)	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)	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)	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)	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)	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)	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)

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

Question number	Answer	Mark
8 (i)	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)	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)	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)

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Question number	Answer	Mark
8 (l)	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)	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)

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