

Mark Scheme (Final)

Summer 2008

GCE

GCE SNAB Biology (6135/01)

General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

GENERAL INFORMATION

The following symbols are used in the mark schemes for all questions:

Symbol	Meaning of symbol
; semi colon	Indicates the end of a marking point
eq	Indicates that credit should be given for other correct alternatives to a word or statement, as discussed in the Standardisation meeting
/ oblique	Words or phrases separated by an oblique are alternatives to each other
{ } curly brackets	Indicate the beginning and end of a list of alternatives (separated by obliques) where necessary to avoid confusion
() round brackets	Words inside round brackets are to aid understanding of the marking point but are not required to award the point
[] square brackets	Words inside square brackets are instructions or guidance for examiners

Crossed out work

If a candidate has crossed out an answer and written new text, the crossed out work can be ignored. If the candidate has crossed out work but written no new text, the crossed out work for that question or part question should be marked, as far as it is possible to do so.

Spelling and clarity

In general, an error made in an early part of a question is penalised when it occurs but not subsequently. The candidate is penalised once only and can gain credit in later parts of the question by correct reasoning from the earlier incorrect answer.

No marks are awarded specifically for quality of language in the written papers, except for the essays in the synoptic paper. Use of English is however taken into account as follows:

- the spelling of technical terms must be sufficiently correct for the answer to be unambiguous
e.g. for amylase, 'ammalase' is acceptable whereas 'amylose' is not
e.g. for glycogen, 'glicojen' is acceptable whereas 'glucagen' is not
e.g. for ileum, 'illeum' is acceptable whereas 'ilium' is not
e.g. for mitosis, 'mytosis' is acceptable whereas 'meitosis' is not
- candidates must make their meaning clear to the examiner to gain the mark.
- a correct statement that is contradicted by an incorrect statement in the same part of an answer gains no mark - irrelevant material should be ignored.

PRE-STANDARDISATION MARK SCHEME - UNIT SN5
(6135/01)
A2 BIOLOGY (Salters-Nuffield) June 2008

STRICTLY CONFIDENTIAL

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This paper is to be standardised online - further details will follow.

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Question Number	Answer	Mark
1(a)	<ol style="list-style-type: none"> reference to columns being {smaller / narrower /eq}(in visual cortex for left eye) /converse ; (sensory) {neurone / axon} {shorter neurone / reduced growth} (for left / deprived eye) converse ; {fewer / shorter dendrites} / fewer {synapses / branches} (in left/deprived eye) / eq / converse ; <p>COMMENT comparative differences required</p> <p>mp 1: NOT shorter but allow references to area NOT visual cortex</p> <p>mp 2: ACCEPT neurones cut back</p> <p>mp 3: IGNORE connections</p>	max (2)

Question Number	Answer	Mark
1(b)	<ol style="list-style-type: none"> reference to {critical/ sensitive} period / critical window (in visual development) ; idea that if one eye is deprived of {stimulation/light}, {neurones /dendrites/synapses / columns} do not develop / eq ; <p>COMMENT mp 1: ALLOW reference to stimulation needed in early years</p> <p>mp 2: IGNORE references to axons, visual cortex.</p>	(2)

Question Number	Answer	Mark
1(c)	<p>reference to visual deprivation studies e.g. cataract removal from children, bandaging of eyes / reference to development of distance perception e.g. Muller-Lyer</p> <p>COMMENT Muller-Lyer needs to be explained</p> <p>ACCEPT ref. to horizontal or vertical stimulation deprivation IGNORE ref. to other mammals</p>	(1)

Question Number	Answer	Mark
2(a)	<ol style="list-style-type: none"> 1. activity in basal ganglia (of treated brain) is {greater than in untreated brain / lower than in healthy brain} ; 2. activity in motor cortex (of treated brain) is {less than in untreated brain / same as in healthy brain} ; 3. drug stimulates release of dopamine / eq ; 4. muscles now {more in control / just tapping fingers / fewer spasms} ; <p>COMMENT mp 2: is for reference to activity not just area ACCEPT patient for on / off drug</p> <p>NB mp 1, 2 and 4 must be comparative</p>	max (3)

Question Number	Answer	Mark
2(b)	<ol style="list-style-type: none"> 1. correct reference to calcium ions required ; 2. (dopamine) released at the (pre)synaptic membrane ; 3. by exocytosis /reference to vesicles fusing ; 4. idea of <u>diffuses</u> across (synaptic cleft) ; 5. binds to {receptors / eq} on post-synaptic membrane ; 6. {sodium ion / cation} channels open ; 7. sodium ions enter ; 8. depolarisation of post-synaptic membrane / eq ; <p>COMMENT Vesicles have the transmitter and these fuse with the membrane releasing it into the synaptic cleft = 2 marks</p> <p>mp 1: calcium ions in context of pre-synaptic membrane</p> <p>mp 2: NOT vesicles released</p> <p>mp 5: NOT binds to channels</p> <p>mp 6: IGNORE voltage dependent</p> <p>mp 8: ACCEPT action potential</p>	max (4)

Question Number	Answer	Mark
2(c)	<p>1. dopamine cannot cross blood brain barrier / eq ;</p> <p>2. therefore L-dopa is used /eq ;</p> <p>3. which is converted into dopamine (in the brain) ;</p> <p>OTHER DRUGS:</p> <p>4. could have a similar shape to dopamine / eq ;</p> <p>5. bind to dopamine receptors ;</p> <p>6. could inhibit enzymes which break down dopamine ;</p> <p>7. correct reference to selegiline ;</p> <p>8. maintaining a high concentration of dopamine ;</p> <p>COMMENT ACCEPT Levo-dopa, L-dope</p> <p>mp 4: ACCEPT same shape IGNORE agonist</p> <p>mp 6: NOT breakdown L-dopa or ACCEPT inhibits uptake of dopamine by presynaptic membrane.</p>	max (4)

Question Number	Answer	Mark
3(a)(i)	<ol style="list-style-type: none"> 1. reference to oxygen (concentration) decreasing / eq ; 2. greater (decrease) when ADP is added ; 3. (oxygen used to) convert ADP to ATP (in respiration) ; 4. oxygen is needed for respiration / eq ; 5. correct reference to <u>oxidative phosphorylation</u> ; 6. reference to {ADP concentration / eq} is limiting ; <p>COMMENT IGNORE any units</p> <p>“greater decrease in oxygen when ADP is present” = 2 marks</p> <p>mp 1: can be obtained from any part of graph</p>	max (3)

Question Number	Answer	Mark
3(a)(ii)	reduced NAD / NADH / NADH ₂ ;	(1)

Question Number	Answer	Mark
3(a)(iii)	cristae / inner membrane / stalked particle ;	(1)

Question Number	Answer	Mark
3(a)(iv)	<ol style="list-style-type: none"> 1. hydrogen atoms split into protons and electrons / eq ; 2. electrons transferred along electron carriers / a series of redox reactions / eq ; 3. oxygen is the terminal electron acceptor / water is formed ; 4. {protons / eq} moved into intermembrane space / eq ; 5. {protons / eq} move (into matrix) down a {concentration / electrochemical} gradient ; 6. through stalked particles / ATP synthetase /eq ; 7. correct ref. to chemiosmotic theory ; 8. (ATP)formed by {phosphorylation of ADP / oxidative phosphorylation } / eq ; <p>COMMENT Needs to be mitochondrial membranes NOT cell Correct ref. to movement across inner membrane</p> <p>ACCEPT H⁺ or hydrogen ions as equivalent to protons</p> <p>mp 4: ACCEPT correct reference to movement across the INNER mitochondrial membrane</p> <p>mp 5: Down NOT across, along, follows</p> <p>IGNORE pH references</p>	max (3)

Question Number	Answer	Mark
3(b)(i)	<ol style="list-style-type: none"> 1. correct reference to ATP (supplies energy) for active transport / reference to sodium-potassium pump / eq ; 2. sodium ions pumped out (of the axon) / restores (membrane to) resting potential ; 	(2)

Question Number	Answer	Mark
3(b)(ii)	<ol style="list-style-type: none"> 1. correct reference to ATP (supplies energy) for active transport / reference to sodium-potassium pump / eq ; 2. (pumps sodium ions out) of inner segment / maintains (more) negative charge inside the membrane / eq ; 	(2)

Question Number	Answer	Mark
4(a)(i)	<p>SLOW TWITCH has:</p> <ol style="list-style-type: none"> 1. more mitochondria ; 2. more myoglobin ; 3. less sarcoplasmic reticulum ; 4. more capillaries ; 5. less (stored) glycogen ; 6. less creatine phosphate ; 7. more resistant to fatigue / more likely to be aerobic / eq ; <p>ACCEPT converse comparison for FAST TWITCH</p> <p>COMMENT IGNORE reference to colour</p> <p>mp 3: not sarcoplasm</p>	max (2)

Question Number	Answer	Mark
4(a)(ii)	prey ;	(1)

Question Number	Answer	Mark
4(a)(iii)	<ol style="list-style-type: none"> 1. predators have more fast twitch (than slow twitch) ; 2. anaerobic respiration / glycolysis is used / eq ; <p>ACCEPT converse for comments on prey</p>	max (2)

Question Number	Answer	Mark
4(b)	<ol style="list-style-type: none"> 1. (lactate) removed from muscle / diffuses into blood stream / enters liver ; 2. (lactate) converted / eq / to pyruvate ; 3. reference to role of {NADH / eq} ; 4. pyruvate {oxidised to carbon dioxide and water / enters Krebs cycle} / eq ; 5. reference to higher oxygen consumption / greater oxygen debt ; 6. (some) lactate {converted / eq} to glycogen (in liver) ; <p>COMMENT mp 2: NOT oxidised to pyruvate mp 4: ACCEPT used in aerobic respiration NOT oxygenate mp 6: IGNORE references to protein, glucose, sweating IGNORE storage of glycogen REJECT glycogen in muscles. NEGATES mp 1: if liver and muscles for final mark point</p>	<p>max (3)</p>

Question Number	Answer	Mark
4(c)	<ol style="list-style-type: none"> 1. correct reference to homeostasis ; 2. correct reference to negative feedback ; 3. changes to (core) temperature detected by {hypothalamus / thermoregulatory centre} ; 4. (arteriole) {vasodilation / shunt vessel constricts} increases blood flow (to the skin / tongue) / eq ; 5. increase loss of heat from (skin / tongue / surfaces) / loss of heat from (skin / tongue / surfaces) has a cooling effect ; <p>COMMENT mp 4: NOT arteries, capillaries, veins NOT move closer to the surface</p>	<p>max (4)</p>