

Mark Scheme (RESULTS)

June 2008

GCE

GCE Biology (6102/01)

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.

| Question Number | Answer | Mark |
|-----------------|--|------|
| 1 | <ol style="list-style-type: none">1. anterior ;2. follicle stimulating hormone / FSH ;3. follicles ;4. secondary oocyte ; | (4) |

| Question Number | Answer | Mark |
|-----------------|--|------|
| 2(a) | <p>A erythrocyte / red blood cell / red blood corpuscle ;</p> <p>B lymphocyte / agranulocyte ;</p> | (2) |

| Question Number | Answer | Mark |
|-----------------|--|------|
| 2(b) | <p>1. reference to biconcave (disc) / thin / large surface area / description of shape ;</p> <p>2. reference to diffusion of respiratory gases / oxygen / carbon dioxide ;</p> <p>OR</p> <p>1. small / flexible / eq ;</p> <p>2. to pass through capillaries ;</p> | (2) |

| Question Number | Answer | Mark |
|-----------------|---|------------|
| 2(c) | <p>1. {neutrophils / eosinophils} are {phagocytic / eq} ;</p> <p>2. monocytes are {phagocytic / eq} ;</p> <p>3. reference to phagocytosis of {bacteria / eq} ;</p> <p>4. (B) lymphocytes secrete antibodies / eq ;</p> <p>5. in presence of antigens / function of antibody / antitoxins / eq ;</p> <p>6. reference to production of memory cells ;</p> | max (3) |

| Question Number | Answer | Mark |
|-----------------|--|------------|
| 3(a) | <ol style="list-style-type: none"> 1. capillaries {have thin walls / made of flattened epithelium / thin cells / eq} ; 2. reference to presence of <u>pores</u> ; 3. reference to basement membrane ; 4. reference to permeability of capillary wall /eq ; | max (3) |

| Question Number | Answer | Mark |
|-----------------|---|------|
| 3(b) | <ol style="list-style-type: none"> 1. proteins are large (molecules) ; 2. cannot pass through capillary wall / eq ; | (2) |

| Question Number | Answer | Mark |
|-----------------|--|------|
| 3(c) | <ol style="list-style-type: none"> 1. idea of reduced concentration of plasma proteins / eq ; 2. therefore reduced osmotic effect / eq ; | (2) |

| Question Number | Answer | Mark |
|-----------------|---|------------|
| 4(a) | <ol style="list-style-type: none"> 1. reference to (salivary / pancreatic) amylase ; 2. breaks down starch to maltose (and dextrans) ; 3. maltase ; 4. breaks down maltose to (α) glucose ; | max (3) |

| Question Number | Answer | Mark |
|-----------------|--|------|
| 4(b)(i) | <ol style="list-style-type: none"> 1. (villi) increase the surface area ; 2. reference to increasing diffusion ; | (2) |

| Question Number | Answer | Mark |
|-----------------|---|------|
| 4(b)(ii) | <ol style="list-style-type: none"> 1. reference to transport (of (absorbed) monosaccharides / named monosaccharides) ; 2. maintains {diffusion / concentration} gradient / eq ; | (2) |

| Question Number | Answer | Mark |
|-----------------|---|------------|
| 4(c)(i) | <ol style="list-style-type: none"> 1. uptake of galactose is {fastest / faster than glucose / fructose} ; 2. uptake of fructose is {slowest / slower than glucose / galactose} ; 3. glucose and galactose have similar rates of uptake ; | max (2) |

| Question Number | Answer | Mark |
|-----------------|--|------|
| 4(c)(ii) | reference to {specific / more} glucose {carrier proteins / eq} / glucose is absorbed actively, but fructose by (facilitated) diffusion / glucose is absorbed by glucose-sodium co-transport, fructose by diffusion ; | (1) |

| Question Number | Answer | Mark |
|-----------------|---|------------|
| 5(a) | <ol style="list-style-type: none"> 1. thick cuticle ; 2. reduces {transpiration / water loss / eq} ; 3. leaves rolled / folded / curled up / eq ; 4. reduces (exposed) surface area / stomata enclosed / reduces air movements / eq ; 5. sunken / fewer stomata ; 6. reduces {transpiration / water loss / eq} ; 7. presence of spines / spikes / hairs ; 8. trap water vapour near leaf / reduces air movement / eq ; 9. reference to hinge cells ; 10. (which) cause the leaf to roll up / eq ; | max (6) |

| Question Number | Answer | Mark |
|-----------------|--|------|
| 5(b) | leaf not rolled / no hairs / no spines / thin cuticle / no cuticle / air spaces / aerenchyma / no stomata / stomata on upper epidermis only / stomata on upper surface only / less supporting tissue / stomata not sunken / leaves feathery / eq ; | (1) |

| Question Number | Answer | Mark |
|-----------------|---|------|
| 6(a)(i) | to {reset / level the} liquid in capillary tube / to calibrate the scale / eq ; | (1) |

| Question Number | Answer | Mark |
|-----------------|---|------|
| 6(a)(ii) | to {absorb / take up / remove} carbon dioxide ; | (1) |

| Question Number | Answer | Mark |
|-----------------|--|------------|
| 6(b) | <ol style="list-style-type: none"> 1. to keep the temperature constant / eq ; 2. idea that temperature affects gas volumes ; 3. idea that temperature affects respiration / metabolic rates ; | max (2) |

| Question Number | Answer | Mark |
|-----------------|--|------|
| 6(c) | 12×0.19 (or 2.28) ; $\div 15$; $= 0.15(2)$; | (3) |

| Question Number | Answer | Mark |
|-----------------|---|------------|
| 7(a) | <ol style="list-style-type: none"> 1. apoplast pathway described ; 2. symplast pathway described ; 3. reference to the vacuolar pathway ; 4. reference to the endodermis <u>and</u> {Casparian strip / layer of suberin / waxy layer} ; 5. function of the Casparian strip ; | max (4) |

| Question Number | Answer | Mark |
|-----------------|--|------------|
| 7(b)(i) | <ol style="list-style-type: none"> 1. reference to increase from {08.00 / start} until 10 / 12 / 14 ; 2. reference to maximum at 14.00 / peaks at 50 au ; 3. reference to decrease from 14.00 ; 4. credit a manipulated quantitative comment ; | max (3) |

| Question Number | Answer | Mark |
|-----------------|---|------|
| 7(b)(ii) | <p>08.00 to 14.00:</p> <p>stomata open / increase in light (intensity) / increase in temperature / increase in wind speed / decrease in humidity ;</p> <p>14.00 to 20.00:</p> <p>converse of points above ;</p> | (2) |

| Question Number | Answer | Mark |
|-----------------|---------------|------|
| 8(a)(i) | 0.6 to 0.65 ; | (1) |

| Question Number | Answer | Mark |
|-----------------|---------------|------|
| 8(a)(ii) | 3.1 to 3.15 ; | (1) |

| Question Number | Answer | Mark |
|-----------------|--|------------|
| 8(b) | <ol style="list-style-type: none"> 1. idea that oxygen is transferred from haemoglobin to myoglobin ; 2. myoglobin acts as a {store / eq} of oxygen ; 3. in muscle (tissue) ; 4. oxygen released from myoglobin at (very) low partial pressures / during {extreme / strenuous / eq} exercise ; 5. this allows <u>aerobic</u> respiration to continue / eq ; | max (3) |

| Question Number | Answer | Mark |
|-----------------|--|------------|
| 8(c) | <ol style="list-style-type: none"> 1. idea that respiring {tissues / cells} produce carbon dioxide ; 2. reference to reduced <u>affinity</u> for oxygen ; 3. oxygen is released (more) readily / (more) oxygen is released / haemoglobin is less saturated with oxygen / percentage saturation decreases / eq ; 4. at {a given / the same} partial pressure of oxygen / eq ; 5. (oxygen released) to tissues / cells / muscle /eq ; | max (4) |