



*Rewarding Learning*

General Certificate of Secondary Education  
2011–2012

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**Science: Double Award (Modular)**

Living Organisms and the Processes of Life

End of Module Test

Higher Tier

**A**

[GDA02]

**MONDAY 27 FEBRUARY 2012**

**9.30 am–10.15 am**

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**MARK  
SCHEME**

|   |   |     | AVAILABLE MARKS |
|---|---|-----|-----------------|
| 1 | (a) (i) <span style="border: 1px solid black; padding: 2px;">G</span>   | [1] | 4               |
|   | (ii) <span style="border: 1px solid black; padding: 2px;">E</span>  | [1] |                 |
|   | (b) Appropriate direction of arrows through each side of the heart:<br>from D through to E; from G through to F in heart  | [2] |                 |
|   |   |     |                 |
| 2 | (a) Any <b>two</b> from: (assume inhaled) <ul style="list-style-type: none"> <li>● inhaled air has more oxygen <b>or</b> converse: exhaled has less O<sub>2</sub></li> <li>● inhaled air has less carbon dioxide <b>or</b> converse: exhaled has more CO<sub>2</sub></li> <li>● inhaled air has less water vapour <b>or</b> converse</li> <li>● inhaled air is colder <b>or</b> converse.</li> </ul>  | [2] | 4               |
|   | (b) Any <b>two</b> from:<br>large surface area/lots of them;<br>good blood supply/capillaries close by;<br>moist;<br>short diffusion distance/thin walls of alveoli or capillaries;/very thin permeable   | [2] |                 |
| 3 | tube A;<br>snail respire/produces carbon dioxide;<br>in tubes B/C plant takes in carbon dioxide; by photosynthesis<br>in tube A no pondweed to absorb CO <sub>2</sub> ;   | [4] | 4               |
| 4 | description: Cells are plasmolysed/cell membrane has pulled away from cell wall/cells are flaccid/cells shrivel/vacuole shrunk;<br><br>explanation (any <b>three</b> from): <ul style="list-style-type: none"> <li>● lower water concentration outside cells/more water inside cells</li> <li>● water moves out of the cells</li> <li>● by osmosis</li> <li>● across a partially/selectively/semi-permeable membrane (not solution passes out)</li> </ul> | [4] | 4               |

|   |  |   | AVAILABLE<br>MARKS |   |
|---|--|---|--------------------|---|
| 5 | (a)  | all points correctly plotted;<br>points joined with straight lines;<br><ul style="list-style-type: none"> <li>● vertical lines = 1 mark for points</li> <li>● not lines of best fit</li> <li>● -1 if drawn from origin.</li> </ul>  | [2]                |   |
|   | (b)  | 37–40 bubbles (consequential marking according to graph)  | [1]                |   |
|   | (c)  | as the light intensity decreases, there are less oxygen bubbles produced/less photosynthesis <b>or</b> closer lamp to beaker → more O <sub>2</sub> bubbles/more photosynthesis <b>or</b> converse   | [1]                |   |
|   | (d) (i)  | Any <b>two</b> from: <ul style="list-style-type: none"> <li>● control temperature (use heat shield or water bath) (not same size beaker)</li> <li>● same concentration of carbon dioxide in water/same hydrogen carbonate concentration in water. (not measure accurately).</li> <li>● same pH in water</li> <li>● allow 5 minutes equilibration at each distance/or settle at</li> <li>● same piece or amount of pondweed</li> <li>● same vol. of water</li> <li>● same bulb/strength of bulb</li> </ul> | [2]                |   |
|   | (ii)   | reliability – do repeats at each distance/repeat experiment (not repeat at different distance not repeat with different pondweed).  | [1]                | 7 |
| 6 | (a)  | effector i.e. muscle drawn at end of motor neurone (not hand) (not arm)   | [1]                |   |
|   | (b)  | does not involve the brain/no thinking time required/shorter nerve pathway/automatic  | [1]                |   |
|   | (c)  | pupil dilation/constriction/knee jerk/blinking/sneezing/step on a pin/ coughing or other  | [1]                | 3 |
| 7 | blockage in coronary artery;<br>less glucose/less blood/O <sub>2</sub> (to heart muscle) (not body)<br>less respiration/energy;<br>heart muscle cells die/heart does not beat/heart attack (not heart disease) | [4]   | 4                  |   |

|    |  | AVAILABLE MARKS |
|----|--|-----------------|
| 8  | <p>(a) to cause the production of antibodies (<b>not</b> Laura has higher chance of getting measles) [1]</p> <p>(b) Any <b>three</b> from:</p> <ul style="list-style-type: none"> <li>● Paul has memory cells in blood/WBC's have a memory.</li> <li>● Paul shows faster production of antibodies/Laura slower production.</li> <li>● Paul produces higher level (quantity) of antibodies;/or Laura produces lower levels.</li> <li>● Paul shows secondary response/Laura only shows primary response. Laura response is slower.</li> <li>● Paul – antibodies remain in blood.</li> <li>● Paul's response is quicker (<b>not</b> Paul will recover faster)</li> <li>● Paul doesn't get the disease the 2nd time Paul is immune. [3]</li> </ul> | 4               |
| 9  | <p>artery – tough layer to withstand pressure;<br/>to carry blood away from the heart;<br/>valves in vein prevent blood flowing backwards/large lumen in vein to allow easy blood flow/not more blood in veins.<br/>veins carrying blood towards the heart<br/>veins – thinner walls because blood under low pressure.<br/>veins – large lumen to allow blood to flow easily.<br/>(<b>not</b> veins have valves)<br/>(<b>not</b> large lumen – need function) max [3]</p>  | 3               |
| 10 | <p>(a) orange;<br/>lipase breaks fat down into fatty acids;<br/>which make the solution acidic/lowers the pH<br/>(not emulsify to give fatty acids). [3]</p> <p>(b) lipase has been denatured/destroyed (not killed). [1]</p>  | 4               |
| 11 | <p>(a) magnesium being absorbed as fast as it can be/oxygen limits rate/<br/>energy available limits rate/amount of magnesium limits rate/cannot absorb anymore Mg/no Mg left in solution – same as Mg limits rate [1]</p> <p>(b) respiration [1]</p> <p>(c) allows higher concentrations of magnesium in the roots than in the soil/against concentration gradient<br/>(not faster) [1]</p>   | 3               |

12 Any four from:

- (a) ● grease/cover lower leaf surfaces with vaseline
- record distance moved by air bubble (not mark just for bubble moves along apparatus)
- in a set time
- reset the bubble
- introduce new bubble by lifting end of capillary tube out of beaker of water
- repeat above experiment (i.e. replicates)
- replace with a new shoot of the same size/species/type of plant
- grease only the upper leaf surfaces  
(no additional marks for description of experimental method/ replicates as described above)
- keep all other external conditions (wind, humidity, temperature, light) the same in both experiments/or if specify one.  
(not just compare results) [4]

- (b) more water lost when upper surface is greased;/more H<sub>2</sub>O lost from lower surface;  
because more stomata on lower surface  
or converse. [2]

**Total**

**50**

**AVAILABLE  
MARKS**

6