Rewarding Learning

General Certificate of Secondary Education
2011–2012

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

MARK SCHEME

			AVAILABLE MARKS
1	(a) (i)	G [1]	
	(ii)	E [1]	
	(b)	Appropriate direction of arrows through each side of the heart: from D through to E; from G through to F in heart [2]	4
2	(a)	Any **two** from: (assume inhaled) ● inhaled air has more oxygen **or** converse: exhaled has less O_2 ● inhaled air has less carbon dioxide **or** converse: exhaled has more CO_2 ● inhaled air has less water vapour **or** converse ● inhaled air is colder **or** converse. [2]	
	(b)	Any **two** from: large surface area/lots of them; good blood supply/capillaries close by; moist; short diffusion distance/thin walls of alveoli or capillaries;/very thin permeable [2]	4
3		tube A; snail respires/produces carbon dioxide; in tubes B/C plant takes in carbon dioxide; by photosynthesis in tube A no pondweed to absorb CO_2; [4]	4
4		description: Cells are plasmolysed/cell membrane has pulled away from cell wall/cells are flaccid/cells shrivel/vacuole shrunk; explanation (any **three** from): ● lower water concentration outside cells/more water inside cells ● water moves out of the cells ● by osmosis ● across a partially/selectively/semi-permeable membrane (not solution passes out) [4]	4

			AVAILABLE MARKS
5	**(a)**	all points correctly plotted; points joined with straight lines; ● vertical lines = 1 mark for points ● not lines of best fit ● –1 if drawn from origin. [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 **or** closer lamp to beaker → more O_2 bubbles/more photosynthesis **or** converse [1]	
	(d)	**(i)** Any **two** from: ● control temperature (use heat shield or water bath) (not same size beaker) ● same concentration of carbon dioxide in water/same hydrogen carbonate concentration in water. (not measure accurately). ● same pH in water ● allow 5 minutes equilibration at each distance/or settle at ● same piece or amount of pondweed ● same vol. of water ● same bulb/strength of bulb [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; less glucose/less blood/O_2 (to heart muscle) (not body) less respiration/energy; heart muscle cells die/heart does not beat/heart attack (not heart disease) [4]	4

			AVAILABLE MARKS
8	**(a)**	to cause the production of antibodies (**not** Laura has higher chance of getting measles) [1]	
	(b)	Any **three** from: ● Paul has memory cells in blood/WBC's have a memory. ● Paul shows faster production of antibodies/Laura slower production. ● Paul produces higher level (quantity) of antibodies;/or Laura produces lower levels. ● Paul shows secondary response/Laura only shows primary response. Laura response is slower. ● Paul – antibodies remain in blood. ● Paul's response is quicker (**not** Paul will recover faster) ● Paul doesn't get the disease the 2nd time Paul is immune. [3]	4
9		artery – tough layer to withstand pressure; to carry blood away from the heart; valves in vein prevent blood flowing backwards/large lumen in vein to allow easy blood flow/not more blood in veins. veins carrying blood towards the heart veins – thinner walls because blood under low pressure. veins – large lumen to allow blood to flow easily. (**not** veins have valves) (**not** large lumen – need function) max [3]	3
10	**(a)**	orange; lipase breaks fat down into fatty acids; which make the solution acidic/lowers the pH (not emulsifiy to give fatty acids). [3]	
	(b)	lipase has been denatured/destroyed (not killed). [1]	4
11	**(a)**	magnesium being absorbed as fast as it can be/oxygen limits rate/energy available limits rate/amount of magnesium limits rate/cannot absorb anymore Mg/no Mg left in solution – same as Mg limits rate [1]	
	(b)	respiration [1]	
	(c)	allows higher concentrations of magnesium in the roots than in the soil/against concentration gradient (not faster) [1]	3

		AVAILABLE MARKS
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_2O lost from lower surface; because more stomata on lower surface **or** converse. [2]	6
	Total	**50**