PEARSON EDEXCEL IGCSE BIOLOGY · 4BI1

BIOLOGY



MARK SCHEME

SECTION 2: STRUCTURE AND FUNCTIONS IN LIVING ORGANISMS (PACK 4)

SCORE	PERCENTAGE
/59	%

STEMUP

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Mark Scheme

Q1.

Question Number	Answer	Mark
	An answer that makes reference to six of the following points: • C shampoo with oil and without oil / shampoo with oil and no shampoo (1) • O hair from same person / same hair length / width / age / sex/ same hair type / dry hair same way (1) • R test many different hairs / repeat (1) • M1 add weights / masses to hairs (1) • M2 measure mass / g / pressure / weight / force /N that causes hair to break (1) • S1 same volume / concentration of shampoo / same type of shampoo with and without oil (1) • S2 wash for same time / frequency / same temperature of water (1)	**6** **exp** ignore amount
		Total 6 marks

Q2.

Question number	Answer	Mark
(a)(i)	An explanation that makes reference to the following five points: • training improves performance by increasing the number of capillaries (1) • better supply of oxygen/aerobic (1) • better supply of glucose (1) • respiration/energy/ATP (1) • muscle contraction (1) • better removal of lactic acid/carbon dioxide (1) • can run for longer/equivalent (1)	**5**

Question number	Answer	Mark
(a)(ii)	An answer that makes reference to two of the following points: • use more people (1) • extend training period (1) • compare different ages/genders (1)	**2**

Question number	Answer	Additional guidance	Mark
(b)(i)	Multiplication • 0.008 (1) Division • 25 ÷ 0.008 = 3125 = 3100 (1)	award full marks for correct numerical answer without working accept 3125 the final answer should reflect the precision of the least precise data (in this case two sig figs)	2

Question number	Answer	Additional guidance	Mark
(b)(ii)	An explanation that makes reference to two of the following points: • wall contains muscle/elastic tissue (1) • blood is under high pressure from the left ventricle (1) • aorta needs to expand (1) • need to transport more blood (1)	allow converse	2

Q3.

Question number	Answer	Mark
(a)(i)	An explanation that makes reference to the following five points: • training improves performance by increasing the number of capillaries (1) • better supply of oxygen/aerobic (1) • better supply of glucose (1) • respiration/energy/ATP (1) • muscle contraction (1) • better removal of lactic acid/carbon dioxide (1) • can run for longer/equivalent (1)	5

Question number	Answer	Mark
(a)(ii)	An answer that makes reference to two of the following points: • use more people (1) • extend training period (1) • compare different ages/genders (1)	2

Question number	Answer	Additional guidance	Mark
(b)(i)	Multiplication • 0.008 (1) Division • 25 ÷ 0.008 = 3125 = 3100 (1)	award full marks for correct numerical answer without working accept 3125 the final answer should reflect the precision of the least precise data (in this case two sig figs)	2

Question number	Answer	Additional guidance	Mark
(b)(ii)	An explanation that makes reference to two of the following points: • wall contains muscle/elastic tissue (1) • blood is under high pressure from the left ventricle (1) • aorta needs to expand (1) • need to transport more blood (1)	allow converse	2

Q4.

Question number	Answer	Mark
	An answer that makes reference to six of the following points: • C use different pH and how equivalent add acid or alkali or use buffer solutions (1) • O use lipase from same source or lipid from same source (1) • R repeat readings at each pH (1) • M1 how digestion judged equivalent in lipid digestion or production of amino acids/change in pH (1) • M2 reference to time taken and how measured (1) • S1 and S2 variables kept constant equivalent volume of lipase/concentration of lipase, equivalent volume/mass of lipid temperature/reference to water bath (2)	6

Q5.

Question number	Answer	Mark
	An answer that makes reference to six of the following points: • C use different pH and how equivalent add acid or alkali or use buffer solutions (1) • O use lipase from same source or lipid from same source (1) • R repeat readings at each pH (1) • M1 how digestion judged equivalent in lipid digestion or production of amino acids/change in pH (1) • M2 reference to time taken and how measured (1) • S1 and S2 variables kept constant equivalent volume of lipase/concentration of lipase, equivalent volume/mass of lipid temperature/reference to water bath (2)	**6**

Q6.

Question Number	Answer	additional guidance	Mark
(a)	movement of a substance / molecules / particles / ions from a region of high concentration to a region of lower concentration / down a concentration gradient / eq	ignore ref to partially permeable	**1**

Question Number	Answer	additional guidance	Mark
(b)	An answer that refers to two of • temperature (1) • concentration of dye (1) • density / thickness / concentration / solidity of / type of agar / jelly eq (1) • volume of dye (1)	ignore time ignore amount of dye	**2**

Question Number	Answer	additional guidance	Mark
(c)(i)	SA = 6 × SA of one side 6 × 2 × 2 6 × 4 • 24 cm ^{2} (2)	allow 1 mark for × 4 or × 2 × 2 allow full marks for correct answer with no working	**2**

Question Number	Answer	additional guidance	Mark
(c)(ii)	• 3:1 / eq	allow 3 allow ECF from ci	**1**

Question Number	Answer	additional guidance	Mark
(c)(iii)	2 (mm)	allow **1-2**(mm)	**1**

Question Number	Answer	additional guidance	Mark
(c)(iv)	An answer that makes reference to four of the following points: • dye moves (into each cube) same distance / eq (1) • but smaller cube (C) has greater proportion penetrated / eq (1) • as small cube (C) has higher surface area to volume ratio / eq (1) • as size decreases SA / vol ratio increases (1) • so smaller organisms are more efficient / can rely on diffusion (alone) / diffusion more effective / eq (1) • larger organisms need circulation system / transport system / ventilation / lungs / digestive system / eq (1)	allow converse mp 2 3 4 5 6	**4**

Q7.

Question Number	Answer	additional guidance	Mark
(a)	P is the ileum / small intestine (1) Q is the <u>oesophagus</u> (1)	allow intestine reject large intestine	**2**

Question Number	Answer	additional guidance	Mark
(b)	An explanation that makes reference to two of the following points: • <u>cellulose</u> (1) • (produces / release) glucose / energy (1) • respiration (1)	allow produce <u>cellulase</u> no credit for microorganisms being digested for glucose	**2**

Question Number	Answer	additional guidance	Mark
(c)	An explanation that makes reference to two of the following points: • fewer cows means less methane (into atmosphere) (1) • greenhouse gas (1) • (less) heat trapped / (less) radiation reflected (1) • (less) global warming (1) • farmers may choose to keep same number / more cows (1) • some cows kept for beef / eq (1) • other sources of greenhouse gas / cars / fossil fuels / eq	allow converse ignore climate change	**4**
			Total 8 marks