Mark Scheme (Results)

Summer 2022

Pearson Edexcel International GCSE In Biology (4BI1) Paper 2BR

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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.

Question Number	Answer	Additional guidance	Mark
1(a)	An answer that makes reference to one of the following points: • balanced diet / eq (1) • less lipid / fat / oil / eq (1) • less foods that contain cholesterol eg eat fewer eggs that contain cholesterol /eq (1)	oily / fatty not just eat less cholesterol/ eat fewer eggs	**1**

Question Number	Answer	Additional guidance	Mark
1(b)	An answer that includes : • maintains water level/ water of body / body fluids / plasma / blood / cells / eq (1) • maintains **salt and water levels / salt and water balance / concentration / water potential** in body / body fluids / blood/ plasma cells / eq (2)	controls water / water levels in body = 1 mark controls water and dissolved materials / solutes in body = 2 marks	**2**

Question Number	Answer	Additional guidance	Mark
1(c)	An explanation that makes reference to two of the following points: • (body produces) urea / salt / toxins / water / metabolic waste / eq • need to be excreted / removed / prevent build up / prevent poisoning / become toxic eq (1) • kidneys cannot recover / no cure / incurable / (until) transplant /eq (1)	Not urine cannot excrete / remove Remove excrete urea = 2 remove toxins = 2	**2**

Question Number	Answer	Additional guidance	Mark
1(d)(i)	An explanation that makes reference to the following points: • (only) lets / allows some molecules / substances / water pass through (stops others) eq (1) • does not let large ones / charged ones / pass through / eq (1)	allow converse	**2**

Question Number	Answer	Additional guidance	Mark
1(d)(ii)	An explanation that makes reference to two of the following points: • so that substances do not leave blood / so they can return to blood / eq (1) • by diffusion / down concentration gradient / eq (1) • as cells require water for water balance / ions for water balance / water for metabolic reactions / eq (1) • glucose for respiration / energy / allow named mineral ion for correct function / (1)	kidney normally reabsorbs these	**2**

Question Number	Answer	Mark
1(e)	An explanation that makes reference to two of the following points: • lower concentration of / no urea / salts / waste products in dialysis fluid (1) • by <u>diffusion</u> / (from blood / into solution) (1)	**2**

Question Number	Answer	additional guidance	Mark
1(f)(i)	9 ÷ 24 = 0.375 or 63÷168 0.375 × 100 = 38 % 37.5 or 38 % (2)	9÷24 or 63÷168 For one mark	**2**

Question Number	Answer	Mark
1(f)(ii)	• you can walk around / can be done at home / when travelling / does not require machine/ eq (1)	**1**

Question Number	Answer	Additional guidance	Mark
1(g)	A description that makes reference to three of the following points: • proteins **/** large molecules can't leave glomerulus / can't go into Bowman's capsule / eq (1) • reabsorption of glucose / amino acids / glucose absorbed (back) into blood eq (1) • by proximal convoluted tubule / eq (1) • water reabsorbed from collecting duct / eq (1)	must refer to large molecules / proteins **and** glomerulus or Bowman's capsule Allow from PCT and Loop of Henle	**3**

Total 17 marks

Question Number	Answer	Mark
2 (a) (i) Clip table with (i) (ii) and (iii)	increase in temperature 15 (1)	**1**
(ii) Clip table with (i) (ii) and (iii)	energy released 20 × 4.2 × 15 1260 (J) (1)	**1**
(iii) Clip table with (i) (ii) and (iii)	energy released by 1 g 1260 ÷ 0.20 = 6300 (J) (1)	**1**

Question Number	Answer	additional guidance	Mark
2(b)	An answer that makes reference to five of the following points: • student value much lower / eq (1) • not all energy released from food (1) • not burnt in oxygen / not completely combusted (1) • energy / heat not all transferred to tube / some energy / heat lost (to atmosphere)/ eq (1) • energy lost / heat to atmosphere when moving food / flame (1) • energy lost as light / eq (1) • flame / affected by draught / eq (1) • water not evenly heated/ not stirred / eq (1) • only repeated 3 times / eq (1) • different / distances from tube / distance not fixed / eq (1) • variation in results / parallax error / eq (1)	allow converse for published value	**5**

Question Number	Answer	Mark
2(c)	An answer that makes reference to two of the following points • fix position of food / clamp needle (1) • use stirrer/ stir contents / eq (1) • use heat shield / eq (1) • use lid / eq (1) • insulate tube / eq (1)	**2**

total 10 marks

Question Number	Answer	Mark
3(a)(i)	The only correct answer is C as they are the microvilli A is not correct as it is not the microvilli B is not correct as it is not the microvilli D is not correct as it is not the microvilli	**1**

Question Number	Answer	Mark
3(a)(ii)	The only correct answer is B as this is a mitochondrion A is not correct as it is not a mitochondrion B is not correct as it is not a mitochondrion D is not correct as it is not a mitochondrion	**1**

Question Number	Answer	Additional guidance	Mark
3(b)	An answer that makes reference to four of the following points: • folded / long to increase surface area / (1) • contains many villi to increase surface area (1) • contains microvilli to increase surface area (1) • contains lacteal to absorb lipid / eq (1) • contains capillaries to absorb glucose / amino acids / minerals /eq (1) • capillaries / blood flow maintain diffusion / concentration gradient / eq (1) • thin wall/ one cell thick for fast diffusion/ short diffusion distance / eq (1)	must have structure and explanation	**4**

Question Number	Answer	additional guidance	Mark
3(c)	A description that makes reference to three following points: • oxygen to foetus from mother / eq (1) • digested food / nutrients / amino acids / glucose / fatty acids to foetus from mother / eq (1) • removes waste (products) / urea / carbon dioxide from foetus to mother / eq (1) • provides antibodies for baby / foetus /eq (1) • produces hormones / progesterone / eq (1)	If write blood transferred from mother to foetus penalise once -1 allow minerals named mineral / vitamin / named vitamin	**3**

Total 9 marks

Question Number	Answer	Mark
4(a)	An answer that makes reference to five of the following points: • oxygen decreases / eq (1) • bacteria increase as present in sewage (1) • bacteria feed on nutrients / sewage (1) • mayfly numbers drop (1) • bacteria use oxygen for respiration / mayfly larvae need oxygen for respiration / eq (1) • tubifex numbers increase as use nutrients from / feed on sewage / eq (1) • tubifex can survive in low oxygen / eq (1) • then bacteria decrease / eq (1) • (so) oxygen increases (1) • mayfly increase / tubifex decrease / eq (1)	**5**

Question Number	Answer	Additional guidance	Mark
4(b)(i)	An explanation that makes reference to **two** of the following points • variation shown by organisms in an ecosystem (1) • number of / how many (different) species (1) • number / abundance / how many of **each** species / eq (1)	 allow richness allow evenness	**2**

Question Number	Answer	Additional guidance	Mark
4(b)(ii)	An answer that makes reference to the following points • mayfly (only) found in oxygen rich / unpolluted water /no / few mayfly in polluted / eq (1) • tubifex (can be) found oxygen deprived / polluted water / no /few tubifex in unpolluted / eq (1)	In polluted water mayfly low /in unpolluted mayfly high (1) In polluted water tubifex high/ in unpolluted tubifex low (1)	**2**

total 9 marks

Question Number	Answer	Mark
5(a)		**6**

Hormone	Organ that releases hormone	Location of target cells	Effect on target cells and tissues
FSH	**pituitary (1)**	**ovaries (1)**	growth of follicle
LH	pituitary	ovaries	**ovulation / release of egg (1)**
progesterone	ovary	uterus	**thickens / maintains lining /eq (1)**
testosterone (1)	testes	**skin / armpit / groin /scrotum / / penis / eq (1)**	growth of body hair
		Ignore testes/testicles	

Question Number	Answer	additional guidance	Mark
5(b)	An answer that makes reference to three of the following points • hormone produced in endocrine cells / glands / eq (1) • carried in blood stream / plasma /eq (1) • all around body / affects many target cells / eq (1) • long term effect / response / eq (1)	allow converse for neurotransmitter produced in presynaptic cell / neurone into synapse one cell / local affect short term effect/ response ignore faster / slower	**3**

total 9 marks

Question Number	Answer	additional guidance	Mark
6(a)	A description that makes reference to four of the following points: • nucleus from (body) cell of male horse (1) • insert this (nucleus) into enucleated egg cell / empty egg cell / eq (1) • <u>electric</u> shock / electricity (1) • mitosis / cell division / cell divides /eq (1) • <u>embryo</u> into <u>uterus / womb</u> (1) • <u>surrogate</u> mother (1)	reject from udder reject egg cell from male horse	**4**

Question Number	Answer	Additional guidance	Mark
6(b)	An explanation that makes reference to three of the following points • no sperm / gametes produced / eq (1) • no fertilisation / cannot impregnate female / eq (1) • but in cloning all chromosome / genes / DNA / nucleus comes from body cells (diploid male) / cloning uses body cell /eq (1)	Allow converse for mp1 and mp 2	**3**

Question Number	Answer	Additional guidance	Mark
6(c)	An answer that makes reference to one of the following points • to keep value of male / sire / eq (1) • prevent inbreeding / maintain genetic diversity / maintain genetic variation / prevent genetic disease / disorder / eq • limit number of offspring from each sire / stallion / eq (1) • to prevent fraud / confirm paternity / eq / (1) • ethical issues use of embryo / eq (1) • many attempts needed to get successful clone / eq (1) • idea of unfairness/ unequal competition / cheating / eq (1)	cloning will increase inbreeding and reduce diversity	**1**
Question Number	Answer	Additional guidance	Mark
6(d)	An answer that makes reference to the following • clones are <u>genetically</u> identical / have same <u>genotype</u> / eq (1)	Allow converse GM produces <u>genetic</u> change / introduces <u>new genes</u> / <u>genetic</u> variation	**1**

total 9 marks

Question Number	Answer	Mark
7(a)(i)	The only correct answer is B leaf area covered A is not correct as leaf size is not varied C is not correct as mass lost is the dependent variable D is not correct as time is not varied	**1**

Question Number	Answer	Additional guidance	Mark
7(a)(ii)	An answer that makes reference to the following • same density / number of stomata / different species may have different transpiration rates/ valid experiment / make it a fair test / make results accurate / comparable / eq (1)	Ignore reliable	**1**

Question Number	Answer	additional guidance	Mark
7(b)(i)	3.1 – 3 = 0.1 (0.1 ÷3.1) ×100 3.2 % (2)	full marks for correct answer no working one mark for 0.1 allow 3.23 or 3.226 or 3.2258 / eq for 2 marks *check in table for answer*	**2**

Question Number	Answer	Additional guidance	Mark
7(b)(ii)	An explanation that makes reference to three of the following points: • most mass lost / water loss from leaf when no surface is covered / both exposed (1) • water lost from stomata (on leaf surfaces) / eq (1) • more mass lost / more water lost from lower surface **/** most water / most mass lost when lower exposed / eq (1) • lower surface has most stomata / upper has fewest / eq (1) • (upper surface) has waxy cuticle (1)	least mass lost / less water lost when both surfaces covered/ no surface exposed / eq (1) less water lost from upper surface / least mass lost / least water lost when upper exposed / eq (1)	**3**

Total 7 marks

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