



Mark Scheme (FINAL)

Summer 2019

Pearson Edexcel International GCSE
Biology (4BI1) Paper 2B

Question Number	Answer	Additional guidance	Mark
1(a)	<p>An answer that makes reference to the following points:</p> <ul style="list-style-type: none"> • (all) living organisms / community / (different / all) species (1) • and environment / area / habitat / abiotic factors / non-living factors / physical factors (1) 	Mp1 Ignore animals and plants	2

Question Number	Answer	Additional guidance	Mark
1(b)	<p>An explanation that makes reference to the following points:</p> <ul style="list-style-type: none"> • (animals get) glucose / oxygen / energy (1) • (algae get) carbon dioxide / protection / shelter / safety / cannot be eaten (1) 	<p>Mp1 Ignore food / nutrients</p> <p>Mp2 Ignore place to live / food</p>	2

Question Number	Answer	Mark
1(c)(i)	<p>An explanation that makes reference to the following points:</p> <ul style="list-style-type: none"> • (sun)<u>light</u> (1) • photosynthesis (1) 	2

Question Number	Answer	Additional guidance	Mark
1 (c) (ii)	<p>An answer that makes reference to two of the following points:</p> <ul style="list-style-type: none"> • supply food / algae / plankton (1) • supply minerals / ions / named mineral (1) • supply oxygen (1) • supply carbon dioxide (1) • remove waste / faeces / carbon dioxide (1) • distribute gametes (1) 	Ignore nutrients / clean water / remove bacteria / cooling	2

Question Number	Answer	Additional guidance	Mark
1 (d)	<p>An answer that makes reference to the following points:</p> <ul style="list-style-type: none"> • <u>quadrat</u> (1) • repeat (1) • random / random number (1) • count / measure / number of / percentage cover of coral (1) • calculate percentage by $\frac{\text{dead}}{\text{total}} \times 100$ / $\frac{\text{dead}}{\text{dead} + \text{living}} \times 100$ (1) 	<p>Allow quadrants for Mp 1 and 2</p> <p>quadrats = Mp1 and Mp2</p> <p>Allow bleached / white as eq to dead</p>	3

Question Number	Answer	Additional guidance	Mark
1(e)	An answer that makes reference to the following point: there is less food / less coral to eat (1)	Ignore only source of food / only coral available	1

Question Number	Answer	Additional guidance	Mark
1(f)	An answer that makes reference to three of the following points: <ul style="list-style-type: none"> • reduce <u>greenhouse</u> gas / <u>greenhouse</u> effect (1) • reduce carbon dioxide / CFCs / methane / N₂O / ozone / HCFCs / HFCs emissions (1) • use less fossil fuel / fewer cars / fewer vehicles / less deforestation / use renewable sources of energy / solar / wind / hydroelectric / farm fewer cattle / cycling more / fewer aerosols / eq (1) • control/reduce predators / starfish / snails (1) • reduce tourism / fishing / diving / restrict access / cordon reef / eq (1) • reintroduce coral / plant more coral / grow coral in lab and place on coral / supply other surfaces for coral to grow (1) 	Mp2 Ignore carbon emissions / carbon footprint Ignore pollution	3

Total 15 marks

Question Number	Answer	Additional guidance	Mark
2(a)	<p>A description that makes reference to the following points:</p> <ul style="list-style-type: none"> • use warm/hot ethanol/alcohol / use ethanol in water bath (1) • use iodine (1) • blue black / blue / black (1) 	Add Benedict's and blue black = 1	3

Question Number	Answer	Additional guidance	Mark
2(b)	<p>An explanation that makes reference to four of the following points:</p> <ul style="list-style-type: none"> • (position) palisade at top / (just) beneath upper epidermis OR spongy in middle/near(er) lower surface (1) • (structure) palisade closely packed / long / rectangular / elongated / column / packed together / dense / fixed together / no air spaces / no gaps OR spongy have air spaces / gaps / rounded (1) • (chloroplasts) palisade have <u>more/many</u> chloroplasts / chlorophyll OR spongy have <u>fewer</u> chloroplasts / <u>less</u> chlorophyll (1) • (palisade cells) absorb (sun)light (1) • spongy allow diffusion / gas exchange / gases to move / movement of water <u>vapour</u> / movement of carbon dioxide / movement of oxygen / transpiration (1) 	<p>Mp1 Ignore palisade closer to surface</p> <p>Mp3 palisade have more and spongy have none = 0</p>	4

Question Number	Answer	Additional guidance	Mark
2(c)	<p>An answer that makes reference to three of the following points:</p> <ul style="list-style-type: none"> • mass is lost from lower surface / mass is lost when upper surface covered / OR little/least mass lost from upper surface / little/least mass lost when lower surface is covered (1) • stomata in lower surface / few/no stomata on upper surface (1) • disagrees with conclusion (1) 	<p>Mp1 Ignore change in mass</p>	3

Total 10 marks

Question Number	Answer	Mark
3(a)(i)	<p>The only correct answer is C thread-like hyphae</p> <p><i>A is incorrect because fungi lack chloroplasts</i></p> <p><i>B is incorrect because fungi do not store starch</i></p> <p><i>D is incorrect because fungi walls are made of chitin</i></p>	1

Question Number	Answer	Mark
3(a)(ii)	<p>The only correct answer is D maltose</p> <p><i>A is incorrect because amino acids are products of protease digestion</i></p> <p><i>B is incorrect because fatty acids are products of lipase digestion</i></p> <p><i>C is incorrect because glycerol is a product of lipase digestion</i></p>	1

Question Number	Answer	Mark
3(a)(iii)	<p>A description that makes reference to five of the following points:</p> <ul style="list-style-type: none"> • <u>transcription</u> / <u>transcripts</u> / <u>transcribes</u> (1) • mRNA/messenger RNA and leaves <u>nucleus</u> / mRNA/messenger RNA and enters <u>cytoplasm</u> (1) • ribosomes (1) • tRNA/transfer RNA (brings) attached amino acids (1) • codons / anticodons / complementary bases (1) • <u>translation</u> / <u>translated</u> / <u>translates</u> / amino acid chain / polypeptide chain (1) 	5

Question Number	Answer	Mark
3(b)(i)	70.475 to 70.5	1

Question Number	Answer	Additional guidance	Mark
3(b)(ii)	(70.5 – 50 =) 20.5	Allow (answer from 3(b)(i) – 50) eg: 70.4 – 50 = 20.4	1

Question Number	Answer	Additional guidance	Mark
3(b)(iii)	<p>An answer that makes reference to four of the following points:</p> <ul style="list-style-type: none"> • same surface area / mass / thickness / area / size (1) • remove soil from square (before weighing) (1) • control <u>temperature</u> / oxygen / moisture / water (1) • (soil) same mass / same amount / same volume / same type / same soil / decomposers / bacteria / fungi (1) • repeat / use more squares / obtain average / remove anomalies (1) • increase range of pH / use different pHs / more pHs (1) 	<p>Ignore more time</p> <p>Mp3 Ignore light / carbon dioxide</p> <p>Mp4 Ignore sterile soil</p>	4

Total 13 marks

Question Number	Answer	Mark
4(a)(i)	<p>The only correct answer is A</p> <p><i>B is incorrect because ultrafiltration does not take place at the proximal convoluted tubule</i></p> <p><i>C is incorrect because ultrafiltration does not take place at the loop of Henle</i></p> <p><i>D is incorrect because ultrafiltration does not take place at the collecting duct</i></p>	1

Question Number	Answer	Mark
4(a)(ii)	<p>The only correct answer is B</p> <p><i>A is incorrect because reabsorption of glucose does not take place at the glomerulus</i></p> <p><i>C is incorrect because reabsorption of glucose does not take place at the loop of Henle</i></p> <p><i>D is incorrect because reabsorption of glucose does not take place at the collecting duct</i></p>	1

Question Number	Answer	Mark
4(a)(iii)	<p>The only correct answer is D</p> <p><i>A is incorrect because the proximal convoluted tubule does not respond to ADH</i></p> <p><i>B is incorrect because ultrafiltration does not respond to ADH</i></p> <p><i>C is incorrect because ultrafiltration does not respond to ADH</i></p>	1

Question Number	Answer	Mark
4(b)(i)	<p>An explanation that makes reference to the three of following points:</p> <ul style="list-style-type: none"> • water <u>reabsorbed</u> / water into <u>blood</u> (1) • osmosis (1) • concentrated <u>urine</u> / less water in <u>urine</u> / less <u>urine</u> (1) 	3

Question Number	Answer	Additional guidance	Mark
4(b)(ii)	<p>An explanation that makes reference to the following points:</p> <ul style="list-style-type: none"> • hot/higher temperature during day / cool(er)/lower temperature at night / cool(er)/lower temperature underground (1) • less water loss / less dehydration (1) • hide from <u>predators</u> / less visible to <u>predators</u> / less chance of being <u>hunted</u> (1) 	<p>Mp2 Allow less sweating Allow converse for Mps 2 and 3</p>	2

Question Number	Answer	Additional guidance	Mark
4(b)(iii)	<p>An answer that makes reference to one of the following:</p> <ul style="list-style-type: none"> • respiration (1) • food / cacti / plants / seeds (1) • condensation (1) 	<p>Ignore rain / other water source</p>	1

Total 9 marks

Question Number	Answer	Mark
5 (a)	XY / X and Y / YX / Y and X	1

Question Number	Answer	Mark
5(b)(i)	<p>The only correct answer is D ZZ</p> <p><i>A is incorrect because XY are the sex chromosomes of a human male</i></p> <p><i>B is incorrect because ZW are the sex chromosome of a female bird</i></p> <p><i>C is incorrect because ZY are not the sex chromosomes of a male bird</i></p>	1

Question Number	Answer	Additional guidance	Mark
5(b)(ii)	<ul style="list-style-type: none"> determine probability of having one female raise to the power of 4 <p>= 0.0625 / 6.25% / 1/16 1 in 16 (2)</p>	<p>award full marks for correct numerical answer without working</p> <p>p of one female = 0.5</p> <p>(0.5)⁴</p> <p>Allow one mark for 0.5 / ½ / 50% / 1 in 2 in working</p>	2

Question Number	Answer	Additional guidance	Mark															
5(c)(i)	<table border="1"> <thead> <tr> <th>Hormone</th> <th>Source</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td>FSH</td> <td>pituitary (1)</td> <td>(stimulate follicle growth)</td> </tr> <tr> <td>LH</td> <td>(pituitary)</td> <td>ovulation / egg release / release of oestrogen / release of progesterone / develop corpus luteum (1)</td> </tr> <tr> <td>oestrogen</td> <td>ovary / ovaries / corpus luteum / placenta (1)</td> <td>(repair uterus lining)</td> </tr> <tr> <td>progesterone</td> <td>(ovary)</td> <td>maintain uterus lining/wall / prevents shedding of uterus lining /wall inhibit FSH / inhibit LH / inhibit lactation (1)</td> </tr> </tbody> </table>	Hormone	Source	Function	FSH	pituitary (1)	(stimulate follicle growth)	LH	(pituitary)	ovulation / egg release / release of oestrogen / release of progesterone / develop corpus luteum (1)	oestrogen	ovary / ovaries / corpus luteum / placenta (1)	(repair uterus lining)	progesterone	(ovary)	maintain uterus lining/wall / prevents shedding of uterus lining /wall inhibit FSH / inhibit LH / inhibit lactation (1)	<p>Two answers must be correct for the mark eg: (LH) ovulation and inhibits oestrogen = 0</p> <p>Ignore maintains pregnancy</p>	4
Hormone	Source	Function																
FSH	pituitary (1)	(stimulate follicle growth)																
LH	(pituitary)	ovulation / egg release / release of oestrogen / release of progesterone / develop corpus luteum (1)																
oestrogen	ovary / ovaries / corpus luteum / placenta (1)	(repair uterus lining)																
progesterone	(ovary)	maintain uterus lining/wall / prevents shedding of uterus lining /wall inhibit FSH / inhibit LH / inhibit lactation (1)																

Question Number	Answer	Additional guidance	Mark
5(c)(ii)	<p>An answer that makes reference to the following:</p> <ul style="list-style-type: none"> • FSH = Q • LH = R • oestrogen = P • progesterone = S (3) 	<p>three or four correct = 3</p> <p>two correct = 2</p> <p>one correct = 1</p> <p>more than one letter on a line = 0</p>	3

Total 11 marks

Question Number	Answer	Mark			
6(a)(i)	Cube side in cm	Surface area of one cube in cm ²	Total Surface area in cm ²	Volume of one cube in cm ³	Total volume in cm ³
	20	2400	2400	8000	8000
	1	6	48 000	1	8000
	<ul style="list-style-type: none"> • 6 (1) • (6 x 8000 =) 48 000 (1) Allow if not in table but in working 				

Question Number	Answer	Additional guidance	Mark
6(a)(ii)	20 : 1	award the mark for error carried forward from table Allow their number for total surface area : 2400 eg: 48 000 : 2400 / 6 : 2400 / 1 : 400	1

Question Number	Answer	Additional guidance	Mark
6(b)	An answer that makes reference to two of the following points: One from: <ul style="list-style-type: none"> • (number) reference to many cubes / many alveoli / (alveoli) not one large cube • (surface) reference to SA:Vol / surface area (1) One from: <ul style="list-style-type: none"> • (shape) <u>alveoli</u> are not cubes / <u>alveoli</u> are round/spherical / <u>alveoli</u> have different shape / <u>lungs</u> are not cubes / eq (1) • <u>alveoli</u> surfaces touch / not all surfaces of <u>alveoli</u> are exposed (1) • reference to <u>bronchioles</u> (1) 	Eg: alveoli have large SA:Vol / alveoli have large SA	2

Question Number	Answer	Additional guidance	Mark
6(c)	<p>An explanation that makes reference to the following points:</p> <ul style="list-style-type: none"> • thin (walls) / one cell thick / close to <u>capillaries</u> and short <u>diffusion</u> distance / not far to <u>diffuse</u> (1) • wet / water / moist and gases <u>dissolve</u> / <u>in solution</u> (1) • capillaries / blood supply / blood flow and concentration/diffusion gradient (1) 	<p>Mp1 Ignore faster diffusion</p> <p>Mp2 Ignore liquid</p>	3

Total 8 marks

Question Number	Answer	Additional guidance	Mark
7(a)(i)	An answer that makes reference to one of the following: <ul style="list-style-type: none"> • bleach / hypochlorite / disinfectant / antiseptic / chlorine (1) • alcohol / ethanol (1) • radiation / uv / gamma rays / X-rays (1) 	Reject boil / steam or any method that kills cells Reject acid / alkali / anti-bacterial wash / antibiotic / sterilising solution Boiling in ethanol = 0	1

Question Number	Answer	Additional guidance	Mark
7(a)(ii)	An answer that makes reference to one of the following: <ul style="list-style-type: none"> • nitrate / ammonium / magnesium / calcium / sulphate / potassium / phosphate / iron (1) • amino acids (1) • sucrose / glucose / fructose / sugar / starch (1) 	Ignore water / phosphorus / nitrogen / mineral ions	1

Question Number	Answer	Additional guidance	Mark
7(b)	An explanation answer that makes reference to two of the following points: <ul style="list-style-type: none"> • cells are differentiated / specialised / can only form one cell type / cells unable to differentiate / specialise / form other cell types (1) • no / fewer stem cells (1) • stem cells found in embryo / bone marrow / umbilical cord (1) 	Ignore references to plant tissue	2

Total 4 marks