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Pearson
Edexcel

Mark Scheme (FINAL)

Summer 2019

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

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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.

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Question Number	Answer	Additional guidance	**Mark**
1(a)	An answer that makes reference to the following points: • (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)	An explanation that makes reference to the following points: • (animals get) glucose / oxygen / energy (1) • (algae get) carbon dioxide / protection / shelter / safety / cannot be eaten (1)	Mp1 Ignore food / nutrients Mp2 Ignore place to live / food	**2**

Question Number	Answer	**Mark**
1(c)(i)	An explanation that makes reference to the following points: • (sun)<u>light</u> (1) • photosynthesis (1)	**2**

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Question Number	Answer	Additional guidance	**Mark**
1(c)(ii)	An answer that makes reference to two of the following points: • 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)	An answer that makes reference to the following points: • quadrat (1) • repeat (1) • random / random number (1) • count / measure / number of / percentage cover of coral (1) • calculate percentage by dead ÷ total ×100 / dead ÷ living + dead ×100 (1)	Allow quadrants for Mp 1 and 2 quadrats = Mp1 and Mp2 Allow bleached / white as eq to dead	**3**

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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: • reduce <u>greenhouse</u> gas / <u>greenhouse</u> effect (1) • reduce carbon dioxide / CFCs / methane / N_2O / 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

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Question Number	Answer	Additional guidance	**Mark**
2(a)	A description that makes reference to the following points: • 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)	An explanation that makes reference to four of the following points: • (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)	Mp1 Ignore palisade closer to surface Mp3 palisade have more and spongy have none = 0	**4**

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Question Number	Answer	Additional guidance	**Mark**
2(c)	An answer that makes reference to three of the following points: • 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)	Mp1 Ignore change in mass	**3**

Total 10 marks

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

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

Question Number	Answer	Mark
3(a)(iii)	A description that makes reference to five of the following points: • transcription / transcripts / transcribes (1) • mRNA/messenger RNA **and** leaves nucleus / mRNA/messenger RNA **and** enters cytoplasm (1) • ribosomes (1) • tRNA/transfer RNA (brings) attached amino acids (1) • codons / anticodons / complementary bases (1) • translation / translated / translates / amino acid chain / polypeptide chain (1)	**5**

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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)	An answer that makes reference to four of the following points: • 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)	Ignore more time Mp3 Ignore light / carbon dioxide Mp4 Ignore sterile soil	**4**

Total 13 marks

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

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

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

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Question Number	Answer	Mark
4(b)(i)	An explanation that makes reference to the three of following points: • water reabsorbed / water into blood (1) • osmosis (1) • concentrated urine / less water in urine / less urine (1)	**3**

Question Number	Answer	Additional guidance	Mark
4(b)(ii)	An explanation that makes reference to the following points: • 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 predators / less visible to predators / less chance of being hunted (1)	Mp2 Allow less sweating Allow converse for Mps 2 and 3	**2**

Question Number	Answer	Additional guidance	Mark
4(b)(iii)	An answer that makes reference to one of the following: • respiration (1) • food / cacti / plants / seeds (1) • condensation (1)	Ignore rain / other water source	**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)	The only correct answer is D ZZ *A is incorrect because XY are the sex chromosomes of a human male* *B is incorrect because ZW are the sex chromosome of a female bird* *C is incorrect because ZY are not the sex chromosomes of a male bird*	**1**

Question Number	Answer	Additional guidance	Mark
5(b)(ii)	• determine probability of having one female • raise to the power of 4 = 0.0625 / 6.25% / 1/16 1 in 16 (2)	award full marks for correct numerical answer without working p of one female = 0.5 $(0.5)^4$ Allow one mark for 0.5 / ½ / 50% / 1 in 2 in working	**2**

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<table>
<tr><th>Question Number</th><th>Answer</th><th>Additional guidance</th><th>Mark</th></tr>
<tr><td>5(c)(i)</td><td>
<table>
<tr><th>Hormone</th><th>Source</th><th>Function</th></tr>
<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>
</table>
</td><td>Two answers must be correct for the mark eg: (LH) ovulation and inhibits oestrogen = 0

Ignore maintains pregnancy</td><td>4</td></tr>
</table>

Question Number	Answer	Additional guidance	Mark
5(c)(ii)	An answer that makes reference to the following: • FSH = Q • LH = R • oestrogen = P • progesterone = S (3)	three or four correct = 3 two correct = 2 one correct = 1 more than one letter on a line = 0	**3**

Total 11 marks

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Question Number	**Answer**	**Mark 2**

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

- 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:** • (number) reference to many cubes / many alveoli / (alveoli) not one large cube • (surface) reference to SA:Vol / surface area (1) **One from:** • (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**

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Question Number	Answer	Additional guidance	**Mark**
6(c)	An explanation that makes reference to the following points: • 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)	Mp1 Ignore faster diffusion Mp2 Ignore liquid	**3**

Total 8 marks

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Question Number	Answer	Additional guidance	**Mark**
7(a)(i)	An answer that makes reference to one of the following: • 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: • 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: • 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