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Mark Scheme (Results)

January 2021

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.

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Question Number	Answer	Mark
1(a)	An explanation that makes reference to two of the following points: • less oxygen (1) • (less) respiration (1) • (less) energy / ATP (1)	**2**

Question Number	Answer	Mark
1(b)	An explanation that makes reference to three of the following points: • DNA unzips / separates / one strand copied / eq (1) • complementary / base pairing /eq (1) • template (1) • mRNA produced / eq (1) • transcription (1)	**3**

Question Number	Answer	additional guidance	Mark
1(c)	• no nucleus / DNA / no ribosomes/ mitochondria /eq	ign amino acids / genetic material	**1**

Question Number	Answer	Mark
1(d)	• can pass across placenta (1)	**1**

Question Number	Answer		Mark

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1(e)(i)	An answer that makes reference to the following points: • parent genotype dd x Dd (1) • gamete d (and d) and D or d (1) • offspring genotype Dd and dd (1)	allow Punnett square any letter TE max 2	**3**

Question Number	Answer	Mark
1(e)(ii)	• 50% / 0.5 / half / 50:50 **not if contradicts ei**	**1**

Question Number	Answer	Mark
1(f)	An explanation that makes reference to three of the following points: • memory cells (1) • remain in mother's blood (1) • recognise / identify antigen / binds with antigen (1) • more antibodies produced/ produced faster / sooner (1) • secondary immune response (1)	**3**

Question Number	Answer	Mark
1(g)	• **in** the uterus / womb	**1**

Question Number	Answer	Mark
1(h)	• (adult) (rhesus) positive / positive / eq	**1**

Total 16 marks

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Question Number	Answer	additional guidance	Mark
2(a)(i)	An explanation that makes reference to two of the following points: • higher when temperature increases / lower when temp decreases (1) • more (kinetic) energy of water molecules / particles / eq (1) • increased diffusion / more liquid become gas / eq (1)	allow converse	**2**

Question Number	Answer	additional guidance	Mark
2(a)(ii)	An answer that makes reference to three of the following points: • use scale on beaker / tube / ruler / eq (1) • volume / mass of water lost from beaker / level of water in beaker / distance moved by bubble/eq (1) • use clock / measure time /stated time /eq (1) • divide volume / distance by time (1)	ign weigh clay pot	**3**

Question Number	Answer	Mark
2(b)(i)	An explanation that makes reference to two of the following points: • light (intensity) / carbon dioxide / turgor (1) • affects stomata opening / guard cells / eq (1)	**2**

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Question Number	Answer	additional guidance	Mark
2(b)(ii)	An answer that makes includes **labelled** drawings of: **<u>bubble potometer</u>** • plant (1) • capillary tube (1) • with bubble / drop of liquid /meniscus (1) • seal / petroleum jelly / /cork /bung/eq (1) • scale / ruler /eq (1) OR **<u>mass potometer</u>** • plant (1) • pot with soil / glass container with water (1) • method to avoid soil water loss eg. polythene / bung / (1) • weighing scales (1)	**no label no mark**	**4**

Total 11 marks

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Question Number	Answer	Mark
3(a)	The only correct answer is C as they are released from the pituitary A is not correct as they are not produced in ovary B is not correct as they are not produced in ovary D is not correct as they are not produced in ovary	**1**

Question Number	Answer	Additional guidance	Mark
3(b)	• 45 – 5 = 40 • 40 ÷ 5 × 100 = 800 (2)	allow one mark for 40 award full marks for correct numerical answer without working	**2**

Question Number	Answer	Mark
3(c)	A description that makes reference to four of the following points: **two from** • FSH stimulates **development / growth / maturation /eq** of follicle / egg / sperm production (1) • FSH stimulates oestrogen release /eq (1) **two from** • LH stimulates release of progesterone / testosterone (1) • LH stimulates ovulation / egg release (1) • LH stimulates development of corpus luteum (1) • LH inhibits release of oestrogen (1)	**4**

Total 7 marks

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Question Number	Answer	Mark
4(a)(i)	The only correct answer is A B is not correct as B is not Nitrogen fixation C is not correct as C is not Nitrogen fixation D is not correct as D is not Nitrogen fixation	**1**

Question Number	Answer	Mark
4(a)(ii)	The only correct answer is D A is not correct as A is not decomposition B is not correct as B is not decomposition C is not correct as C is not decomposition	**1**

Question Number	Answer	Mark
4(a)(iii)	The only correct answer is C A is not correct as A is not nitrification B is not correct as B is not nitrification D is not correct as D is not nitrification	**1**

Question Number	Answer	additional guidance	Mark
4(a)(iv)	• (nitrifying) bacteria / fungi allow correctly named genus / species (1)	ign denitrifying / nitrogen fixing bacteria / microorganisms	**1**

Question Number	Answer	Mark
4(b)(i)	An explanation that makes reference to two of the following points • compare / (look at growth in) test solution / without **nitrate** / eq (1) • compare with (growth of) control / shows normal growth /eq(1) • if control had no minerals / other minerals absent would not show normal growth (1)	**2**

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Question Number	Answer	Mark
4(b)(ii)	• remove nitrates / all minerals /eq (1)	**1**

Question Number	Answer	Mark
4(b)(iii)	An explanation that makes reference to two of the following points • block out light (from roots) /eq (1) • prevent photosynthesis (1) • prevent algal growth (1)	**2**

Question Number	Answer	Mark
4(b)(iv)	An explanation that makes reference to two of the following points • measure height / length / leaf area / mass of plants (1) • using ruler / balance / scales / eq (1) • of both solutions / seedlings complete with minus nitrates (1)	**2**

Total 11 marks

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Question Number	Answer	Mark
5(a)	277 x 50 • 13 850 (1)	**1**

Question Number	Answer	Mark
5(b)	An answer that makes reference to five of the following points • nucleus from (**body) / adult /diploid** cell of **male** dog (1) • insert (this) nucleus into enucleated / empty egg cell/eq (1) • electric shock (1) • mitosis / cell division (1) • <u>embryo</u> into uterus / womb (1) • surrogate mother (1)	**5**

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Question Number	Answer	Mark
5(c)	An answer that makes reference to four of the following points For cloning • can produce genetically identical pet / reduced genetic variation/ eq (1) • may have similar appearance / features to pet / eq (1) • can be cloned before death / may stop owner grieving / eq (1) Against • expensive / eq (1) • pet may behave different due to environment / training / eq (1) • many dogs used / die in attempt / dog farming / unethical /eq (1) • shorter life span (1) • idea of reduce variation within breed/ inbreeding idea bad for breed health / eq (1)	**4**

Total 10 marks

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Question Number	Answer	additional guidance	Mark
6(a)(i)	producer to primary consumer = 132/ 703 x 100 = 19%	**allow 18.8 / 18.78 / 18.777 18.7767 / eq**	**1**

Question Number	Answer	Mark
6(a)(ii)	primary consumer to secondary consumer = 1% of 1 = 0.01	**1**

Question Number	Answer	additional guidance	Mark
6(a)(iii)	• more energy transferred / less energy lost / less heat loss / less movement in aquatic / more of producer eaten /eq (1)	**allow converse** not all crop eaten	**1**

Question Number	Answer	Additional Guidance	Mark
6(b)	An explanation that makes reference to **two** the following points • less biomass in producers than consumers have more biomass / eq (1) • but producers have more energy /eq (1) • producers have low mass at any one point in time / are continually being consumed / replaced / high reproduction rate (1) • consumers feed in other areas/ eq (1)	ignore number	**2**

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Question Number	Answer	Mark
6(c)	An answer that makes reference to two of the following points • sampling using quadrats (1) • burn plants to release energy (1) • use of calorimeter / how heat energy released is measured when burning / heat volume of water and note temperature change/ eq (1)	**2**

Total 7 marks

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Question Number	Answer	additional guidance	Mark
7(a)	• 600 / 1400 • 0.43 dm^3 = • 430	one mark for 600 /1400 or one mark for 0.43/ eq **full marks for correct answer with no working** allow 429 / 428.57 or 428.6 / eq	**2**

Question Number	Answer	additional guidance	Mark
7(b)	• lungs / skin (1)	allow liver if two answers and one incorrect = 0 skin anus =0	**1**

Question Number	Answer	additional guidance	Mark
7(c)	An answer that makes reference to five of the following points • as blood concentration increases osmoreceptors / hypothalamus detects change (1) • pituitary gland release ADH (1) • increase permeability of collecting duct (1) • reabsorbed from collecting duct / into blood (1) • less urine /more concentrated urine (1) • increases water level / reduces blood concentration (1) • (so that) hypothalamus not stimulated / pituitary releases less ADH / negative feedback idea (1)	**allow converse if blood water content increases**	**5**

Total 8 marks

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