



# Mark Scheme (Results)

January 2021

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

Question Number	Answer	Mark
<b>1(a)</b>	An explanation that makes reference to two of the following points: <ul style="list-style-type: none"> <li>• less oxygen (1)</li> <li>• (less) respiration (1)</li> <li>• (less) energy / ATP (1)</li> </ul>	<b>2</b>

Question Number	Answer	Mark
<b>1(b)</b>	An explanation that makes reference to three of the following points: <ul style="list-style-type: none"> <li>• DNA unzips / separates / one strand copied / eq (1)</li> <li>• complementary / base pairing /eq (1)</li> <li>• template (1)</li> <li>• mRNA produced / eq (1)</li> <li>• transcription (1)</li> </ul>	<b>3</b>

Question Number	Answer	additional guidance	Mark
<b>1(c)</b>	<ul style="list-style-type: none"> <li>• no nucleus / DNA / no ribosomes/ mitochondria /eq</li> </ul>	ign amino acids / genetic material	<b>1</b>

Question Number	Answer	Mark
<b>1(d)</b>	<ul style="list-style-type: none"> <li>• can pass across placenta (1)</li> </ul>	<b>1</b>

Question Number	Answer	Mark

<b>1(e)(i)</b>	An answer that makes reference to the following points: <ul style="list-style-type: none"> <li>parent genotype dd x Dd (1)</li> <li>gamete d (and d) and D or d (1)</li> <li>offspring genotype Dd and dd (1)</li> </ul>	allow Punnett square any letter TE max 2	<b>3</b>
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Question Number	Answer	Mark
<b>1(e)(ii)</b>	<ul style="list-style-type: none"> <li>50% / 0.5 / half / 50:50 <b>not if contradicts ei</b></li> </ul>	<b>1</b>

Question Number	Answer	Mark
<b>1(f)</b>	An explanation that makes reference to three of the following points: <ul style="list-style-type: none"> <li>memory cells (1)</li> <li>remain in mother's blood (1)</li> <li>recognise / identify antigen / binds with antigen (1)</li> <li>more antibodies produced/ produced faster / sooner (1)</li> <li>secondary immune response (1)</li> </ul>	<b>3</b>

Question Number	Answer	Mark
<b>1(g)</b>	<ul style="list-style-type: none"> <li><b>in</b> the uterus / womb</li> </ul>	<b>1</b>

Question Number	Answer	Mark
<b>1(h)</b>	<ul style="list-style-type: none"> <li>(adult) (rhesus) positive / positive / eq</li> </ul>	<b>1</b>

Total 16 marks

Question Number	Answer	additional guidance	Mark
<b>2(a)(i)</b>	<p>An explanation that makes reference to two of the following points:</p> <ul style="list-style-type: none"> <li>• higher when temperature increases / lower when temp decreases (1)</li> <li>• more (kinetic) energy of water molecules / particles / eq (1)</li> <li>• increased diffusion / more liquid become gas / eq (1)</li> </ul>	allow converse	<b>2</b>

Question Number	Answer	additional guidance	Mark
<b>2(a)(ii)</b>	<p>An answer that makes reference to three of the following points:</p> <ul style="list-style-type: none"> <li>• use scale on beaker / tube / ruler / eq (1)</li> <li>• volume / mass of water lost from beaker / level of water in beaker / distance moved by bubble/eq (1)</li> <li>• use clock / measure time /stated time /eq (1)</li> <li>• divide volume / distance by time (1)</li> </ul>	ign weigh clay pot	<b>3</b>

Question Number	Answer	Mark
<b>2(b)(i)</b>	<p>An explanation that makes reference to two of the following points:</p> <ul style="list-style-type: none"> <li>• light (intensity) / carbon dioxide / turgor (1)</li> <li>• affects stomata opening / guard cells / eq (1)</li> </ul>	<b>2</b>

Question Number	Answer	additional guidance	Mark
<b>2(b)(ii)</b>	<p>An answer that makes includes <b>labelled</b> drawings of:</p> <p><b><u>bubble potometer</u></b></p> <ul style="list-style-type: none"> <li>• plant (1)</li> <li>• capillary tube (1)</li> <li>• with bubble / drop of liquid /meniscus (1)</li> <li>• seal / petroleum jelly / /cork /bung/eq (1)</li> <li>• scale / ruler /eq (1)</li> </ul> <p>OR</p> <p><b><u>mass potometer</u></b></p> <ul style="list-style-type: none"> <li>• plant (1)</li> <li>• pot with soil / glass container with water (1)</li> <li>• method to avoid soil water loss eg. polythene / bung / (1)</li> <li>• weighing scales (1)</li> </ul>	<b>no label no mark</b>	<b>4</b>

Total 11 marks

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

Question Number	Answer	Additional guidance	Mark
<b>3(b)</b>	<ul style="list-style-type: none"> <li>• <math>45 - 5 = 40</math></li> <li>• <math>40 \div 5 \times 100 = 800</math> (2)</li> </ul>	<p>allow one mark for 40</p> <p>award full marks for correct numerical answer without working</p>	<b>2</b>

Question Number	Answer	Mark
<b>3(c)</b>	<p>A description that makes reference to four of the following points:</p> <p><b>two from</b></p> <ul style="list-style-type: none"> <li>• FSH stimulates <b>development / growth / maturation /eq</b> of follicle / egg / sperm production (1)</li> <li>• FSH stimulates oestrogen release /eq (1)</li> </ul> <p><b>two from</b></p> <ul style="list-style-type: none"> <li>• LH stimulates release of progesterone / testosterone (1)</li> <li>• LH stimulates ovulation / egg release (1)</li> <li>• LH stimulates development of corpus luteum (1)</li> <li>• LH inhibits release of oestrogen (1)</li> </ul>	<b>4</b>

Total 7 marks

Question Number	Answer	Mark
<b>4(a)(i)</b>	<p>The only correct answer is A</p> <p>B is not correct as B is not Nitrogen fixation</p> <p>C is not correct as C is not Nitrogen fixation</p> <p>D is not correct as D is not Nitrogen fixation</p>	<b>1</b>

Question Number	Answer	Mark
<b>4(a)(ii)</b>	<p>The only correct answer is D</p> <p>A is not correct as A is not decomposition</p> <p>B is not correct as B is not decomposition</p> <p>C is not correct as C is not decomposition</p>	<b>1</b>

Question Number	Answer	Mark
<b>4(a)(iii)</b>	<p>The only correct answer is C</p> <p>A is not correct as A is not nitrification</p> <p>B is not correct as B is not nitrification</p> <p>D is not correct as D is not nitrification</p>	<b>1</b>

Question Number	Answer	additional guidance	Mark
<b>4(a)(iv)</b>	<ul style="list-style-type: none"> <li>(nitrifying) bacteria / fungi allow correctly named genus / species (1)</li> </ul>	ign denitrifying / nitrogen fixing bacteria / microorganisms	<b>1</b>

Question Number	Answer	Mark
<b>4(b)(i)</b>	<p>An explanation that makes reference to two of the following points</p> <ul style="list-style-type: none"> <li>compare / (look at growth in) test solution / without <b>nitrate</b> / eq (1)</li> <li>compare with (growth of) control / shows normal growth /eq(1)</li> <li>if control had no minerals / other minerals absent would not show normal growth (1)</li> </ul>	<b>2</b>

Question Number	Answer	Mark
<b>4(b)(ii)</b>	<ul style="list-style-type: none"> <li>remove nitrates / all minerals /eq (1)</li> </ul>	<b>1</b>

Question Number	Answer	Mark
<b>4(b)(iii)</b>	<p>An explanation that makes reference to two of the following points</p> <ul style="list-style-type: none"> <li>block out light (from roots) /eq (1)</li> <li>prevent photosynthesis (1)</li> <li>prevent algal growth (1)</li> </ul>	<b>2</b>

Question Number	Answer	Mark
<b>4(b)(iv)</b>	<p>An explanation that makes reference to two of the following points</p> <ul style="list-style-type: none"> <li>measure height / length / leaf area / mass of plants (1)</li> <li>using ruler / balance / scales / eq (1)</li> <li>of both solutions / seedlings complete with minus nitrates (1)</li> </ul>	<b>2</b>

Total 11 marks

Question Number	Answer	Mark
<b>5(a)</b>	$277 \times 50$ <ul style="list-style-type: none"> <li>• 13 850 (1)</li> </ul>	<b>1</b>

Question Number	Answer	Mark
<b>5(b)</b>	<p>An answer that makes reference to five of the following points</p> <ul style="list-style-type: none"> <li>• nucleus from (<b>body</b>) / <b>adult</b> / <b>diploid</b> cell of <b>male</b> dog (1)</li> <li>• insert (this) nucleus into enucleated / empty egg cell/eq (1)</li> <li>• electric shock (1)</li> <li>• mitosis / cell division (1)</li> <li>• <u>embryo</u> into uterus / womb (1)</li> <li>• surrogate mother (1)</li> </ul>	<b>5</b>

Question Number	Answer	Mark
<b>5(c)</b>	<p>An answer that makes reference to four of the following points</p> <p>For cloning</p> <ul style="list-style-type: none"> <li>• can produce genetically identical pet / reduced genetic variation/ eq (1)</li> <li>• may have similar appearance / features to pet / eq (1)</li> <li>• can be cloned before death / may stop owner grieving / eq (1)</li> </ul> <p>Against</p> <ul style="list-style-type: none"> <li>• expensive / eq (1)</li> <li>• pet may behave different due to environment / training / eq (1)</li> <li>• many dogs used / die in attempt / dog farming / unethical /eq (1)</li> <li>• shorter life span (1)</li> <li>• idea of reduce variation within breed/ inbreeding idea bad for breed health / eq (1)</li> </ul>	<b>4</b>

Total 10 marks

Question Number	Answer	additional guidance	Mark
<b>6(a)(i)</b>	producer to primary consumer = $132 / 703 \times 100 = 19\%$	<b>allow 18.8 / 18.78 / 18.777 18.7767 / eq</b>	<b>1</b>

Question Number	Answer	Mark
<b>6(a)(ii)</b>	primary consumer to secondary consumer = 1% of 1 = 0.01	<b>1</b>

Question Number	Answer	additional guidance	Mark
<b>6(a)(iii)</b>	<ul style="list-style-type: none"> <li>more energy transferred / less energy lost / less heat loss / less movement in aquatic / more of producer eaten / eq (1)</li> </ul>	<b>allow converse</b> not all crop eaten	<b>1</b>

Question Number	Answer	Additional Guidance	Mark
<b>6(b)</b>	<p>An explanation that makes reference to <b>two</b> the following points</p> <ul style="list-style-type: none"> <li>less biomass in producers than consumers / consumers have more biomass / eq (1)</li> <li>but producers have more energy / eq (1)</li> <li>producers have low mass at any one point in time / are continually being consumed / replaced / high reproduction rate (1)</li> <li>consumers feed in other areas/ eq (1)</li> </ul>	ignore number	<b>2</b>

Question Number	Answer	Mark
<b>6(c)</b>	An answer that makes reference to two of the following points <ul style="list-style-type: none"><li>• sampling using quadrats (1)</li><li>• burn plants to release energy (1)</li><li>• use of calorimeter / how heat energy released is measured when burning / heat volume of water and note temperature change/ eq (1)</li></ul>	<b>2</b>

Total 7 marks

Question Number	Answer	additional guidance	Mark
<b>7(a)</b>	<ul style="list-style-type: none"> <li>• 600 / 1400</li> <li>• <math>0.43 \text{ dm}^3 =</math></li> <li>• 430</li> </ul>	<p>one mark for 600 /1400 or one mark for 0.43/ eq</p> <p><b>full marks for correct answer with no working</b></p> <p>allow 429 / 428.57 or 428.6 / eq</p>	<b>2</b>

Question Number	Answer	additional guidance	Mark
<b>7(b)</b>	<ul style="list-style-type: none"> <li>• lungs / skin (1)</li> </ul>	<p>allow liver</p> <p>if two answers and one incorrect = 0 skin anus =0</p>	<b>1</b>

Question Number	Answer	additional guidance	Mark
<b>7(c)</b>	<p>An answer that makes reference to five of the following points</p> <ul style="list-style-type: none"> <li>• as blood concentration increases osmoreceptors / hypothalamus detects change (1)</li> <li>• pituitary gland release ADH (1)</li> <li>• increase permeability of collecting duct (1)</li> <li>• reabsorbed from collecting duct / into blood (1)</li> <li>• less urine /more concentrated urine (1)</li> <li>• increases water level / reduces blood concentration (1)</li> <li>• (so that) hypothalamus not stimulated / pituitary releases less ADH / negative feedback idea (1)</li> </ul>	<p><b>allow converse if blood water content increases</b></p>	<b>5</b>

Total 8 marks