



Pearson
Edexcel

Mark Scheme (Results)
November 2020

Pearson Edexcel International GCSE
In Biology (4BI1) Paper 1BR

Question Number	Answer	Mark
1(a)(i)	<p>B cell wall</p> <p><i>A is incorrect because it is not the cell membrane</i> <i>C is incorrect because it is not mitochondria</i> <i>D is incorrect because it is not the nucleus</i></p>	1 comp

Question Number	Answer	Mark
1(a)(ii)	<p>D starch</p> <p><i>A is incorrect because it is not chlorophyll</i> <i>B is incorrect because it is not glucose</i> <i>C is incorrect because it is not glycogen</i></p>	1 comp

Question Number	Answer	Additional guidance	Mark
1 (b) (i)	<p>An answer that makes reference to the following points:</p> <ul style="list-style-type: none"> • A: (chloroplasts absorb light) for photosynthesis / absorb light energy to make carbohydrate / eq (1) • B: (nucleus) controls protein synthesis / contains DNA / contains genes / controls cell / eq (1) • C: (vacuole) contains cell sap eq (1) • D: (cytoplasm) where chemical reactions occur (1) 	<p>Allow starch / glucose /sugar</p> <p>Allow maintains turgor / stores water / salts / pigments / toxins</p> <p>Allow where protein synthesis occurs / respiration occurs / medium for reactions</p>	4 grad

Question Number	Answer	Mark
1 (b) (ii)	<p>An answer that makes reference to the following points:</p> <ul style="list-style-type: none"> contains chloroplasts to absorb light / for photosynthesis eq (1) long / arranged in a vertical plane / large surface area / rectangular shape, to absorb most light / eq (1) large vacuole to store water (1) 	2 grad

Total 8 marks

Question Number	Answer	Mark
2(a)	<p>C plasmid</p> <p><i>A is incorrect because it is not the cell wall</i> <i>B is incorrect because it is not the nucleoid</i> <i>D is incorrect because it is not RNA</i></p>	1 comp

Question Number	Answer	Additional guidance	Mark
2(b)	<p>An answer that makes reference to three of the following points:</p> <ul style="list-style-type: none"> insulin / glucagon (1) steam / hot water (1) competition / contamination / eq (1) mix / stir / agitate / distribute / eq (1) oxygen / O₂ (1) temperature (1) 	<p>Allow disinfectant / bleach / sterilising fluid / alcohol / ethanol</p> <p>Allow infection</p>	6 grad

Total 7 marks

Question Number	Answer	Mark
3(a)(i)	<p>D trachea</p> <p><i>A is incorrect because it is not the bronchiole</i> <i>B is incorrect because it is not the bronchus</i> <i>C is incorrect because it is not the oesophagus</i></p>	1 comp

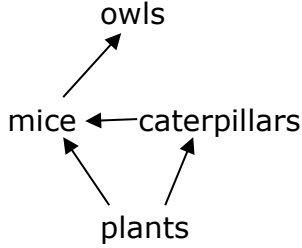
Question Number	Answer	Mark
3(a)(ii)	<p>B pulmonary artery</p> <p><i>A is incorrect because it is not the aorta</i> <i>C is incorrect because it is not the pulmonary vein</i> <i>D is incorrect because it is not the vena cava</i></p>	1 comp

Question Number	Answer	Mark
3(a)(iii)	<p>A contract contract</p> <p><i>B is incorrect because the external intercostals do not relax</i> <i>C is incorrect because the diaphragm does not relax</i> <i>D is incorrect because the diaphragm and the intercostals do not relax</i></p>	1 comp

Question Number	Answer		Mark
3(b)	<p>An answer that makes reference to four of the following points:</p> <ul style="list-style-type: none"> • more blood to muscles / less blood to intestine (during exercise) / eq (1) • supply oxygen / oxygenated blood / glucose (1) • respiration (1) • energy / ATP (1) • muscle contraction (1) • less absorption of food / eq, in intestine when running / (1) 	<p>Allow converse for at rest Allow blood is diverted to the muscles from the intestine</p> <p>Allow prevent anaerobic respiration / enable aerobic respiration for two marks</p> <p>Allow high blood flow at rest to intestine to absorb food / maintain concentration gradient</p>	4 exp

Question Number	Answer	Mark
3(c)	<p>An explanation that makes reference to two of the following points:</p> <ul style="list-style-type: none"> • (supply (more)) oxygen / there was a shortage of oxygen (1) • breakdown / remove lactic acid (1) • repay oxygen debt (1) • anaerobic respiration had occurred (1) 	2 exp

Total 9 mark

Question Number	Answer	Additional guidance	Mark
4(a)	<p>An answer that makes reference to the following points:</p> <ul style="list-style-type: none"> arrows in correct direction (1) food web includes four organisms (in correct places) (1) 	<p>Allow MP1 if only one food chain</p> <p>plants →caterpillars →mice→owls = one mark</p> <p>No marks if more than one web drawn and one is incorrect</p>	2 grad

Question Number	Answer	Mark
4(b)	<ul style="list-style-type: none"> primary consumer / 1^o consumer 	1 cler

Question Number	Answer	Additional guidance	Mark
4(c)(i)	<ul style="list-style-type: none"> $3 \times 10^3 = 3000$ per km^2 (1) $\times 5 = 15\,000$ (1) 	<p>Allow $\times 5$ for one mark</p> <p>Allow 3000 for one mark</p> <p>Allow $1.5 \times 10^4 / 15 \times 10^3$</p> <p>Award full marks for correct numerical answer without working</p>	2 grad

Question Number	Answer	Additional guidance	Mark
4(c)(ii)	<p>An answer that makes reference to three of the following points:</p> <ul style="list-style-type: none"> • more food / plants / caterpillars / other sources of food available (1) • warmer weather (1) • fewer other predators / owls ate other species (1) • less disease / infection (1) • higher birth rate than death rate (1) 	Ignore fewer owls	3 exp

Question Number	Answer	Mark
4(c)(iii)	<p>An answer that makes reference to two of the following points:</p> <ul style="list-style-type: none"> • feed on other prey (1) • insufficient food / energy to maintain more owls (1) • have no predators (1) • birth rate = death rate / birth rate and death rate are similar (1) • owls produce few offspring (so population will not rapidly increase) (1) 	2 exp

Question Number	Answer	Mark
4(c)(iv)	<p>An answer that makes reference to three of the following points:</p> <ul style="list-style-type: none">• use a trap / use filming / use a sample area / use a quadrat (1)• random sampling (1)• repeat (1)• count number of mice / faeces (in quadrat) (1)• calculate average (1)• multiply up to total area (1)	3 exp

Total 12 marks

Question Number	Answer	Mark
5(a)(i)	<p>An explanation that makes reference to three of the following points:</p> <ul style="list-style-type: none"> • oxygen (1) • glucose (1) • respiration (1) • energy / ATP (1) 	3 exp

Question Number	Answer	Additional guidance	Mark
5(a)(ii)	<p>An explanation that makes reference to two of the following points:</p> <ul style="list-style-type: none"> • antibodies (from mother) (1) • (bind to) antigens (1) • to kill bacteria / pathogen / virus eq (1) 	Allow destroy / bind to pathogens / clump pathogens / mark / label pathogen	2 grad

Question Number	Answer	Additional guidance	Mark
5(b)	<p>An answer that makes reference to two of the following points:</p> <ul style="list-style-type: none"> • fetus is female / a girl (1) • cells contain 46 chromosomes / 23 pairs / has a diploid number / has two sets of chromosomes / normal number of chromosomes / eq (1) • chromosomes have different lengths / sizes / shapes (1) 	Allow does not have Down's syndrome /	2 exp

Question Number	Answer	Mark
5(c)(i)	<p>An answer that makes reference to four of the following points:</p> <ul style="list-style-type: none"> • calcium for bone / teeth growth / bone / teeth development / prevent rickets (1) • protein to grow / for enzymes / antibodies / eq (1) • iron for haemoglobin / red blood cells / prevent anaemia (1) • vitamin D for bone growth / bone development / calcium absorption / strong bones (1) • more energy as baby is heavy / mother becomes heavy / more energy for fetal development / to carry baby / eq (1) 	4 exp

Question Number	Answer	Additional guidance	Mark
5(c)(ii)	<ul style="list-style-type: none"> • $9 = 50\%$ more (1) • $100\% = 9 \times 2 = 18$ (1) • $18 + 9 = 27$ (1) 	<p>Allow one mark for 0.5 / 50% / $\frac{1}{2}$ / times 2</p> <p>Allow 18 for two marks</p> <p>Award full marks for correct numerical answer without working</p>	3 exp

Total 14

Question Number	Answer	Additional guidance	Mark
6(a)	<p>An explanation that makes reference to two of the following points:</p> <ul style="list-style-type: none"> • as distance from city centre increases, percentage coverage by lichen increases (1) • more cars in city centre / more car pollution in city centre (1) • more sulfur dioxide in city centre (1) 	<p>Allow correlation idea eg as lichen increases so does distance Allow converse</p> <p>Allow converse</p> <p>Allow converse</p>	2 grad

Question Number	Answer	Additional guidance	Mark
6(b)	<p>An answer that makes reference to three of the following points:</p> <ul style="list-style-type: none"> • measure area of lichen (1) • measure the (total) area of stone (1) • divide (lichen) cover by total area and x 100 (1) • repeat (to find mean) (1) 	<p>Allow use a grid / quadrat to measure percentage cover / count squares with lichen</p>	3 exp

Question Number	Answer		Mark
6(c)	<p>An answer that makes reference to six of the following points:</p> <ul style="list-style-type: none"> • C seeds exposed to SO₂ and not exposed to SO₂ / different concentrations of SO₂ (1) • O same species / age / variety/ type of seed (1) • R lots of seeds / repeat experiments (1) • M1 measure temperature change (1) • M2 using thermometer (1) • S1 thermos flask to contain seeds / insulate / prevent heat loss / eq (1) • S2 same moisture / humidity oxygen / water carbon dioxide / same starting temperature / light intensity / wash seeds with disinfectant / time / eq (1) 	Allow seeds with metabisulphite and seeds without	6 exp

Total 11 marks

Question Number	Answer	Mark
7(a)	<p>An explanation that makes reference to the following points:</p> <ul style="list-style-type: none"> • produces maltose / glucose (1) • turns red / green /yellow/orange /eq (with Benedict's test) (1) 	2 exp

Question Number	Answer	Additional guidance	Mark
7(b)	<p>An explanation that makes reference to four of the following points:</p> <ul style="list-style-type: none"> • same/stated volume / concentration of amylase (1) • same/stated mass of bread (1) • same/stated time (before pouring water) (1) • same/stated volume of water (1) • same/stated volume / concentration of Benedict's (1) • same time of heating / same temp for Benedict's test (1) • stated range of temperatures (1) • repeat each temperature / calculate mean time (1) 	<p>Ignore amount for all</p> <p>Allow same size /volume / piece of bread /same type of bread</p> <p>Allow same number of drops</p> <p>at least two stated temperatures</p>	4 exp

Question Number	Answer	Mark
7(c)	<p>An answer that makes reference to four of the following points:</p> <p>(increased temperature increases rate)</p> <ul style="list-style-type: none"> • (due to increased) kinetic energy (1) • (more) movement of molecules / collisions (1) • until <u>optimum</u> temperature (1) • rate decreases at high temperature / digestion stops at high temperature (1) • (because) enzyme denatured / change to active site / no longer binds (1) 	4 exp

Total 10 marks

Question Number	Answer	Additional guidance	Mark
8(a)	<p>An answer that makes reference to the following points:</p> <ul style="list-style-type: none"> • S scales linear and at least half axis (1) • A1 Axes 'correct way round' (1) • L lines straight and joining each point (1) • A2 labelled 'year' and 'percentage of students' (1) • P points accurately plotted (1) • K key or lines labelled for cigarettes and vaping (1) 	<p>bar chart lose L only</p> <p>Do not allow L if extrapolated</p> <p>Points plotted within one small square</p>	6 exp

Question Number	Answer	Mark
8(b)	<p>A description that makes reference to two from the following points:</p> <ul style="list-style-type: none"> • e-cigarette use increased (from 2011) up to 2015 then decreased / decreased in 2016 (1) • smoking normal cigarettes decreases (from 2011 to 2016) (1) • at start e-cigarettes lower than smoking / significantly low / at end e-cigarette use higher than smoking / significantly high (1) 	2 grad

Question Number	Answer	Additional guidance	Mark
8(c)	<ul style="list-style-type: none"> • $15.8 - 8 = 7.8$ • $7.8 \div 100 \times 60\,000 = 4680$ <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> • $15.8 / 100 \times 60\,000 = 9480$ • $8.0 / 100 \times 60\,000 = 4800$ • $9480 - 4800 = 4680$ 	<p>Allow 1 mark for 7.8 or 0.078</p> <p>Award full marks for correct numerical answer without working</p>	2 grad

Question Number	Answer	Additional guidance	Mark
8(d)(i)	<p>An explanation that makes reference to four of the following points</p> <ul style="list-style-type: none"> • less tar (1) • fewer carcinogens / less risk of cancer (1) • less risk of emphysema / lung disease / damage to alveoli / chronic bronchitis / damage to cilia / eq (1) • less carbon monoxide (1) • less risk of heart disease / strokes (1) • less risk of addiction / can control nicotine levels (1) 	<p>Allow converse for normal cigarettes for all MPs</p>	4 exp

Question Number	Answer	Mark
8(d)(ii)	An answer that makes reference to two of the following points: <ul style="list-style-type: none">• non-smokers may start using e-cigarettes (1)• e-cigarettes may lead to taking up smoking (1)• e-cigarettes are addictive as they contain nicotine (1)• nicotine can increase risk of blood clots / increase blood pressure (1)• e-cigarettes may also be harmful / damage lungs / risks not yet known (1)	2 exp

Total 16 marks

Question Number	Answer	Mark
9(a)(i)	<ul style="list-style-type: none"> cleft chin or not / appearance of chin / eq (1) 	1 grad

Question Number	Answer	Additional guidance	Mark
9(a)(ii)	<p>An answer that makes reference to one of the following points:</p> <ul style="list-style-type: none"> (the section of) DNA that determines whether the individual is cleft chin or not (1) section of DNA that codes for a protein (1) 	Allow (section of) DNA that codes for cleft chin characteristic	1 exp

Question Number	Answer	Mark
9(a)(iii)	<ul style="list-style-type: none"> (different) version(s) of the (cleft chin) gene / alternative forms of the gene (1) 	1 exp

Question Number	Answer	Additional guidance	Mark
9(b)(i)	<p>An answer that makes reference to the following points:</p> <ul style="list-style-type: none"> both parents Nn (1) gametes produced N or n from each parent (1) offspring genotypes shown NN Nn Nn nn (1) offspring phenotypes shown 3 cleft 1 without cleft chin (1) 	<p>Allow full marks from a Punnett square</p> <p>Allow MP2 and MP3 for wrong parental genotypes</p>	4 exp

Question Number	Answer	Additional guidance	Mark
9(b)(ii)	$0.25 \times 0.5 =$ $0.125 / 1/8 / 12.5 \%$	<p>Allow 1 mark for 0.25 / 25 % / $1/4$</p> <p>Allow full marks for correct numerical answer without working</p>	2 grad

Question Number	Answer	Mark
9(b)(iii)	<p>An answer that makes reference to one of the following points:</p> <ul style="list-style-type: none"> • environment / diet means different shaped chin(1) • mutation (1) 	1 exp

Question Number	Answer	Mark
9(c)	<p>A description that makes reference to three of the following points:</p> <ul style="list-style-type: none"> • use crosses between different rats / test cross pedigree analysis to predict outcomes / look at pedigree diagrams / family trees / family history (1) • if single gene offspring show simple pattern / shows 3:1 ratios / look like one parent / eq(1) • single gene shows discontinuous variation / two or three phenotypes (1) • polygenic leads to continuous variation / intermediate expression many different phenotypes / much more variation / three of more phenotypes (1) 	3 exp

Total 13 marks

Question Number	Answer	Mark
10(a)	<p>An explanation that makes reference to four of the following points:</p> <ul style="list-style-type: none">• nitrates (for growth) (1)• for amino acids (1)• for protein (1)• magnesium for chlorophyll / chloroplasts (1)• so more photosynthesis (1)• more glucose (1)• phosphates used for ATP / DNA / eq (1)• potassium for control of water movement / eq (1)	4 exp

Question Number	Answer	Mark
10(b)	<p>An answer that makes reference to four of the following points:</p> <ul style="list-style-type: none"> • fertiliser leaches into river / washed into river / eq (1) • fertiliser would cause algal / plant growth / algal bloom / eutrophication (1) • dead algae are decomposed / broken down by bacteria / decomposers (1) • (bacterial) respiration would reduce oxygen (1) • means were calculated / readings repeated so experiment is <u>reliable / valid</u> (1) • measurements taken at same time of year / in April (so are valid) (1) • direction of river is past farm (1) • reduced oxygen could be due to other factors / sources of fertiliser from other fields (1) 	4 exp

Question Number	Answer	Mark
10(c)	<ul style="list-style-type: none"> • manure / faeces / dung / compost / seaweed / bone / blood / animal wastes / eq (1) 	1 grad

Total 10 marks