Mark Scheme (Results)

Summer 2017

Pearson Edexcel International GCSE
in Biology (4BI0) Paper 1BR

Pearson Edexcel International GCSE
in Science (Double Award) (4SC0) Paper 1BR

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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.

Question number	Answer	Notes	Marks
1 (a) (i)	three / 3;		1
(ii)	tertiary consumer / 3^0;	Ignore third consumer / top carnivore / predator	1
(b)(i)	1. (absorbed) by chlorophyll / chloroplasts; 2. photosynthesis; 3. chemical energy / carbohydrate / starch / glucose; 4. open stomata to let carbon dioxide in;	3. Ignore food / sugar / sucrose	max 2
(ii)	31.2 / 31;;	Allow one mark for ÷ 2000 in working	2
(iii)	1. temperature; 2. carbon dioxide; 3. water / humidity / moisture; 4. minerals / ions / named mineral / named ion / eq;	4. Ignore nutrients	max 2
(c)	1. respiration / heat loss / movement; 2. egested / undigested / faeces / cellulose; 3. excreted / urine / urea; 4. uneaten / not all organism eaten / roots not eaten / bones not eaten / teeth not eaten;	not digested so excreted as faeces = 1	max 3

Total 11 marks

<table>
<tr><th>Question number</th><th>Answer</th><th>Notes</th><th>Marks</th></tr>
<tr><td>2 (a)</td><td>
<table>
<tr><th>Part of digestive system</th><th>Starch</th><th>Fat</th><th>Protein</th></tr>
<tr><td>A</td><td>(✓)</td><td>×</td><td>×;</td></tr>
<tr><td>B</td><td>(×)</td><td>×</td><td>✓;</td></tr>
<tr><td>C</td><td>✓</td><td>✓</td><td>✓;</td></tr>
<tr><td>D</td><td>×</td><td>×</td><td>×;</td></tr>
</table>
Hybrid cross tick = 0
Blank box = 0
</td><td>one for each correct row</td><td>4</td></tr>
<tr><td>(b) (i)</td><td>1. <u>capillary</u> (drawn and) labelled;

2. <u>lacteal</u> (drawn and) labelled;

3. <u>microvilli</u> position labelled;</td><td></td><td>3</td></tr>
<tr><td>(ii)</td><td>1. <u>less</u> growth / eq;

2. (less) surface area;

3. (less) absorption of amino acids / glucose / fatty acids / glycerol / mineral(s)/ion(s) / vitamin(s);

4. less respiration / less energy / less ATP / less protein synthesis / eq;</td><td>Ignore fewer villi

3.Ignore nutrients / food / digested food

3. starch and amino acids = 0</td><td>max 3</td></tr>
</table>

Total 10 marks

Question number	Answer	Notes	Marks
3 (a) (i)	A;		1
(ii)	C;		1
(b)(i)	1. water;	Ignore amylase / enzymes / hops	
	2. starch / malt / barley;	2. Ignore carbohydrate / sucrose / sugar	
	3. glucose / maltose;		
	4. ethanol;		max 2
(ii)	7.0 / 7;;	Allow one mark for 13 or 18 or 21 in working	2
(c)(i)	39 °C;		1
(ii)	1. low (kinetic) energy / less movement of molecules / enzymes / substrate;	1. Ignore less activity	
	2. few collisions / few enzyme substrate complexes;		2
(iii)	1. water bath / Bunsen / adding hot water;	thermostatically controlled water bath = 2	
	2. thermometer;		2

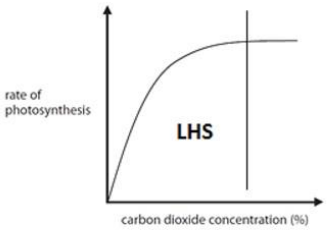
Total 11 marks

Question number	Answer	Notes	Marks
4 (a) (i)	1. increase heart rate / increase breathing rate; 2. (more) oxygen / widen bronchi; 3. (more) glucose / glycogen to glucose; 4. muscles; 5. respiration / energy / ATP; 6. divert blood from intestine;	Ignore pupil dilation	max 4
(ii)	1. collecting duct; 2. (more) permeable; 3. (more) water (re)<u>absorption</u> / water into <u>blood</u>; 4. less urine / more concentrated urine / less water in urine / eq;		max 4
(b)(i)	1. low and high exercise = more risk / (above) average / high; 2. medium = less risk / below / low;	Risk falls when more exercise is done and risk increases when high exercise is done = 2	2
(ii)	(risk of infection increases because) 1. (fewer) phagocytes to engulf / ingest / digest; 2. (fewer) lymphocytes / memory cells to produce antibody;	1. (less) phagocytosis = 1 1. Ignore destroy / kill / eat Fewer phagocytes so less antibodies = 0	2

Total 12 marks

Question number	Answer	Notes	Marks
5 (a)	1. anther; 2. meiosis; 3. stigma; 4. style; 5. ovule; 6. fertilisation; 7. fruit;	1. Ignore stamen 3. Ignore carpel 5. Ignore ovum / ova / egg / ovary Ignore fusion 7. Reject fruit wall	7
(b) (i)	1. stigma enclosed / covered stigma / short stigma / not feathery; 2. anthers enclosed / stamens enclosed / covered stamens / filaments short / eq; 3. petals large / (flowers) large; 4. nectary;	Allow converse 2. Ignore pollen grains 3. Ignore bright / coloured 4. ignore nectar / scent	max 2
(ii)	1. more pollen / eq; 2. light / small / dust like / eq;	Allow converse	max 2

Total 11 marks

Question number	Answer	Notes	Marks
6 (a)	X on any part left hand side of the vertical line;	 Line bisects 'n and t'	1
(b)	1. carbon dioxide + water; 2. glucose + oxygen;	Allow marks if chemical equation given and ignore balance Ignore light / chlorophyll / energy	2
(c)(i)	carbon dioxide;		1
(ii)	1. temperature; 2. light; 3. plant species / mass of plant / type of plant / size of plant / eq;	Ignore water 2. Ignore sun 3. plant alone = 0	max 1
(iii)	1. repeat / calculate mean / eq; 2. similar results / similar pattern / concordant results / identify anomalous results;	1. Ignore if with different plant species / different abiotic variables	2

Total 7 marks

Question number	Answer	Notes	Marks
7 (a)	1. gene / allele / DNA / genetic material / genome; 2. new / different / changed / altered / recombinant / inserted / eq;	 2. Ignore modified 2. must be linked to Mp1	 2
(b) (i)	1. S both scales linear and at least half grid; 2. L both lines straight and through points; 3. A1 axes correct way around; 4. A2 y axis labelled with <u>percentage/%</u> (of each crop that is) <u>GM</u> and x axis labelled <u>year</u>; 5. P points plotted correctly; 6. K key soybean and corn;	 2. Lose if extrapolated from origin 5. Allow half square error	 6
(ii)	1. both increase in growth / eq; 2. soybean growth is more / soybean early increase in growth / growth sooner / levels off;	Ignore quoted numbers alone 2. Allow converse	 2
(c)(i)	1. herbicides will not affect/harm crop / only kill weeds / kill other plants / eq; 2. increase crop yield / reduce competition / eq;		 2
(ii)	pests / insects / pathogens / microorganisms / fungi / viruses / parasites / frost / drought / diseases / eq;	Ignore infection / pesticide / fungicide	1

Question number	Answer	Notes	Marks
(d)	1. use plants with large seeds; 2. (how) plant seeds / grow seeds / germinate seeds / eq; 3. breed / reproduce / pollination / eq; 4. use offspring with large seeds / eq; 5. repeat for several generations / eq;	1. R if also choose small seeds 3. R if asexual 4. R if asexual	max 4

Total 17 marks

Question number	Answer	Notes	Marks
8 (a) (i)	1. sample C; 2. protein into Bowman's capsule / out of glomerulus / out of capillaries / in filtrate;	 2. Allow converse	 2
(ii)	(sample A) 1. positive / sample has glucose / glucose present (in urine) / non diabetic has no glucose (in urine) / eq; 2. too much glucose in the blood / glucose not (re)absorbed / lack insulin / cannot convert glucose to glycogen / eq;		 2
(iii)	1. Benedict's <u>and</u> heat / warm / boil / water bath 2. (brick) red / green / yellow / orange;	Allow colour if test is incorrect	 2
(b)	1. pathogen / bacteria / virus / microorganism / eq; 2. infection / disease;	1. Ignore germs 2. Ignore hygiene / health 2. Allow named pathogen / infection	 2

Total 8 marks

Question number	Answer	Notes	Marks
9 (a) (i)	X in oviduct / X labelling oviduct;	Allow from funnel to white of uterus	1
(ii)	A oviduct / fallopian tube; B ovary; C uterus / womb;		3
(iii)	1. intercourse / copulation / mating / receives penis / ejaculation / receives sperm / eq; 2. birth / eq;		2
(b) (i)	oestrogen;		1
(ii)	1. menstrual cycle / menstruation / ovulation (starts) / periods (start); 2. breasts / mammary glands / eq; 3. body hair / pubic hair / eq; 4. hips widen / fat deposition on hips / eq;	Ignore repair uterus Ignore deepening of voice / voice breaks Ignore secondary sexual characteristics Ignore body shape changes	max 2

Total 9 marks

Question number	Answer	Notes	Marks
10 (a) (i)	water <u>vapour</u>;		1
(ii)	CFCs / nitrous oxide / nitrogen oxides / N_2O / HFCs / SF_6 / halocarbons / / fluorinated gases / eq;	Ignore NO / NO_2	1
(b) (i)	1. less abundant / less emissions / less produced / eq; 2. not stay long / degenerates / breaks down / eq;	Allow converse Ignore blows away	2
(ii)	1. CO_2 is increasing; 2. humans can control CO_2 / CO_2 release due to human activity / eq;		max 1

Question number	Answer	Notes	Marks
(iii)	1. reduce use of fossil fuels / coal / oil / gas / petrol;	Ignore recycling	
	2. use renewable energy / solar / wind / waves / biofuels / eq;	2. Ignore electricity / insulate buildings / low energy bulbs	
	3. reduce deforestation / reforestation / plant more trees / eq;		
	4. travel by public transport / bus / train / bicycle / walking / hybrid cars / eq;		max 2
(c)	1. climate change / extreme weather / change in rainfall / desertification / drought / erosion / coral bleaching / eq;	Ignore habitat destruction / fires	
	2. ice melting / raise sea level / flooding / eq;		
	3. change in food chain / food web / food supply / eq;		
	4. spread of disease / pests / pathogens / migration / extinction / eq;		max 2

Total 9 marks

Question number	Answer	Notes	Marks
11 (a) (i)	1. red cells high(er) density / great(est) mass / heavy / eq; 2. plasma low density / least mass / light(er) / eq; 3. white cells / platelets / intermediate mass / density / eq;		max 2
(ii)	1. more red blood cells / eq; 2. less plasma / eq; 3. same white blood cells / platelets / eq;	Allow number / volume / amount Allow converse for anaemia	max 2
(iii)	1. less energy / tiredness / fatigue / / out of breath / paleness / difficult to exercise / eq; 2. (less) haemoglobin / iron; 3. (less) oxygen / (less) respiration;	Ignore heavy breathing / trouble breathing / feeling weak	2
(iv)	menstruation / loss of uterus lining / periods / eq;		1
(b) (i)	glucose / amino acids / glycerol / fatty acids / vitamins / named vitamin / minerals / named mineral;	Ignore carbohydrate / sugar / protein / lipid / fat / electrolytes	1
(ii)	hormones / named hormone / antibody / plasma proteins / named plasma protein / clotting proteins / water / urea / carbon dioxide / oxygen;		1

Total 9 marks

Question number	Answer	Notes	Marks
12	C different/range of temperatures; O same type of powder / same mass of powder / same concentration of powder / same enzymes; R repeat for each temperatures / repeat same experiment / eq; M1 measure (change in) mass of stain / colour / area / disappearance of stain / eq; M2 time stated / time taken (to disappear) / eq; S1 same mass of stain / same source of stain / same area of stain / same type of stain / same colour of stain / eq; or S2 same water / same volume of water / same washing machine / washing action / same pH / eq; or S3 same material / same shirt / same position on shirt / eq;	M1 Allow amount S marks Max 2	6 max

Total 6 marks

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