

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°;	Ignore third consumer / top carnivore / predator	1
(b)(i)	 (absorbed) by chlorophyll / chloroplasts; photosynthesis; 		
	3. chemical energy / carbohydrate / starch / glucose;	3. Ignore food / sugar / sucrose	
	4. open stomata to let carbon dioxide in;		max 2
(ii)	31.2 / 31;;	Allow one mark for ÷ 2000 in working	2
(iii)	1. <u>temperature</u> ;		
	2. carbon dioxide;		
	3. water / humidity / moisture;		
	4. minerals / ions / named mineral / named ion / eq;	4. Ignore nutrients	max 2
(c)	 respiration / heat loss / movement; egested / undigested / faeces / cellulose; 	not digested so excreted as faeces = 1	
	3. excreted / urine / urea;		
	4. uneaten / not all organism eaten / roots not eaten / bones not eaten / teeth not eaten;		max 3
		Total 11 ma	

Question number		Answ	/er		Notes	Marks
2 (a)	Part of digestive system A B C D	(√) (*) √	Fat x x x x	Protein	one for each correct row	4
(b) (i)	Hybrid cross tick Blank box = 0 1. capillary (drawn 2. lacteal (drawn 3. microvilli posi	wn and) label n and) labelle	d;			3
(ii)	 less growth / (less) surface (less) absorpt glucose / fatt vitamin(s); less respiration less protein state 	area; tion of amino y acids / glyc	erol / minera gy / less ATP		Ignore fewer villi 3.Ignore nutrients / food / digested food 3. starch and amino acids = 0	max 3

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 /	
			3. glucose / maltose;	sucrose / sugar	
			4. ethanol;		max 2
		(ii)	7.0 / 7;;	Allow one mark for 13 or 18 or 21 in working	2
		(c)(i)	<u>39 °C</u> ;		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;	Butti – Z	2

Total 11 marks

Question number	Answer	Notes	Marks
4 (a) (i)	 increase heart rate / increase breathing rate; (more) oxygen / widen bronchi; 	Ignore pupil dilation	
	3. (more) glucose / glycogen to glucose;4. muscles;5. respiration / energy / ATP;6. divert blood from intestine;		max 4
(ii)	 collecting duct; (more) permeable; (more) water (re)<u>absorption</u> / water into <u>blood</u>; less urine / more concentrated urine / less water in urine / eq; 		max 4
(b)(i)	 low and high exercise = more risk /	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;	 (less) phagocytosis = 1 Ignore destroy / kill / eat Fewer phagocytes so less antibodies = 0 	2

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

Question number	Answer	Notes	Marks
6 (a)	X on any part left hand side of the vertical line;	rate of photosynthesis LHS carbon dioxide concentration (%)	1
		Line bisects 'n and t'	
(b)	 carbon dioxide + water; glucose + oxygen; 	Allow marks if chemical equation given and ignore balance	2
		Ignore light / chlorophyll / energy	
(c)(i)	carbon dioxide;		1
(ii)	1. temperature;	Ignore water	
	2. light;	2. Ignore sun	
	3. plant species / mass of plant / type of plant / size of plant / eq;	3. plant alone = 0	max 1
(iii)	 repeat / calculate mean / eq; similar results / similar pattern / concordant results / identify anomalous results; 	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 modified2. 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;	2. Lose if extrapolated from origin	
	3. A1 axes correct way around;	Origin	
	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;	5. Allow half square error	
	6. K key soybean and corn;	Square error	6
(ii)	1. both increase in growth / eq;	Ignore quoted numbers alone	
	2. soybean growth is more / soybean early increase in growth / growth sooner / levels off;	2. Allow converse	2
(c)(i)	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)	 use plants with large seeds; (how) plant seeds / grow seeds / germinate seeds / eg; 	1. R if also choose small seeds	
	3. breed / reproduce / pollination / eq;	3. R if asexual	
	4. use offspring with large seeds / eq;5. repeat for several generations / eq;	4. R if asexual	max 4

Total 17 marks

Question number	Answer	Notes	Marks
8 (a) (i)	 sample C; 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 		
(iii)	/ eq; 1. Benedict's <u>and</u> heat / warm / boil / water bath	Allow colour if test is incorrect	2
	2. (brick) red / green / yellow / orange;		2
(b)	pathogen / bacteria / virus / microorganism / eq;	1. Ignore germs	
	2. infection / disease;	2. Ignore hygiene / health	2
		2. Allow named pathogen / infection	

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);	Ignore repair uterus	
	2. breasts / mammary glands / eq;	Ignore deepening of voice / voice breaks	
	3. body hair / pubic hair / eq;	Ignore secondary sexual	
	4. hips widen / fat deposition on hips /	characteristics	max 2
	eq;	Ignore body shape changes	

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;	Allow converse	
			2. not stay long / degenerates / breaks down / eq;	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;	/ low energy builds	
	4. travel by public transport / bus / train / bicycle / walking / hybrid cars / eq;		max 2
(c)	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;	Allow number / volume /	
		2. <u>less</u> plasma / eq;	amount	
		3. <u>same</u> <u>white</u> blood cells / platelets / eq;	Allow converse for anaemia	max 2
	(iii)	1. less energy / tiredness / fatigue / / out of breath / paleness / difficult to exercise / eq;	Ignore heavy breathing / trouble	
		2. (less) haemoglobin / iron;	breathing / feeling weak	
		3. (less) oxygen / (less) respiration;		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

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;	M1 Allow amount	
	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	S marks Max 2	
	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;		6 max

Total 6 marks

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