

Mark Scheme (Results)

Summer 2012

International GCSE

Biology (4BI0) Paper 1B

Science Double Award (4SC0) Paper 1B

Edexcel Level 1/Level 2 Certificate

Biology (KBI0) Paper 1B

Science (Double Award) (KSC0) Paper 1B

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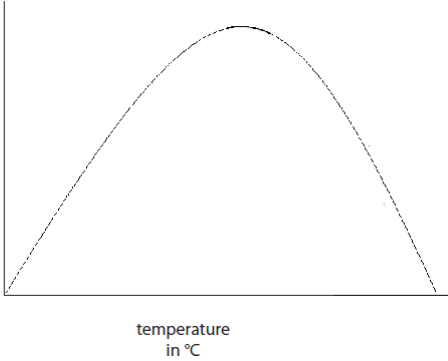
INTERNATIONAL GCSE BIOLOGY PAPER 1B – SUMMER 2012

Question number	Answer			Notes	Marks
1 (a)	Feature	Plants	Animals	4 marks all correct 3 marks for 6 or 7 2 marks for 4 or 5 1 marks for 2 or 3 0 marks for 0 or 1 blank squares = wrong tick cross combined = wrong	4
	can move from place to place	(X)	(√)		
	can carry out photosynthesis	√	X;		
	are multicellular	√	√;		
	have cells with cell walls	√	X;		
	store carbohydrate as glycogen	X	√;		
(b)	fungi; bacteria / prokaryotes; protocists / protozoa; viruses;			allow singular or plural ignore parasites / microorganisms / specific names eg cholera / amoeba	Max 2

Total 6 marks

Question number	Answer			Notes	Marks
2 (a)				2 for all 3 correct 1 for 1 or 2 correct	2
	Name of blood vessel	Diameter of the lumen in mm	Thickness of the wall in mm		
	<u>vena cava</u> ;	30.0	1.5		
	<u>capillary</u> ;	0.006	0.001		
	<u>aorta</u> ;	25.0	2.0		
(b) (i)	<u>aorta</u> ;				1
(ii)	<u>vena cava</u> ;				1
(iii)	capillary; one cell thick / thin (wall/membrane) / short diffusion distance / low pressure / slow blood flow / eq;			ignore 0.001mm thick / small / ref to surface area to volume reject ref to thin <u>cell wall</u> wrong named blood vessel = 0 for whole item	2

Total 6 marks

Question number	Answer	Notes	Marks
3 (a)	keep out oxygen; <u>anaerobic</u> / prevent <u>aerobic</u> idea / eq;	respiration alone gets no credit	2
(b) (i)	 <p>rate of carbon dioxide production in bubbles per minute</p> <p>temperature in °C</p> <p>starts low and rises; peak / level / rise less steep; down;</p>	inverted = 0	3
(ii)	carbon dioxide / CO ₂ (production);		1
(iii)	temperature;		1
(c)	<p>volume of glucose; concentration / mass of glucose;</p> <p>mass / volume / number / of yeast; species / type of yeast; pH of <u>solution</u>;</p>	<p>allow amount / quantity</p> <p>ignore volume of water in bath ignore room temperature ignore ref to oxygen ignore ref to oil</p>	2
(d)	repeat / eq;		1
(e)	volume of gas / measuring cylinder / syringe / eq;		1

Question number	Answer	Notes	Marks
3 (f)	glucose; → ethanol/alcohol; + carbon dioxide;	ignore yeast on left hand side of equation but reject if any other substance used ignore energy / heat allow symbols only if correct eg CO ₂ = 0 CO ₂ = 1	3

Total 14 marks

Question number	Answer	Notes	Marks	
4 (a) (i)			3	
	Structure			Organ
	Spongy mesophyll			leaf
	Alveolus			lung(s);
	Nephron			kidney(s);
	Villus			<u>small</u> intestine / duodenum / ileum;
(b) (i)	movement of molecules/particles/gases/named molecule; high conc. to low conc. / down concentration gradient / eq; passive / eq;	ignore <u>substances</u> allow along concentration gradient	Max 2	
(c)	ultrafiltration / pressure; glomerulus / Bowman’s capsule / renal capsule;	ignore filtered alone	2	

Total 7 marks

Question number	Answer	Notes	Marks
5 (a) (i)	enzymes; kinetic energy / more collisions / molecules move faster / eq; (more) photosynthesis; (more) carbohydrate / glucose / eq; energy / respiration;	ignore reactions alone ignore ref to transpiration / diffusion ignore food	Max 3
(ii)	minerals / ions / salts / nutrients / eq; named mineral 1; function of named mineral 1; named mineral 2; function of named mineral 2;	eg. nitrate (ignore nitrogen) / ammonium for; amino acids / protein; if nitrogen ignored still allow function mark magnesium; for chlorophyll/chloroplast; phosphate for; ATP / DNA / eq; ignore NPK	Max 3
(b) (i)	ladybird / eq; aphid / eq;	accept any predator prey eg birds eating caterpillars ignore 'predator' eats a 'pest'	2
(ii)	1. lasts longer / no need to reapply / eq; 2. specific / no harm to other species; 3. no bioaccumulation / no biomagnification / eq; 4. no resistance; ignore immunity 5. no harm/affect to food chain(s) / eq;	accept converse answers that refer to chemical pesticide ignore ref to eutrophication ignore pollution / harm to habitat / eq ignore cost ignore ref to not harming crops/safer for humans	3

Total 11 marks

Question number	Answer	Notes	Marks
6 (a) (i)	respiration / energy;		1
(ii)	active transport / active uptake; low to high conc. / against conc. gradient / eq;	ignore across concentration gradient	2
(iii)	chlorophyll / chloroplasts; photosynthesis / absorb light / eq;		2
(b)	1. variation (in Ash borers) / eq; 2. <u>mutation</u> / <u>mutate(s)</u> / <u>mutated</u> ; 3. not eaten / not attacked / avoided / eq; 4. <u>survive(s)</u> / <u>survival</u> / <u>survived</u> ; 5. reproduce / breed / mated / multiply / eq; 6. pass on gene(s) / allele(s) / eq; 7. process continues over time / eq;		Max 4

Total 9 marks

Question number	Answer	Notes	Marks
7 (a) (i)	<p>parents: Aa Aa;</p> <p>gametes: A a A</p> <p>a;</p> <p>offspring: AA Aa Aa</p> <p>aa;</p> <p>phenotypes: short short short</p> <p>average;</p>	<p>allow parent, gamete and offspring marks in Punnett square</p> <p>if parent genotypes wrong allow ecf to max of 3 for gametes, offspring and phenotypes</p> <p>allow if other symbols used</p> <p>allow other terms for short and average eg achondroplasia and tall</p> <p>only give phenotype mark if it is clear that candidate knows there are three short and one average</p> <p>a statement that the phenotypes are short and average = 0</p>	4
(b)	$\frac{1}{4}$ / 25% / 0.25 / 1 in 4 / eq;	ecf	1

Question number	Answer	Notes	Marks
7 (c) (i)	always / in heterozygote / in both heterozygote and homozygote / eq; expressed / seen / shown / determines characteristic / develops the trait / (in phenotype) / eq;	ignore stronger / overpowers / masks	Max 2
(ii)	1. those with achondroplasia less likely to have children / reproduce / eq; 2. allele is rare / eq; 3. selective advantage for aa / eq;	allow converse for all points allow health implications for achondroplasia	Max 2

Total 9 marks

Question number	Answer	Notes	Marks
8 (a)	S scale linear and at least half grid; L lines neat and through points; A1 axes correct way round; A2 axes labelled <u>temperature</u> and <u>midpoint/period/year</u> ; U <u>°C</u> ; P 1795 and 1995 plotted correct;	annotate using the letters provided extrapolation loses P mark	6
(b)	1695-1720;		1
(c) (i)	water <u>vapour</u> / carbon dioxide / nitrous oxide / methane / CFCs / ozone;	allow any oxide of nitrogen	1
(ii)	traps heat / reflects infra red / reflects long wave radiation / contributes to global warming / eq;	ignore contributes to greenhouse effect	1
(iii)	1. burning / combustion / eq; 2. fossil fuels / coal / oil / gas; 3. cars / planes / factories / trains / power stations / eq; 4. <u>cattle</u> farming / <u>rice</u> farming; 5. deforestation; 6. fridges / aerosols (CFCs);	ignore petrol	3

Total 12 marks

Question number	Answer			Notes	Marks
9 (a)	runners / corms / bulbs / tubers / rhizomes;			ignore cuttings / cloning / vegetative propagation /micropropagation /tissue culture	1
(b)	Feature	Sexual reproduction in plants	Sexual reproduction in animals		3
	male gametes	(pollen nucleus)	sperm;		
	site of fertilisation	<u>ovule</u> ;	oviduct / fallopian tube / eq;		
(c)	1. indication of number and size difference; eg .more sperm + smaller / less eggs + larger / more sperm + larger egg / less eggs + smaller sperm 2. sperm: better chance of fertilisation / swim easier / eq egg: more cytoplasm / more nutrition / eq;				2

Total 6 marks

Question number	Answer	Notes	Marks
10 (a)	stomata / guard cells; <u>spongy</u> (mesophyll) / <u>spongy</u> (layer) / air spaces / eq; moist; thin; large surface area;	ignore wide and flat	Max 3
(b)	$6\text{CO}_2 + 6\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$;; $\text{CO}_2 + \text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + \text{O}_2 = 1$	allow one mark for correct equation and correct formula and a second mark for correct balance formula wrong = 0 eg. CO_2 = wrong but CO_2 = correct reject word equation ignore light/chlorophyll/energy	2
(c) (i)	dark for 12 hours plus;		1
(ii)	keep in dark / no light / cover leaf surface / eq;		1
(iii)	boil/heat/warm in ethanol/alcohol; safety: water bath / no flame / eq; iodine; blue black / eq;	tube of ethanol in water bath = 2 ignore tongs / gloves etc allow black / dark black / dark blue / blue	3

Total 10 marks

Question number	Answer	Notes	Marks								
11 (a) (i)	(-)10.62 / (-)10.6;; allow one mark for 9.76 or 1.16 in working however used	ignore minus sign ignore additional decimal places	2								
(ii)	idea of <u>less</u> oxygen /eq; (less) respiration / energy; low yield / less growth / smaller fish / eq;	ignore idea of high oxygen needed for growth ignore death ignore number	Max 2								
(b)	<table><tr><th>Method</th><th>How method increases fish production</th></tr><tr><td>adding antibiotics to the water</td><td>control disease / kill bacteria / parasites / pathogens / eq;</td></tr><tr><td>using nets to cover tanks</td><td>protect fish being eaten by predators / named predator / prevent escape;</td></tr><tr><td>feeding small quantities of food frequently</td><td>all eaten / no waste / no decay / less eutrophication / less bacterial growth / eq;</td></tr></table>	Method	How method increases fish production	adding antibiotics to the water	control disease / kill bacteria / parasites / pathogens / eq;	using nets to cover tanks	protect fish being eaten by predators / named predator / prevent escape;	feeding small quantities of food frequently	all eaten / no waste / no decay / less eutrophication / less bacterial growth / eq;	ignore competition ignore ref to energy / nutrients ignore overfeeding ignore pollution	3
Method	How method increases fish production										
adding antibiotics to the water	control disease / kill bacteria / parasites / pathogens / eq;										
using nets to cover tanks	protect fish being eaten by predators / named predator / prevent escape;										
feeding small quantities of food frequently	all eaten / no waste / no decay / less eutrophication / less bacterial growth / eq;										
(c)	digested / broken down; amino acids / (poly)peptides; stomach; protease / named protease enzyme (ONCE); HCl / acid / low pH / eq; small intestine / duodenum / ileum; bile / neutralise /alkaline / eq; <u>optimum</u> pH (ONCE)	ignore pepsinogen / trypsinogen accept name of enzyme if in incorrect part of gut	Max 5								

Total 12 marks

Question number	Answer	Notes	Marks
12 (a) (i)	hypothalamus / pituitary;		1
(ii)	1. <u>collecting</u> duct; 2. more permeable / eq; 3. (more) water (re)absorbed (into blood) / blood more dilute / eq; 4. <u>osmosis</u> ; 5. urine concentrated / less water in urine / less urine;	1. ignore nephron 2. ignore changes permeability 3. allow water potential concept if used correctly	3
(b)	1. fast(er) (versus slow(er)); 2. electrical/impulse (versus chemical); 3. neurones (versus blood); 4. short(er) lasting (versus long(er) lasting); 5. target cells (versus all around body);	nervous / hormone point alone = accept 'it' is faster – assume nerves discussed allow two ways if in same numbered section	Max 2
(c)	light all around: straight and taller than start; light from side: grows towards light; darkness: straight and taller than light all around after two days;		3
(d)	down / positively geotropic / toward gravity / eq; anchor / hold plant / stability / eq; (obtain) water / mineral ions / nutrients / eq;		3

Total 12 marks

Question number	Answer	Notes	Marks
13	<p>C indoors / outdoors / eq;</p> <p>O same species / size / age / breed / gender / eq;</p> <p>R repeats / groups / lots / some chickens / eq;</p> <p>M1 mass / length / eq ;</p> <p>M2 time period <u>stated</u>;</p> <p>S1 one variable controlled;</p> <p>S2 another variable controlled;</p>	<p>eg. 2 inside and 2 outside</p> <p>allow if at start or at end</p> <p>at least one day</p> <p>eg. mass of food / same food / area / water / light / eq</p> <p>ignore temperature ignore environment</p>	Max 6

Total 6 marks

PAPER TOTAL: 120 MARKS

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