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Mark Scheme (Results)

Summer 2015

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

Pearson Edexcel International 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)	<table><tr><th>sentence</th><th>number</th></tr><tr><td>The number of organisms is</td><td>(8)</td></tr><tr><td>The number of different types of plant is</td><td>2 / two;</td></tr><tr><td>The number of animals is</td><td>6 / six;</td></tr><tr><td>The number of primary consumers is</td><td>2 / two;</td></tr><tr><td>The number of food chains is</td><td>5 / five;</td></tr></table>		4
(b) (i)	producer(s);		1
(ii)	predator / tertiary consumer / carnivore;		1
(c) (i)	decrease / fewer / less / eq;	Ignore die out / extinct	1
(ii)	increase / more / eq;		1

Total 8 marks

Question number	Answer	Notes	Marks
2 (a)	C;	Ignore ureter	1
(b) (i)	1. (protein molecules are) large / too big / eq; 2. leave glomerulus / leave capillaries / enter Bowman's / enter renal capsule / eq;	Accept converse linked to small molecules Ignore if into glomerulus	2
(ii)	1. reabsorbed / (absorbed) back into blood; 2. proximal / first (convoluted) tubule / eq; 3. active transport / active uptake / against concentration gradient / eq;	Ignore other named parts of nephron	2 max
(iii)	1. urea; 2. minerals / ions / salts / named mineral ion / hormones / vitamins;		2
(c)	1. no insulin / not enough insulin; 2. high blood glucose levels; 3. cannot reabsorb (all) glucose;		max 2

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(d)	1. (more) ADH;		3 max
	2. increased permeability;		
	3. collecting duct;		
	4. (re)absorption of water;		

Total 12 marks

Question number		Answer	Notes	Marks
3(a)	(i)	insects eat the crop / prevent insects eating rice / rice not eaten by insects / / biological control / eq;		1
	(ii)	1. (less) <u>competition</u> / (more) <u>photosynthesis</u>; 2. mineral ions / named mineral ion / nutrients / light;	Ignore water / carbon dioxide / space	2
(b)		1. decomposed / broken down / digested; 2. bacteria / microorganisms / fungi / eq; 3. mineral ions / named mineral ion / ions / nutrients / fertiliser;	Ignore decomposers in Mp2 Mp3 Ignore nitrogen	2 max
(c)		1. respiration / energy / ATP; 2. active transport / active uptake; 3. of mineral ions / named mineral ions / nutrients;		2 max
(d) (i)		kills weeds / kills unwanted plants / kills unwanted herbs / prevent growth of weeds;	Ignore kills herbs / kills plants / kills pests	1

(ii)			3 max
	1. lasts longer / eq;	Allow converse for all Mps	
	2. no reapplication / no need to keep buying pesticide / eq;	Mp2 ignore cheaper	
	3. specific / eq;	Mp3 ignore no allergy / harm to people / contamination of products	
	4. avoids bioaccumulation / builds up in food chains / eq;		
	5. no development of resistance;	Mp4 ignore pollution / environmentally friendly	
		Mp5 ignore immune	

Total 11 marks

Question number	Answer	Notes	Marks
4	1. <u>nucleus</u> from (adult) sheep put into empty egg cell / enucleated egg cell / eq; 2. electricity; 3. mitosis / cell division; 4. embryo; 5. uterus / womb; 6. <u>surrogate</u>;	Mp1 ignore DNA / gene / plasmid	max 5

Total 5 marks

Question number		Answer	Notes	Marks
5(a)	(i)	(student B) 1. random / spread out / scattered / eq; 2. used 10 quadrats / repeated use of quadrats / several / eq;		2 max
	(ii)	<u>number / all / total / amount</u> of named species / of a species / of one species;	number of species = 0 number of organisms = 0 number of same organism = 1 number of an organism = 1 Ignore group	1
(b)	(i)	(student) B;		1
	(ii)	(student) D;		1

Total 5 marks

Question number	Answer	Notes	Marks
6(a)	A (right) lung(s) / <u>intercostal</u> muscle(s); B rib(s) / rib cage; C heart; D diaphragm;	 Allow diaphram	4
(b)	1. diaphragm/D <u>contracts</u>; 2. moves down / flattens / eq; 3. ribcage/B moves up/out / eq; 4. increase in (thorax) volume; 5. decrease in (thorax) pressure;	 Mp3 Allow ribcage expand / ribs expand	5 max
(c)(i) (ii)	1. Ff and Ff; 2. FF and Ff and Ff and ff; 1. bacteria / pathogens / microorganisms / microbes; 2. reproduce / multiply / grow / feed / divide / eq; 3. remain in lung / cannot be removed / eq;	Allow TE for children Allow ecf for 1 mark if parents wrong Mp1 ignore germs	2 2

| (iii) | 1. less air / oxygen / gas; 2. to alveoli / air sacs; | | 2 |

Total 15 marks

Question number	Answer	Notes	Marks
7	1. the colder the place the bigger the mouse; 2. <u>variation</u>; 3. (due to) <u>mutation</u>; 4. bigger mice survive / survival / survival of the fittest / not killed <u>and</u> reproduce / breed / eq; 5. less heat loss / keep warm / insulation; 6. small(er) surface area to volume ratio; 7. pass on allele / gene;	Mp1 ignore fatter Mp5 allow if in context of fur / fat Allow converse for small mice	5 max

Question number		Answer	Notes	Marks
8(a)			if two letters in one box = 0	4

statement	section letter
This is the stigma	(A)
This is where fertilisation occurs	C;
This is where the pollen grains land at pollination	A;
This is where most pollen tube growth occurs	B;
This is where a seed will develop	C;

Question number		Answer	Notes	Marks
(b)		1. spikes / eq; 2. attach to insect / stick to insect / eq;	Ignore sticky / feathery	2
(c)	(i)	1. increase / eq; 2. levels / decreases after 80 minutes / decreases at 100 minutes / from 80% / drops to 78%		2
	(ii)	46 ± 2 / 44 to 48 (minutes); ;	Allow one mark for 60% in working	2
	(iii)	0.1125 to 0.175 mm; ; (range between 9 and 14 mm)	Allow one mark for ÷ 80 in working	2

(d)	1. variation / diversity / different;	genetic variation = 2	2 max
	2. of alleles / genes;	Mp2 ignore DNA / chromosomes	
	3. better chance of survival / not all killed by disease / eq;	Mp3 allow resistance to disease	

Total 14 marks

Question number	Answer	Notes	Marks
9(a)(i)	oxygen / O_2;	Ignore O	1
(ii)	Four from:	Mps in pairs	
	1. temperature; 2. waterbath / glass screen / eq;	Mp2 ignore control of room temp. / using a thermometer	4 max
	3. carbon dioxide; 4. add same mass of hydrogen carbonate to water / eq;		
	5. light <u>intensity</u> / wattage of bulb / eq; 6. distance from lamp / use a light meter / same bulb / background light / eq;		
		Plant as variable 1 max	
	7. mass / surface area of plant / number of leaves / species / same plant;		
(b)(i)	25 / 24.7 / 24.6 recurring;	Ignore 24.6 Allow 24.6 = 25 Ignore 24.67	1
	1. (red and blue) have been repeated / show		

(ii)	similar pattern; 2. (green) ignored anomalous result / green only two repeats;		2
(c)	S y axis scale linear and graph at least half the grid; A y axis labelled number of gas bubbles / number of bubbles / rate of photosynthesis; U released in one minute / per minute / in one minute; P <u>average</u> plotted correctly for blue and green; K colour bars identified; Line graph loses P Allow S and A if axes reversed		5
(d)	1. blue light absorbed; 2. green light reflected / transmitted / not absorbed / eq;		2 max

Total 15 marks

Question number	Answer	Notes	Marks
10(a) (i)	A combustion / burning / eq; B respiration; C photosynthesis; D death / decay / decomposition / rotting / eq; E respiration;		5
(ii)	C;		1
(b)	1. global warming / earth warms / atmosphere heats up / temperature rises / traps heat / eq; 2. ice caps melt / eq; 3. flooding / rise in sea level; 4. climate change / extreme weather / hurricanes / drought / eq; 5. habitat destruction / desertification / eq; 6. extinction / disruption of food chains / loss of species; 7. migration / distribution of organisms / distribution of pests / spread of disease / affects plant growth;	Mp6 ignore death of organisms	4 max

(c)	1. burn less fossil fuels / drive less cars / use hybrid cars / use public transport / cycling / low energy light bulbs / eq;	Ignore catalytic converters	2 max
	2. plant more trees / reduce deforestation;		
	3. use renewable energy / wind / solar / wave / nuclear / eq;		
	4. reduce cattle farming / fewer paddy fields / less aerosols / eq;		

Total 12 marks

Question number	Answer	Notes	Marks
11	plasma; red; haemoglobin; aerobic; carbon dioxide; platelets; antibodies; phagocytes;	 Allow macrophage / neutrophils	8

Total 8 marks

Question number	Answer	Notes	Marks
12 (a)	1. do not respire; 2. cannot reproduce without (host) cell / reproduce in (host) cell / can only reproduce within an organism; 3. do not move; 4. do not sense; 5. do not <u>excrete</u>; 6. do not grow; 7. do not feed / do not need nutrition; 8. do not control their internal conditions; 9. are not cellular;		2 max
(b)	HIV / TMV / influenza / Ebola / herpes / swine flu / bird flu / H15;	Allow named virus disease Ignore AIDS	1

	1. bacteria are bigger / viruses are smaller; 2. cell membrane in bacterium; 3. cell wall in bacteria / protein coat/capsid in virus / envelope in virus; 4. flagellum in bacteria / eq; 5. bacteria have plasmids / nucleoid; 6. bacteria have cytoplasm;	Ignore cellular structure alone Ignore nucleus / shape	1 max

Total 4 marks

Question number		Answer	Notes	Marks
13	C	with and without vitamin D / range of vitamin D / different volume of milk;		6 max
	O	same age / same ethnicity / same gender / same health / eq		
	R	more than one child per treatment / repeat investigation / eq;	R Allow group if per treatment	
	M1	measure straightness of legs / height / count number with rickets / curvature / eq;	M1 Ignore mass	
	M2	time period must be minimum of one month;		
	S1 and S2	same area or same town or same country / same exposure to sunlight or same time outside / same time of year / same diet / eq; ;	S Ignore same temperature / same room / same exercise / same sleep	

Total 6 marks