Mark Scheme (Results)

January 2018

Pearson Edexcel International GCSE

In Biology (4BI0) Paper 2B

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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)	(transfer of pollen) from anther to stigma (by insects);		1
(b)	1. yellow; 2. nectar;		max 1
(c)	1. less surface area / less leaf area / less leaf; 2. (less) chloroplasts / chlorophyll; 3. (less) light trapped / absorbed / eq; 4. (less) photosynthesis; 5. (less) energy / ATP / carbohydrate / starch / sugar / glucose / eq;	5. Ignore food	max 3
(d)	1. feed on /eat / consume / damage / other plants / eq; 2. affect food chains / food webs; 3. may become a pest / numbers increase as not eaten / they have no predator / eq;	1. Ignore kill	max 2

(e)	1. mutation; 2. <u>resistant</u> to poison; 3. reproduce / breed / mate / (produce) offspring; 4. pass on allele / gene / DNA (for resistance);	 2. Ignore immunity	max 3
(f)	1. less light (into eye); 2. retina / rod cells / cone cells / fovea;		2
(g)	57.2 / 57;;	Allow one mark for 0.11 x 520 / 11 ÷ 100 x 520 in working	2
(h)	<u>hepatic portal vein</u>;		1
(i)	1. temperature / warmth / suitable temperature; 2. water / moisture / rain; 3. oxygen;	1. Reject heat 2. Reject humidity / fog 3. Reject air List = 0 if one incorrect eg. carbon dioxide and water = 0 moist soil = 0	max 1

(j)	1. grass grows / grass not eaten / other plants grow / other plants not eaten / eq; 2. competition for named abiotic factor; 3. (less) excretion / faeces / manure / urine;	Allow converse 2. Ignore nutrients / resources 3. Ignore seed dispersal	max 2

Total 18 marks

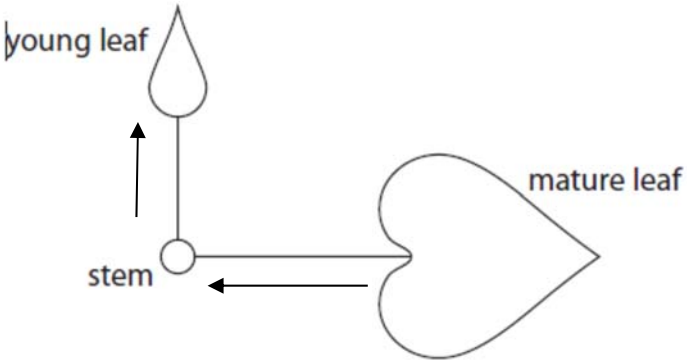
Question number	Answer	Notes	Marks
2 (a) (i)	C;		1
(ii)	E and F only;	A, E and F = 0 E alone = 0 F alone = 0	1
(b)	1. thick wall; 2. muscle; 3. elastic; 4. valves;		max 2
(c) (i)	0.5;;	Allow one mark for 40 in working, but not if 40 + 0.03 + 15	2

(ii)	1. blood flow is slow(er); 2. <u>more</u> (time for) diffusion / gas exchange / oxygen uptake / carbon dioxide removal;	 2. Reject faster diffusion Fast flow means more diffusion = 0 Lots of capillaries so more diffusion = 0	2

Total 8 marks

Question number	Answer	Notes	Marks
3	(fish numbers decrease) 1. sewage decomposed / decomposers / decomposition / broken down / digested / eq; 2. bacteria / fungi / microorganisms; 3. (less) oxygen / eq; 4. respiration (by bacteria / for fish); (decrease in algae numbers) 5. <u>less</u> light for photosynthesis; (increase in algae numbers) 7. <u>more</u> light for <u>photosynthesis</u> / <u>more</u> carbon dioxide (from bacteria respiration) for <u>photosynthesis</u>; 8. (more) mineral ions / named mineral ion; 9. fewer fish to feed on algae;	5. Ignore if caused by algae growth	max 6

Total 6 marks

Question number	Answer	Notes	Marks
4(a) (i)	sulfur dioxide;	Allow pollutant / pollution	1
(ii)	rate of translocation;		1
(iii)	1. temperature / CO_2 / light / pH; 2. size / mass / age / species / type / young bean plants / one mature and one young leaf / eq;	1. Reject time / concentration of SO_2	max 1
(b) (i)	arrow from mature leaf to stem / arrow from stem to young leaf;  	Allow one arrow if from mature leaf to young leaf	1

(ii)	phloem;		1
(iii)	sucrose / amino acid(s) / water / minerals / ions / named mineral;	Reject fructose / glucose / oxygen / carbon dioxide / nutrients Starch and sucrose = 0 Glucose and sucrose = 0	1
(c)	(more photosynthesis) 1. (more) product / glucose / carbohydrate / sugar made; 2. (more) sucrose; 3. (more) translocation / transport; 4. (more) respiration 5. (more) active transport;	Allow converse Ignore references to concentration gradient	max 3

(d)	1. (dissolves) in <u>water</u> in <u>clouds</u>; 2. sulfuric acid / sulfurous acid; 3. acid(ic) rain; 4. lowers pH; 5. <u>leaching</u>; 6. affects crops / trees / plants / fish / aquatic life / eq;	6. Ignore destroys habitats / harms animals / leads to extinction / affects food chains / less photosynthesis / loss of species / death of organisms	max 4

Total 13 marks

Question number	Answer	Notes	Marks
5 (a) (i)	1. pasteurisation / heat milk to 80 to 90 °C / boil milk; 2. kill bacteria / microorganisms; 3. cool / reduce temperature; 4. (add) *Lactobacillus* / *Streptococcus*; 5. leave for stated time between 3 to 12 hours; 6. at 30 to 45 °C / optimum temperature / warm place;	1. Ignore sterilise / high temperature 2. Reject kills lactic acid bacteria Cool not to kill Lactobacillus = 2	max 4
(ii)	bones / teeth / prevents rickets;		1
(iii)	1. less risk of heart disease / of blocking <u>arteries</u> / of stroke / having high blood pressure / of high cholesterol; 2. less risk of obesity / being overweight / of weight gain / less heavy / more weight loss; 3. less risk of type 2 diabetes;	Allow converse 2. Ignore less calories / less energy / healthy weight	max 1

(b)	1. contains <u>no</u> lactose / lactose <u>no</u> longer in yoghurt / yoghurt is lactose-free; 2. digested / broken down; 3. respiration / fermentation; 4. lactic acid;	1. Lactose has been digested = 1	max 2
(c)	1. no need to add sugar / eq; 2. provide vitamin C which prevents scurvy / helps skin / tissue repair / immunity / stick cells together / connective tissue / gums / eq; 3. provide vitamin A which helps vision / sight / sight in dim light / immune system / disease resistance / skin / eq; 4. provide fibre / roughage / cellulose which prevents constipation / helps peristalsis / movement through gut / eq;	1. Ignore sweeten / fructose / fewer calories	max 2

Total 10 marks

Question number	Answer	Notes	Marks
6 (a) (i)	contains DNA/gene/allele/genetic material from another <u>species</u>;	Gene from another organism = 0	1
(ii)	1. more (organisms) produced; 2. genetically identical; 3. (named characteristic) insulin / heart / human organs / antibodies / drugs / clotting proteins / disease resistance / frost resistance / eq; 4. no need to repeat GM process / eq;	1. Ignore faster production	max 2
(b)	1. incubate at 25 °C / not at 37 °C / not at body temperature / eq; 2. do not open / tape / seal /cover (plates/culture/flask) / eq; 3. use non-pathogenic strains / eq; 4. mask / gloves / goggles / labcoat / fume cupboard / eq; 5. description of sterile technique;	1. Ignore right temperature 2. Ignore airtight 5. eg. sterilise work surface / flame loop / wipe surface with disinfectant	max 2

Total 5 marks

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