

Mark Scheme (Final) January 2015

Pearson Edexcel International GCSE in Biology (4BIO) Paper 2B

Pearson Edexcel Certificate in Biology KBIO Paper 2B

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January 2015
Publications Code UG040370
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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)	1. smoking;	Ignore infection	2
	2. dust / asbestos / working in mines;		
	3. fumes;		
	4. genetic / lack of A1T;		
	5. bronchitis;		
(b)	1. digest / breakdown / kill / destroy;		2
	2. bacteria / pathogens / viruses/ microorganisms;		
	3. prevent infection/disease/reproduction;		
(c)	2 268 000;;	1 mark for	2
		0.80 / 80% / 80 ÷ 100 / divide by 10 multiply by 8	
(d) (i)	alveoli / alveolus;	Mark first answer in a list	1
(ii)	1. less surface area;		2
	2. <u>diffusion</u> / gas <u>exchange</u> ;		
	3. (insufficient) oxygen;		

Question number	Answer	Notes	Marks
(e)	1. memory cells;		
	2. antibodies;	Allow if production by incorrect cell	2
	3. (production and response) sooner / quickly / faster / more / last longer / eq;	3. Ignore more robust / more powerful	
(f) (i)	less mucus / digests mucus / breaks down mucus / thinner mucus / runny mucus;		2
	2. wider airways/tubes / more space / less blockage / open up / eq;	2. Ignore easier to breath	
	3. more air / more oxygen;	3. Allow more oxygen into blood	2
(ii)	increases concentration of oxygen / increases concentration gradient / more oxygen;	Greater diffusion gradient = 2	
	2. (more) diffusion / (faster) diffusion / (more) gas exchange;		

Total 15 marks

Question number	Answer	Notes	Marks
2(a)	S scale linear and half grid used for plotting; L lines straight and through points; A axis correct way + units for energy in kJ; P points plotted correctly; K key;	If not linear lose S and P Histogram means lose S and L for Max 3 Line to origin means lose L	5
(b)	increases energy requirement / eq; decreases from 25;	Increases up to a point and then decreases = 1 Decrease/level off at 41 = 0	2
(c)	 (more) muscle contraction; (more) respiration; (more) energy/kilojoules required; (more) food / glucose required / eq; 	Allow converse More energy for respiration = 2 Ignore reference to age 3. Allow calories	3

Total 10 marks

Questio number		Answer	Notes	Marks
3(a)	(i)	amino acids / protein / DNA / RNA / nucleic acid;		1
((ii)	nitrogen-fixing;	Allow Rhizobium	1
(b)		1. nitrifying (bacteria) / nitrification;		2
		2. nitrite (to nitrate);		
(c)	(i)	 more movement / more (kinetic) energy / eq; more collisions / more enzyme substrate complexes / eq; 		2
	(ii)	 denatured; active site; shape altered / bonds broken / eq; 	Ignore inactive / destroyed Reject death	3
		4. substrate no longer fits / eq;		

Total 9 marks

Question number	Answer	Notes	Marks
4(a)	 protect from birds; protect from seals; 	Ignore reference to terms interspecific / intraspecific predation	3
	3. keep out wild salmon / other fish to avoid competition;4. keep out wild salmon / other fish to avoid disease;	Protect from predators alone = 0 must be qualified	
		Ignore stop salmon getting out / salmon eating salmon	
(b)	1. decrease growth;	1 Ignore death	3
	2. idea that bacteria / decomposers / microorganisms involved;3. respiration;	2. Ignore pathogens	
	4. less oxygen;	4. Ignore disease / infection	
(c)	1. remove / dispose / eq;		2
	2. prevent spread of fungus/disease /pathogen/infection;		
(d)	wrasse eat (sea)lice;	Wrasse alone = 0	1

Total 9 marks

Question number	Answer						Notes	Marks
5(a)							First three columns	4
	tube	temperature	water	light	% seeds germinated	average height in cm	One mark for two % germination correct	
	A	(room)	no	(yes)	0	0.0	Two marks for all %	
	В	room	(yes)	yes	90	2.3(1);	germination being correct	
	С	fridge	yes	no;	10;;	(0.3)	One mark for both average height being correct	
(b)	2. <u>root</u> /	 seeds split / seeds burst / sprouts / eq; <u>root</u> / <u>radicle</u> seen / grows / eq; <u>shoot</u> / <u>plumule</u> / <u>stem</u> seen / grows / eq; 					Ignore leaf/plant emerges / increase in height / become seedlings	2
(c)	temperature; water / moisture; light; oxygen;					Allow one mark for two correctly named and two marks for three correctly named Location = 0	2	
	33: 1,							

Question number	Answer	Notes	Marks
(d)	they germinate/grow / eq; reference to (room) temperature and water;	 Ignore same result as tube B Ignore light / oxygen 	2
(e)	(no oxygen) no respiration;		1

Total 11 marks

Question number	Answer	Notes	Marks
6(a)	1. (waste) milk;	Reference to the word	2
	2. more bacteria (growth) / more microorganism (growth);	more must be present ONCE in 2 or 3	
	3. use of more oxygen / eq;		
(b)	1. concentration / strength / dilution / volume / mass released;	Ignore quantity / amount	1
	2. temperature / light;		
	3. speed of river flow;		
	4. nitrate content of pollutant / bacterial content of pollutant;		
(c)	protein / amino acids / lipid / fat / carbohydrate / lactose;	Allow casein	1
		Ignore minerals /	
		vitamins / sugar	
(d)	raw has higher B.O.D. / less oxygen available / more oxygen used;	Allow converse	2
	2. more bacteria/microorganisms (in raw sewage) / eq;	2. Ignore organisms	
	3. more respiration;	-	
	4. raw sewage has more nutrients / organic material / eq;		

Total 6 marks

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