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Mark Scheme (Results)

Summer 2015

Pearson Edexcel International Advanced Level In Biology (WBI03) Paper 01 Practical Biology and Research Skills

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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	Additional Guidance	Mark
1(a)(i)	the mineral(s) (that is absent / present) ;	DO NOT ACCEPT concentration /	
		nutrient	(1)

Question Number	Answer	Additional Guidance	Mark
1(a)(ii)	Paired points.		
	1. temperature ;	2 ACCEPT (water beth (insubstar / room	
	2. thermostatic control / eq ;	<pre>2. ACCEPT { water bath / incubator / room / chamber } (set) at chosen or stated</pre>	
	3. pH of solution ;	temperature	
	4. use of buffer ;		
	 appropriate factor related to the plant (size at start / area at start / age / genetic); 		
	 appropriate method of controlling the factor described ; 	6. e.g. plants collected from same source / plants grown from one parent / appropriate measurement of area at start	
	7. light intensity ;	7. DO NOT ACCEPT light unqualified,	
	8. (same bulb) at fixed distance / eq ;	sunlight, amount 8. ACCEPT under same light bank	
	9. (light) wavelength;		
	10.gel / filter / same bulb / eq ;		
	11.carbon dioxide / bicarbonate concentration / eq ;		
	12.appropriate method of controlling the factor described ;	12. e.g. standard bicarbonate solution / bubbling with air / chamber / room ventilated with air / set at fixed / stated	
	13.oxygen concentration ;	carbon dioxide level	
	14.appropriate method of controlling the factor described ;	14. e.g. bubbling with air / chamber / room ventilated with air / set at fixed / stated oxygen level	
	15.concentration of mineral ions / eq ;		
	16.idea of standard / same solutions used ;		(4)

Question Number	Answer	Additional Guidance	Mark
1(a)(iii)	1. reference to control / standard ;		
	2. idea of allowing comparison ;		(2)

Question Number	Answer	Additional Guidance	Mark
1(b)(i)	A axes correct (x -time , y - no. of plants) ;	ACCEPT day(s) on x axis	
	L axes correctly labelled with units days and no. of plants ;		
	P correct plotting ;	P mark lost if bar chart and x axis is nonlinear IGNORE extrapolation to origin	
	K a suitable key or labelling ;	Sample graph	
		40 35 30 25 20 15 40 35 30 25 40 40 40 40 40 40 40 40 40 40	
		structure 20 ind 15 ind 10 ind 10	
		days	
			(4)

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Question Number	Answer	Additional Guidance	Mark
1(b)(ii)	1. idea of replication (under same conditions);		
	2. reference to mean ;	2 ACCEPT average	
	3. { error bars / SD } plotted / eq ;		(3)

Question Number	Answer	Additional Guidance	Mark
1(c)(i)	plants are of different sizes ;	ACCEPT some plants are bigger / smaller than others	(1)

Question Number	Answer	Additional Guidance	Mark
1(c)(ii)	1. measure { mass / plant area } / eq ;	1 ACCEPT weight	
	2. at set times / days eq ;		(2)

Question Number	Answer	Mark
1d(i)	nitrate / NO_3^- / no nitrate ;	(1)

Question Number	Answer	Additional Guidance	Mark
1d(ii)		Allow ECF from (i)	
	 nitrates needed for synthesis of { amino acids / bases / protein / enzymes / nucleic acids / chlorophyll } ; 	1. ACCEPT other named nitrogen containing compounds found in plants	
	 relevance of correctly named substance from mp 1 to growth rate ; 	 2. ACCEPT answers that reference { structure / cell division / metabolism / photosynthesis } in relation to the requirements for growth such as raw materials, energy or a specific structure e.g. 	
		cell membrane	(2)

Question Number	Answer	Additional Guidance	Mark
2(a)(i)	If graph sketched	if a labelled pie chart allow mp 1 and 2 if appropriate	
	 key to bars or lines / clear labelling of bars or lines with (high) quality habitat and unsuitable habitat; 		
	 sketch includes the three dates 1965, 1975 and 1997 clearly indicated for both sets of data ; 		
	3. y axis labelled hectares ;		
	If table drawn		
	 table has rows / columns headed with (high) quality habitat and unsuitable habitat ; 		
	2. table includes the three dates 1965 , 1975 and 1997 ;		
	3. habitat column / row headed hectares ;		(3)

Question Number	Answer	Additional Guidance	Mark
2(a)(ii)	1. (paragraph) 5 / 6 ;		
	2. idea of habitat { loss / decline / destruction / reduction } ;		(2)

Question Number	Answer	Additional Guidance	Mark
2(b)(i)	Idea of (giant) panda { in decline / endangered / becoming extinct / decreasing / eq } ;		(1)

Question Number	Answer	Additional Guidance	Mark
2(b)(ii)	1. main solution: artificial insemination ;	NB no credit if contradictory statements made	
	 idea of the use of sperm to fertilise the female artificially ; 		
	3. alternative solution: cloning ;		
	 idea of reproduction without sex / asexual / asexual transfer of DNA to an egg cell ; 		(4)

Question Number	Answer	Additional Guidance	Mark
2(b)(iii)	 (AI leads to) { poor / low / eq } genetic variation / inbreeding ; 		
	 consequence of reduced genetic variability e.g. (the population) is susceptible to disease / eq ; 		
	3. cloned mammals die soon after birth ;		
	 cloned mammals { die young / in later life / before reproducing / suffer from various diseases } eq ; 		
	5. idea of lack of breeding experience of pandas ;		
	 there are few / no naturally produced offspring / cannot boost their own population ; 		(4)

Question Number	Answer	Additional Guidance	Mark
2(c)		correct answer only gains 3 marks	
	1. (number of leased pandas is) 18 ;	<u>IF</u> mp 1 is 27 / 239 / 300 / 1,600 ALLOW mp 2	
	2. multiply by 10 / implied by answer ;	and ALLOW mp 3 if consequentially correct i.e. 270m gains 2 marks	
	3. = 180m / 180 million / 180 000 000 / 1.8 x 10 ⁸ / eq ;	2,390m gains 2 marks 3,000m gains 2 marks 16,000m gains 2 marks Award correct answer if given anywhere	
		unless wrong answer on line	(3)

Question Number	Answer	Additional Guidance	Mark
2(d)	1. publication date ;		
	2. { title / name } of paper ;		
	3. volume / pages / part ;		(3)

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