Mark Scheme (Results)

Summer 2015

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

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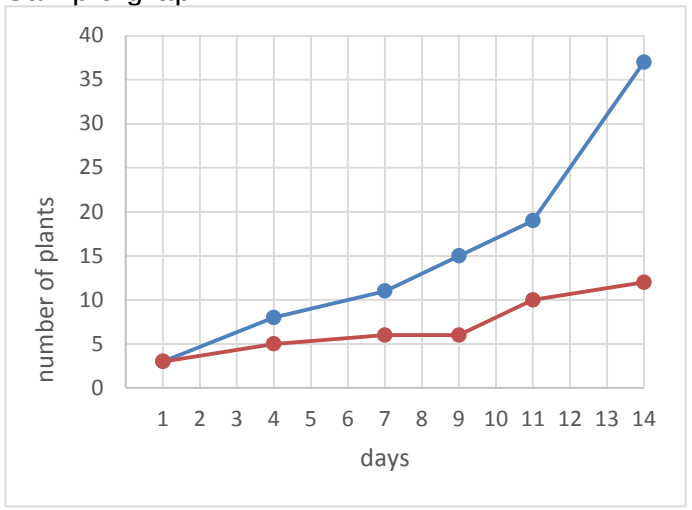
General Marking Guidance

- 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. thermostatic control / eq ; 3. pH of solution ; 4. use of buffer ; 5. appropriate factor related to the plant (size at start / area at start / age / genetic) ; 6. appropriate method of controlling the factor described ; 7. light intensity ; 8. (same bulb) at fixed distance / eq ; 9. (light) wavelength ; 10. gel / filter / same bulb / eq ; 11. carbon dioxide / bicarbonate concentration / eq ; 12. appropriate method of controlling the factor described ; 13. oxygen concentration ; 14. appropriate method of controlling the factor described ; 15. concentration of mineral ions / eq ; 16. idea of standard / same solutions used ;	2. **ACCEPT** { water bath / incubator / room / chamber } (set) at chosen or stated temperature 6. e.g. plants collected from same source / plants grown from one parent / appropriate measurement of area at start 7. **DO NOT ACCEPT** light unqualified, sunlight, amount 8. **ACCEPT** under same light bank 12. e.g. standard bicarbonate solution / bubbling with air / chamber / room ventilated with air / set at fixed / stated carbon dioxide level 14. e.g. bubbling with air / chamber / room ventilated with air / set at fixed / stated oxygen level	**(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) ; L axes correctly labelled with units days and no. of plants ; P correct plotting ; K a suitable key or labelling ;	**ACCEPT** day(s) on x axis P mark lost if bar chart and x axis is nonlinear **IGNORE** extrapolation to origin Sample graph  	(4)

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

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

Question Number	Answer	Additional Guidance	Mark
1d(ii)	1. nitrates needed for synthesis of { amino acids / bases / protein / enzymes / nucleic acids / chlorophyll } ; 2. relevance of correctly named substance from mp 1 to growth rate ;	Allow ECF from (i) 1. **ACCEPT** other named nitrogen containing compounds found in plants 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 1. key to bars or lines / clear labelling of bars or lines with (high) **quality habitat** and **unsuitable habitat** ; 2. sketch includes the three dates **1965, 1975** and **1997** clearly indicated for both sets of data ; 3. y axis labelled **hectares** ; If table drawn 1. 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** ;	**if a labelled pie chart allow mp 1 and 2 if appropriate**	**(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 ; 2. idea of the use of sperm to fertilise the female artificially ; 3. alternative solution: cloning ; 4. idea of reproduction without sex / asexual / asexual transfer of DNA to an egg cell ;	**NB** no credit if contradictory statements made	**(4)**

Question Number	Answer	Additional Guidance	Mark
2(b)(iii)	1. (AI leads to) { poor / low / eq } genetic variation / inbreeding ; 2. consequence of reduced genetic variability e.g. (the population) is susceptible to disease / eq ; 3. cloned mammals die soon after birth ; 4. cloned mammals { die young / in later life / before reproducing / suffer from various diseases } eq ; 5. idea of lack of breeding experience of pandas ; 6. there are few / no naturally produced offspring / cannot boost their own population ;		**(4)**

Question Number	Answer	Additional Guidance	Mark
2(c)	1. (number of leased pandas is) **18** ; 2. multiply by **10** / implied by answer ; 3. = 180m / 180 million / 180 000 000 / 1.8 x 10^8 / eq ;	**correct answer only gains 3 marks** **IF** mp 1 is 27 / 239 / 300 / 1,600 **ALLOW** mp 2 and **ALLOW** mp 3 if consequentially correct i.e. 270m gains 2 marks 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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