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Mark Scheme (Results)

Summer 2016

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

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General Marking Guidance

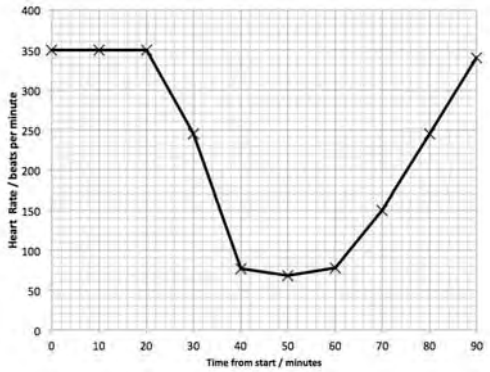
- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should 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)	**practical**: {transparent / eq} so {heart can be seen / no dissection needed} ; **ethical**: {does not feel / has reduced {sensitivity / eq} to} pain ;		**(2)**

Question Number	Answer	Additional Guidance	Mark
1(b)(i)	1. allow any stated temperature between 10 and 40°C ; 2. allows suitable level of (enzyme) activity / optimum temperature for enzymes / will not {cause denaturation of enzymes / kill *Daphnia*} / similar to that of natural habitat;	**IGNORE** a range of temperatures. room temperature **ALLOW** mp2 if mp1 is incorrect	**(2)**

Question Number	Answer	Additional Guidance	Mark
1(b)(ii)	1. some stated feature of *Daphnia* ; 2. (size) measure / (species/type) ref to specific source of *Daphnia* / (sex / gender) reference to some feature to assess sex (e.g. possession of brood chamber) / (age) ref to method to ensure age e.g. all hatched from 'eggs' at same time ; 3. reference to {pre-treatment / previous conditions} ; 4. detail of {pre-treatment / habitat} ; 5. dissolved oxygen concentration ; 6. idea of bubbling air ; 7. pH ; 8. buffer / eq ;	e.g. size / (species / type) / {sex / gender} / age	**(2)**

Question Number	Answer	Additional Guidance	Mark
1(b)(iii)	1. ensure that method is the same for both groups ; 2. {so can make comparison (between the two groups)/ transfer might be a variable (causing heart rate change) / to check that any change in heart rate is due to alcohol (and not to being transferred) } ;		**(2)**

Question Number	Answer	Additional Guidance	Mark
1(c)(i)	A axes right way round (x = time, y= mean heart rate) ; L axes correctly labelled, and with units ; (x = time / mins, y= mean heart rate / bpm); P correct plotting ; S line joining points accurately ruled ;	**IGNORE** plots of SDs and/or control group data. NB Bar chart with no line can be awarded mps A, L and P. **DO NOT AWARD** plotting mark if scale non-linear. OK if y axis is discontinuous but must be clear Graph should be correct shape. e.g:  	**(4)**

Question Number	Answer	Additional Guidance	Mark
1(c)(ii)	1. in the control group the changes are smaller / in the alcohol treatment group they are larger / eq ; 2. suitable comparative manipulation of figures / there are non-overlapping SDs between first 30 mins and second 30 mins in alcohol group but they overlap in control group	e.g. overall change in control is 15 bpm (4.3% decrease) in control but is 282 bpm (81% decrease) in alcohol drops by 5 in control between 30 mins and 40 mins, but by 168 in alcohol. at 50 mins control is 340 and alcohol is 68, diff is 272 bpm biggest drop in control group over 10 minutes is 350 to 340 (10 bpm) but in alcohol group is 245 to 77 (168 bpm)	**(2)**

Question Number	Answer	Additional Guidance	Mark
1(d)(i)	1. difference = {66 – 59 / (=) 7 } ; 2. percentage change = (7 ÷ 59) × 100 ; 3. answer = 12 (%)	Correct answer with no working shown gains 3 marks Answers of 12.0 ,11.90, 11.8 with no working gain 2 marks **AWARD** mp 1 even if rest of calculation is incorrect If mp 1 incorrect allow ecf for mp2 but *not* mp3 ACCEPT 11.9 (%) / 11.86 (%) / 11.864407 or correct rounding	**(3)**

Question Number	Answer	Additional Guidance	Mark
1(d)(ii)	1. {*Daphnia* heart is not a good model for the human heart / {the suggestion / it} is not correct} ; 2. alcohol {increases / hardly affects} the heart rate in humans ; 3. (but) alcohol decreases the heart rate in *Daphnia* ; 4. *Daphnia* heart is a good model for the human heart because alcohol affects both ;	Is a good model must be accompanied by a valid reason or vice versa	**(3)**

Question Number	Answer	Additional Guidance	Mark
2(a)	Idea of possible {extinction / decline in numbers} of Przewalski's horse ;		**(1)**

Question Number	Answer	Additional Guidance	Mark
2(b)	**costs:** 1. transport of horses ; 2. use of IVF / AI ; 3. special diet ; 4. veterinary care / specific example ; **benefits:** 5. encourages visits to zoos ; 6. increasing {income /revenue} ; 7. increases awareness ; 8. encourages donations ;	**AWARD** wherever in relevant column correct answer is found. Ignore irrelevant points e.g. vitamin supplement e.g. flu jabs, worming **max 2** **max 2**	**(4)**

Question Number	Answer	Additional Guidance	Mark
2(c)	1. bar graph / bar chart ; 2. {each bar / x axis / one axis} represents a country ; 3. {height of bar / y axis / one axis} represents number of births ; 4. y axis scale must be up to (at least) 570 ;	**ACCEPT** correctly labelled drawing of graph / chart for mp 1, 2 and 3 **ACCEPT** same points on a pie chart / graph segment = country, size of segment = number of births	**(3)**

Question Number	Answer	Additional Guidance	Mark
2(d)(i)	1. as {inbreeding coefficient / amount of inbreeding / inbreeding} goes down, {number of births increases / there is {inverse relationship/ negative correlation} between inbreeding coefficient and number of births / eq} ; 2. inbreeding goes down because the {population / gene pool / genetic diversity} is bigger / mating between (close) relatives less common in larger population ; 3. {fewer births / higher infertility} when {inbreeding coefficient / amount of inbreeding} is high as {fetus less likely to survive / more genetic diseases / difficulty breeding / eq};	**ACCEPT** inbreds **IGNORE** interbreeding piece together these two points as long as valid **ACCEPT** reverse argument **ACCEPT** reverse argument	**(2)**

Question Number	Answer	Additional Guidance	Mark
2(d)(ii)	Caption **ANY** two of 1. (the extent of) inbreeding ; 2. (number of) births ; 3. from 1949 until 2003 ; **Paragraph number** 4. 3 / 4 / 5 ;		**(3)**

Question Number	Answer	Additional Guidance	Mark
2(d)(iii)		**IGNORE** minor errors in spelling of names	
	1. all 6 elements present with no extras ;	i.e. names, date, article title, journal, volume number and pages do not award if “vol.”, “pages”, “pp” are included **IGNORE** “…by”	
	2. order correct ;	there must be a minimum of 4 elements in the correct order to judge this	
	3. reference has names followed by initial(s) ;	**ACCEPT** any one author followed by “et al.” or “and others”	**(3)**

Question Number	Answer	Additional Guidance	Mark
2(e)	1. mating / eq ; 2. relevant detail from eg. para. 6 and 7 ; 3. AI ; 4. relevant detail from eg. para. 9 ; 5. IVF ; 6. relevant detail from eg. para.10 ;	 e.g. introduce male horse to female horse e.g. taking and keeping sperm and introducing into female e.g. taking sperm and egg and mixing in a dish	**(4)**

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