



Mark Scheme (Results)

Summer 2012

GCE Biology (6BI07) Paper 3B
Practical Biology and Research Skills

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Publications Code US031786

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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	Mark
1 (a) (i)	<ol style="list-style-type: none"> 1. idea of (transparent / eq) so heart visible ; 2. {easily obtainable / cheap / abundant} / eq ; 3. idea that <i>Daphnia</i> {well studied / model organism} ; 4. <i>Daphnia</i> are easy to manipulate / eq ; 	(2)

Question Number	Answer	Mark
1 (a) (ii)	<ol style="list-style-type: none"> 1. {simple nervous system / invertebrate} so reduced awareness of pain /eq ; 2. (transparent so) no need for dissection /eq ; 3. abundant in nature so no threat to it or its dependent species (food chains) / eq ; 4. bred for fish food will thus die anyway / eq ; 5. may be clones therefore no loss of genetic variation / eq ; 6. animal welfare argument e.g. cannot give consent / may feel pain / eq ; 	(2)

Question Number	Answer	Mark
1 (a) (iii)	<ol style="list-style-type: none"> 1. idea that lactic acid concentration is only variable / to avoid changes in heart rate due to temperature changes (rather than [lactate]) ; 2. high enough to ensure good level of activity / not denature enzymes / habitat temperature of <i>Daphnia</i> / easy to maintain 25 ° C / eq ; 	(2)

Question Number	Answer	Mark
1(a)(iv)	<p>Any two paired points:</p> <ol style="list-style-type: none"> 1. some feature of <i>Daphnia</i> (age / size / sex / eq) ; 2. measure/ref to source of fleas / reference to some feature to assess sex (e.g. brood chamber) ; 3. reference to {pre-treatment / acclimatisation / recovery time / eq} ; 4. detail of {pre-treatment / acclimatisation / recovery time / eq} given ; 	(2)

Question Number	Answer	Mark
1(b)(i)	<ol style="list-style-type: none"> 1. $457 \div 3$ / 152.3 ; 2. 152 ; <p>correct answer only, gains 2 marks</p>	(2)

Question Number	Answer	Mark
1(b)(ii)	<p>A axes correct (x-[lactic acid] , y- bpm) ;</p> <p>F axes labelled with units ;</p> <p>P correct plotting ;</p> <p>L suitable line of best fit / line joining points drawn with straight edge ;</p> <p>S standard deviation accurately plotted as bars above and below ;</p>	(5)

Question Number	Answer	Mark
1(b)(iii)	<ol style="list-style-type: none"> 1. increase in lactic acid concentration causes fall in heart rate / eq ; 2. low pH has an effect on enzymes / slows down / inhibits muscle contraction ; 	(2)

Question Number	Answer	Mark
1(c)	<ol style="list-style-type: none">1. Idea that more lactic acid lowers pH2. these data show that lowering pH depresses heart rate in rats as in <i>Daphnia</i> / eq ;3. published in peer-reviewed journal therefore validity is likely to be good ;4. but rat is vertebrate / (many) differences (in physiology) between rat and <i>Daphnia</i> / eq ;5. rat heart is isolated, <i>Daphnia</i> whole organism / eq ;	(3)

Question Number	Answer	Mark
2(a)	treatment of pain / effectiveness of acupuncture / acupuncture as an alternative treatment / eq ;	(1)

Question Number	Answer	Mark
2(b)	1. bar graph(s) / pie charts ; 2. bar graph-clear indication of y axis (eg. percentage ; pie chart-correct explanation of how wedges derived / sketches of pies look right ;	(2)

Question Number	Answer	Mark
2(c) (i)	the following points in the correct order: 1. Loh (et al /and others) 1984 / eq ; 2. Neurology, Neurosurgery and Psychiatry (Vol.) 47 pages 333-337 ; 3. Correct order as above ;	Max (2) 1

Question Number	Answer	Mark
2(c) (ii)	1. reference missing from bibliography / eq ; 2. paragraph 7: Ernst G, Strzyz H and Hagmeister H in 2003 entitled the 'Incidence of adverse effects during acupuncture therapy-a multicentre survey' ; 3. reference in bibliography not used in text / eq ; 4. Dowson, Lewith, and Machin / eq ;	(1)

Question Number	Answer	Mark
2(d)	<ol style="list-style-type: none"> 1. all peer reviewed journal publications so valid in this respect /eq ; 2. BUT not all in agreement in their conclusions so maybe not so valid in some cases / eq ; 3. Comment on factor invalidating study 	(2)

Question Number	Answer	Mark
2(e)	<ol style="list-style-type: none"> 1. bigger sample size / eq ; 2. use of matched populations; 3. using people who have not come from failed drug treatment / eq ; 4. longer term study ; 5. more objective method of measurement of improvement needed ; 1. 6. double blind stated / explained ; 	(2)

Question Number	Answer	Mark
2(f)	<ol style="list-style-type: none"> 1. idea that economic arguments does not support the use of acupuncture ; 2. elaboration of reason for cost (e.g. training, time to {treat / number of treatments / / eq} of acupuncture 3. there are conflicting ideas about cost compared to drugs / eq ; 4. evidence to support MP 3 {para 8 says cheaper due to reduction of cost of drugs, para 11 and/or 1. 12 say more expensive}; 	(3)

Question Number	Answer	Mark
2(g)(i)	<ol style="list-style-type: none"> 1. not effective with reason; 2. effective with reason ; 3. additional evidence for MP 1 ; 4. additional evidence for MP 2 5. comment on subjectivity of methodology ; 	(3)

Question Number	Answer	Mark
2(g)(ii)	<ol style="list-style-type: none"> 1. idea that {drugs / medication} are the alternative (to acupuncture for pain relief) / eq ; 2. (paragraph 4) discusses effectiveness drugs ; 3. (paragraph 9) looks at risks of drugs/ eq ; 4. (paragraph 10) (drugs) take less time ; 5. (paragraph 11 and 12) (drugs) costs less ; 	(3)

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Order Code US031786 Summer 2012

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