Mark Scheme (Results)

Summer 2018

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

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Summer 2018
Publications Code WBI03_01_1806_MS

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.

Using the Mark Scheme

Examiners should look for qualities to reward rather than faults to penalise. This does NOT mean giving credit for incorrect or inadequate answers, but it does mean allowing candidates to be rewarded for answers showing correct application of principles and knowledge. Examiners should therefore read carefully and consider every response: even if it is not what is expected it may be worthy of credit.

The mark scheme gives examiners:
- an idea of the types of response expected
- how individual marks are to be awarded
- the total mark for each question
- examples of responses that should NOT receive credit.

/ means that the responses are alternatives and either answer should receive full credit.
( ) means that a phrase/word is not essential for the award of the mark, but helps the examiner to get the sense of the expected answer.
Phrases/words in **bold** indicate that the meaning of the phrase or the actual word is **essential** to the answer.
ecf/TE/cq (error carried forward) means that a wrong answer given in an earlier part of a question is used correctly in answer to a later part of the same question.

Candidates must make their meaning clear to the examiner to gain the mark. Make sure that the answer makes sense. Do not give credit for correct words/phrases which are put together in a meaningless manner. Answers must be in the correct context.

Quality of Written Communication
Questions which involve the writing of continuous prose will expect candidates to:
- write legibly, with accurate use of spelling, grammar and punctuation in order to make the meaning clear
- select and use a form and style of writing appropriate to purpose and to complex subject matter
- organise information clearly and coherently, using specialist vocabulary when appropriate.

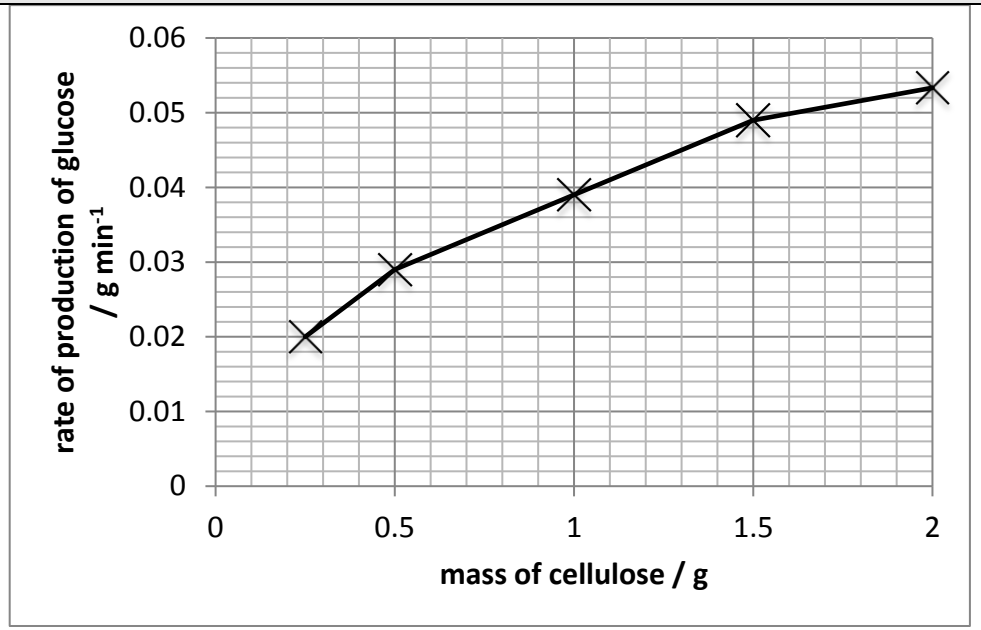
Full marks will be awarded if the candidate has demonstrated the above abilities.
Questions where QWC is likely to be particularly important are indicated (QWC) in the mark scheme, but this does not preclude others.

Question Number	Answer	Additional Guidance	Mark
1(a)(i)	the (mass / weight / concentration) of cellulose ;		(1)

Question Number	Answer	Additional Guidance	Mark
1(a)(ii)	1. find the rate of production of glucose / find the {concentration / eq} of glucose after set time ; 2. at a (suitable) range of temperatures/ quoted range ; 3. credit further detail of method ; 4. idea that optimum temperature is the temperature at which the reaction is {quickest / eq} ;	Mp 3. e.g add a known volume of a known concentration of enzyme to the cellulose / add a known mass of cellulose (to a known volume of water) / idea of equilibration to the appropriate temperature / idea of sugar test / use of Benedict's / keeping pH constant / plot graph of temp against glucose production / repeat at narrow range around where optimum thought to be from graph	(3)

Question Number	Answer	Additional Guidance	Mark
1(a)(iii)	1. pH ; 2. use of buffer ; **Or** 3. {enzyme / cellulase} {concentration/ mass} ; 4. add a known {mass / volume} of cellulase to a known volume of water / use stock solution ; **Or** 5. volume of enzyme solution added ; 6. use of {graduated pipette / burette / eq} ;	ACCEPT same	**(2)**

Question Number	Answer	Additional Guidance	Mark
1(b)(i)	1. 0.80 ÷ 15 ; 2. = 0.053 ;	Correct answer with no working shown gains both marks	**(2)**

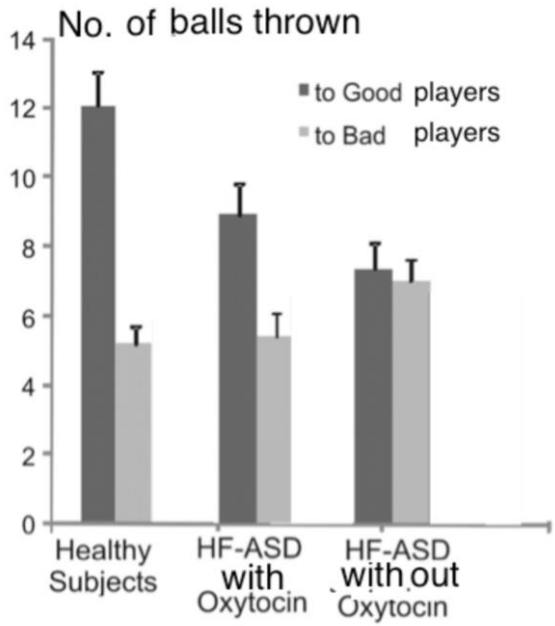
Question Number	Answer	Additional Guidance	Mark
1(b)(ii)	A axes right way round (x = mass of cellulose / g, y= rate of production of glucose / g min^{-1}) ; L axes correctly labelled, and with units ; (x = mass of cellulose / g , y= rate of production of glucose / g min^{-1}) ; P correct plotting on a suitable linear scale ; S line joining points accurately ruled and not extrapolated beyond 2 g ;		(4)

Question Number	Answer	Additional Guidance	Mark
1(c)	1. repeat (the experiment at each concentration / mass of cellulose) ; 2. {calculate / eq} the mean (for each concentration) ; 3. {calculate / eq} {SD / SE / range} ; 4. plot the (means with the) {SD / SE / range / error bars} ;	ACCEPT find for calculate ACCEPT find for calculate	(4)

Question Number	Answer	Additional Guidance	Mark
1(d)	1. idea of using (an enzyme concentration of) 9 (au) ; 2. no increase in glucose production above {this concentration / 9 (au)} ; 3. idea that enzyme costs money ; 4. idea of using a lower concentration than 9 au ; 5. idea that cellulase concentration and rate of glucose production not proportional ; 6. use of data to show mp 4 ;		**(4)**

Question Number	Answer	Additional Guidance	Mark
2(a)(i)	1. (the use of) oxytocin ; 2. idea of improving social behaviour / relieving stress ;	 ACCEPT regulates emotions / development of voluntary social behaviour	**(2)**

Question Number	Answer	Additional Guidance	Mark
2(a)(ii)	1. ABA / Applied Behaviour Analysis; 2. idea of reward based system / operant conditioning ; **Or** 3. CBT / Cognitive Behavioural Therapy ; 4. idea of adjusting how a person thinks about a situation ;	 MP2 ACCEPT considers how behaviour is affected by positive and negative aspects of the environment MP4 ACCEPT helps control negative thoughts / regulate fear and anxiety	**(2)**

Question Number	Answer	Additional Guidance	Mark
2(b)	1. data presented in a correctly labelled {table / bar graph / pie chart} ; 2. data for **all 3 subject** types shown with ref to good and bad players in a comparative way ; 3. mean number of balls thrown shown in proportion ; 4. SDs indicated ;	 MP3 can be judged on the data that is plotted	**(4)**

Question Number	Answer	Additional Guidance	Mark
2(c)(i)	1. (Andari et al) 2010 / number written in bracket / superscript number / eq; 2. paragraph 4 ;	ACCEPT idea of listing A/Y/T/J/V/I/P in any order ACCEPT at the end	**(2)**

Question Number	Answer	Additional Guidance	Mark
2(c)(ii)	1. all 7 elements present with no extras ; 2. order correct ; 3. reference has name(s) followed by initial(s) ;	MP1 ACCEPT any author missing from a list unless Andari, E / Elissar, A is missing If only Andari listed et al / and others must be present MP3 all authors in a list must be in correct format ACCEPT eg Andari, E OR Elissar, A Andari, E. et al. (2010). Promoting social behaviour with oxytocin in high functioning autism spectrum disorders. Proceedings of the National Academy of Sciences, 107 (9), 4389-4394.	**(3)**

Question Number	Answer	Additional Guidance	Mark
2(d)(i)	1. suitable calculation e.g. 62÷50 ; 2. 1.24 ;	Correct answer with no working shown gains both marks	**(2)**

Question Number	Answer	Additional Guidance	Mark
2(d)(ii)	1. suitable calculation e.g. 1.24 x 13 x 24 x 2 ; 2. 773.76 ;	Correct answer with no working shown gains both marks Accept ECF if answer from 2di is multiplied by 624 for two marks (e.g. 6.2 x 624 = 3868.8)	**(2)**

Question Number	Answer	Additional Guidance	Mark
2(e)	1. idea that we do not know if patients gave consent / parents were asked to give consent ; 2. idea that patients denied their normal medication ; 3. disrupting their routine / eq ; 4. idea that experimenting on humans is unethical ;	ACCEPT consequences of experimenting on humans, e.g. side effects	**(3)**