OCR
Oxford Cambridge and RSA

GCE

Applied Science

Unit **G623/01**: Cells and Molecules

Advanced Subsidiary GCE

Mark Scheme for June 2018

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

1. Abbreviations, annotations and conventions used in the detailed Mark Scheme.

/ = alternative and acceptable answers for the same marking point
(1) = separates marking points
not = answers which are not worthy of credit
reject **=** answers which are not worthy of credit
ignore **=** statements which are irrelevant
allow **=** answers that can be accepted
( ) = words which are not essential to gain credit
__ = underlined words must be present in answer to score a mark
ecf = error carried forward
AW = alternative wording
ora = or reverse argument

2. Annotations: the following annotations are available on SCORIS.

✓ = correct response
✗ = incorrect response
bod = benefit of the doubt
nbod = benefit of the doubt **not** given
ECF = error carried forward
^ = information omitted
I = ignore
R = reject

Highlighting is also available to highlight any particular points on the script.

The following questions should be annotated with ticks to show where marks have been awarded in the body of the text: 2(b), 4(c), 6(b), 7(b)(iii) and 12(a)

3. The Comments box
   The comments box will be used by your PE to explain their marking of the practice scripts for your information. Please refer to these comments when checking your practice scripts.
   You should only type in the comments box yourself when you have an additional object of the type described in Appendix B of the Handbook for Assistant Examiners and Subject Markers.
   Please do not use the comments box for any other reason.
   Any questions or comments you have for your Team Leader should be communicated by phone, SCORIS messaging system or e-mail.

4. Please send a brief report on the performance of the candidates to your Team Leader (Supervisor) by the end of the marking period. The Assistant Examiner's Report Form (AERF) can be found on the Cambridge Assessment Support Portal. This should contain notes on particular strengths displayed, as well as common errors or weaknesses. Constructive criticisms of the question paper/mark scheme are also appreciated.

Planning Exercise

An investigation to determine the optimum home brew mashing temperature for maximum release of fermentable sugars

Marking of the plan:

1 Read the material presented.
2 Then *award 1 mark* if *scientific terminology* has been used appropriately. Record using the letter Y.
3 Then re-read, this time point marking up to 24, by placing letters A to X in the margin where you see evidence of the marking criteria.
4 The same piece of evidence can be used to award one criterion only.

Marking Point	Marking Criteria	Mark	Additional notes
A	*easily recognised safety procedures identified from:* glassware burns electrical e.g. waterbath/ colorimeter pH buffers (if used) grain allergy Bunsen burner Acid (hydrolysis)	1	Identify hazard /risk/precaution or similar Need minimum of three Evidence of something that is going to make doing the investigation safer – an active document, a working document related to the plan.
B	prediction made;	1	Prediction related to optimum **sugar yield** and **temperature** in **named** grain (name can appear in plan)
C	with justification;	1	Statement relates to optimum temperature for enzymes/ denaturing of enzymes
D	description of preliminary work;	1	e.g. mass of grain/ pH of mash/ time of mashing/ volume of water/ preparation of calibration curve for reducing sugars/ pre-treatment of grain (e.g. crushing)/ research using secondary sources / narrowing temperature range **Ignore** ref to tissue other than grain
E	clear and in detail;	1	Clear description of any **preliminary** work /for research, evidence of selection with reference to source
F	reason (for doing it) explained;	1	Explanation of why it's necessary for completion of the main investigation
G	clear and in detail;	1	Link to biological explanation.e.g. optimum pH of enzymes

Marking Point	Marking Criteria	Mark	Additional notes
H	at least two secondary sources of information identified;	1	**Ignore** reference to 'insert'. Authenticated websites required. Full website address needed. Full description of named text (Title/Author/Publisher) **Allow** one Wikipedia reference.
I	relevance explained;	1	Brief explanation as to how reference(s) helped in the planning for **at least** one source.
J	basic practical skills and accuracy;	1	Simple method/list of instructions. Basic. Is it a feasible approach? Monitoring of sugar yield. Effect of different temperatures.
K	sound practical skills and accuracy;	1	Could someone follow the instructions unaided? Instructions to include: Range of temperatures (values not needed) Mashing of grain Filtration/ retention of wort Detail of how yield is to be measured
L	range of appropriate equipment listed;	1	List of names of main items of equipment and materials needed for their investigation. Equipment for maintaining and monitoring temperature, glassware, equipment for measuring yield
M	full range of appropriate equipment listed;	1	Any major item missing do not award **Named** grain **and** one of each of: Glassware – number e.g. 5 pipettes Capacity – size e.g. $250cm^3$ Volume /mass/concentration
N	appropriate number of measurements stated;	1	Reference to replicates/ use of repeats – at least one set
O	need for range of measurements stated;	1	Statement: e.g. to compare a range of temperatures to maximise yield. Reference to results of relevant research.
P	appropriate range stated;	1	5 different appropriate temperatures, 20 - 80

Marking Point	Marking Criteria	Mark	Additional notes
Q	relevant variables are identified (stated);	1	At **least two** from: source of grain/ type of grain / mass or volume of grain/ time of mashing/ pH, volume or type of buffer solution/ volume of water or buffer/ vol of indicator / method of recovery **Ignore** independent and dependent references
R	how variables to be controlled explained;	1	For at **least two** of the variables mentioned in Q. **A quantitative description** is required
S	one suitable method to display data;	1	One display of results e.g. table, with clear headers & units
T	additional method to display data;	1	Any **different** display relevant to investigation (allow ecf) e.g. graph with axes correct with labels & units
U	simple data handling;	1	Evidence of calculation e.g. mean
V	possible conclusions; (Allow ecf if correctly related back to original prediction)	1	Statements of expectations or observations to confirm or reject prediction made in **B**. 'What would your results need to show to confirm or reject your prediction?' **Accept** an indication of optimum concentration from annotated graph.
W	recognises sources of error;	1	At least two examples: equipment/ materials/ specific human error (max one) Fluctuations in temperature/ resolution of measuring equipment/ accuracy of Benedict's
X	suggests methods for improving accuracy and or validity;	1	**Accuracy**: relate to '**W**' or use of alternative technique(s). Expand **critical range** of temperatures/ optimum mashing times /resolution of equipment; AND/OR **Validity**: state aspect of collected data to be compared with secondary sources. Alternative method of measuring sugar content/ alternative pH/ . **Accept** qualified repeats if non in main method.
Marks	Maximum for plan = 25	*24 + 1 (scientific terminology)*	

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