GCE A LEVEL MARKING SCHEME

SUMMER 2019

A LEVEL (NEW)
BIOLOGY - UNIT 5
1400U50-1

INTRODUCTION

This marking scheme was used by WJEC for the 2019 examination. It was finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conference was held shortly after the paper was taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conference was to ensure that the marking scheme was interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conference, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about this marking scheme.

WJEC GCE A LEVEL BIOLOGY

UNIT 5 - PRACTICAL EXAMINATION

SUMMER 2019 MARK SCHEME

GENERAL INSTRUCTIONS

Recording of marks

Examiners must mark in red ink.

One tick must equate to one mark.

Question totals should be written in the box at the end of the question.

Question totals should be entered onto the grid on the front cover and these should be added to give the script total for each candidate.

Marking rules

All work should be seen to have been marked.

Marking schemes will indicate when explicit working is deemed to be a necessary part of a correct answer.

Crossed out responses not replaced should be marked.

Credit will be given for correct relevant alternative responses which are not recorded in the mark scheme.

Marking abbreviations

The following may be used in marking schemes or in the marking of scripts to indicate reasons for the marks awarded.

cao = correct answer only ecf =
error carried forward bod =
benefit of doubt

UNIT 5 – EXPERIMENTAL TASK MARK SCHEME

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
1	*(a)*			**Teacher Awarded:** Pieces of vegetable are dried to remove excess water but not overly dried / allowed to sit on paper towels and remove too much water (1)		**1**		**2**		**2**
				Balance is set to zero between weighings (1)		**1**				
				Table: • Headings correct (1) must have reference to <u>mass</u> in heading for DV and mean column (if separate)	**1**					
				• Units correct and in column headings only (either percentage or %) (1) Accept mins/ min Reject m Reject if time converted to seconds Reject if reference made to grams in heading for percentage change	**1**					
				• Percentage changes recorded to 1 d.p. (ignore raw data) (1) Accept if 0 minutes not included in table Reject if they record all data in table		**1**				
				• Means calculated and rounded correctly to 1 or 2 d.p. (1) Accept means calculated to 1 more dp than % changes Reject if % changes for potato 1 and 2 recorded as -ve but mean shown as +ve or vice versa		**1**		**4**	**2**	**4**

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
	(b)			**Graph:** • Use of more than half the graph paper in both directions (1) (use of graph paper must allow for range bars)	**1**					
				• Labels: x axis = time ..... + y axis = **mean** percentage change in mass (1)		**1**				
				Accept if label for x axis given at bottom of page and not on the axis line		**1**				
				Accept inverted axes ECF from table				**7**	**2**	**7**
				• Correct units: x = minutes/ minute/ munud/ munudau + y = %/percentage (1) Reject m (unless ecf)	**1**					
				• Linear scales correct on both axes with figure at origin (1) Reject negative figures going up/ positive numbers going down		**1**				
				• Plots correct ± ½ small square (1) If y axis scale shows negative numbers going up then **accept** correctly plotted data Reject data calculated as negative changes plotted as positive changes Reject if data calculated as +ve changes and plotted as –ve – penalise once (don't penalise range bar mark) Reject if they don't include data for 0 in table and then plot point at origin	**1**					
				• Suitable line drawn (1) Accept line of best fit Reject extrapolation for plot to plot line		**1**				
				• Range bars plotted correctly ± ½ small square (1) Accept if no horizontal line at top and bottom		**1**				

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
	(c)	(i)		different masses at start + so actual change in mass not comparable / measure change irrespective of initial mass(1) Reject references to making mean more {accurate /reliable} / proportional change			**1**	**1**	**1**	**1**
		(ii)		(range bars provide information) on the {reliability / repeatability/ consistency} of the readings / enables you to assess confidence in the {mean/ trend} (1) Accept examples Reject references to making mean more accurate		**1**		**1**		**1**
		(iii)		(line) would {go down further/ plateau / level off} (1) (If results plotted as positive changes accept line would go up / plateau / level off) as cells become fully plasmolysed/ maximum water loss from cells / cell contents become isotonic to sea water / {external solution} / correct description of relationship in water potential of cell contents and sea water (1) Accept tissue as alternative to cells			**2**	**2**		**2**
		(iv)		• If don't dry enough excess water will be left on potato / if over dry then more water will be lost/ varying amounts of water left on potato (1) • Leads to {underestimate / overestimate} in change in mass/ affect (percentage) change in mass (1) Accept refs to weight instead of mass Accept description of error in estimate Ignore reference to inaccuracies (given in stem of question)			**2**	**2**		**2**
		(v)		**Task 1** (boiling) would {destroy/ damage} cell membrane / cell membrane becomes completely permeable (1) Reject refs to cell walls / enzymes / cells being denatured **Task 2** sea water does not contain only sodium chloride / seawater contains other solutes / seawater has a variable concentration (1)			**1**	**1**		**1**
				Question Total	**5**	**9**	**6**	**20**	**5**	**20**

Question			Marking Details	Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
1	(a)	(i)	So that the only difference between the measurements would be due to the light intensity/ prevent leaf thickness being affected by other factors/ owtte (1) To minimise genetic variation between plants/reference to genetic similarity/ similar {genes/ alleles} (1) Reject genetically identical		2		2		2
		(ii)	Any **three** × (1) from: air temperature (1) soil temperature (1) temperature unqualified = 1 mark only (relative) humidity (1) (named) {mineral/ nutrient} availability (1) soil pH (1) water availability/ volume of water (1) (atmospheric) carbon dioxide/ concentration of carbon dioxide (1) any other suitable abiotic factor (1) Reject time of year/ distance from the sea/ weather/ wind/ air pressure/ use of a buffer to control pH/ altitude/ aspect	3			3		3
		(iii)	Same period of exposure / comparable stage of {development/ growth}/ same size/ different ages may have different thickness of leaves		1		1		1
	(b)		1526 / 15 = 101.7 µm		1		1	1	
	(c)	(i)	to compare {the means of data/ two sets of continuous data / normally distributed data} (1)	1					
		(ii)	There is no <u>significant</u> difference in the <u>mean</u> thickness of leaves grown at low or high light intensity/any difference in the mean thickness of the leaves is due to chance alone		1		1		1
		(iii)	28		1		1	1	

Question			Marking Details	Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
		(iv)	Critical value = 2.048 (at level of significance of 0.05);(1) Calculated value is greater than the critical value / 2.386 > 2.048;(1) Reject the null hypothesis;(1) (Mean) thicknesses of the leaves are significantly different / leaves grown at low light intensity are significantly thinner than those grown at high light intensity / differences in thickness of leaves are not due to chance alone(1) ECF if 2.763 chosen as critical value	1		3	4	2	2
		(v)	Any **two** for **1 mark** • Accept the null hypothesis • As calculated value is less than critical value • (mean) thicknesses are not significantly different / any difference in (mean) thickness is due to chance			1	1		1
	(d)	(i)	{More /larger/multiple layers} of palisade cells (1) So more {chloroplasts/ chlorophyll/ photosystems / antenna complexes}/ higher concentration of photosynthetic pigments} (1) Reject wider range of pigments So more light can be absorbed;(1) must be in context of 1st two marking points		2	1	3		
		(ii)	Larger surface area/more {chloroplasts/ chlorophyll}/ different range of pigments/ more movement of chloroplasts(1) to absorb as much light as possible/ absorb light of a wider range of wavelengths(1) Ignore reference to stomata		2		2		
			Question Total	**5**	**10**	**5**	**20**	**4**	**11**

Question				Marking Details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
2	(a)	(i)	A	cilium / cilia		2		2		2
			B	{cell/plasma} membrane						
		(ii)		Correct answer = 0.25 µm (2 dp) = 2marks Actual diameter = $\frac{\text{image width}}{\text{magnification}} = \frac{2 \times 1000}{8000}$ µm = 1 mark Allow one mark for any substitution even if measurement incorrect		2		2	2	2
	(b)	(i)		Image 1 shows cilia in a longitudinal/ vertical section (and Image 2 is in transverse section)/ cut in a different plane Reject different angles		1		1		
		(ii)		Correct answer = 120 000 = 2 marks Magnification = $\frac{\text{image width}}{\text{actual width}} = \frac{30 \times 1000}{0.25}$ = 1 mark for substitution Ecf from (a)ii		2		2	2	1
		(iii)		Size of structures {is below the level of resolution of the light microscope / too small}/ electron microscope able to use a higher magnification	1			1		
	(c)	(i)		trachea / bronchus / any other correctly named site	1			1		
		(ii)		Proximal convoluted cells are cuboidal (and cells in Image 1 are columnar)	1			1		
				Question Total	**3**	**7**	**0**	**10**	**4**	**5**

A2 UNIT 5 – PRACTICAL EXAMINATION - SUMMARY OF ASSESSMENT OBJECTIVES

Experimental Task	Question	AO1	AO2	AO3	TOTAL MARK	MATHS	PRAC
	1	5	9	6	20	6	20
Practical analysis	1	5	10	5	20	4	11
	2	3	7	0	10	4	5
	Total	13	26	11	50	14	36