GCE A LEVEL MARKING SCHEME

SUMMER 2017

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

INTRODUCTION

This marking scheme was used by WJEC for the 2017 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.

UNIT 5 - PRACTICAL EXAMINATION

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 MARK SCHEME Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
Teacher Marks				Volumes measured accurately (1) Washed syringe adequately with distilled water (1)		1 1		2		2
1	*(a)*			• Correct column headings in table: time and concentration of phenol phthalein/ PP (1) NOT phenolphthalein phosphate/ ppp • Appropriate units in headings, not in body of table: minutes/ seconds/ s/ e/ min/ mins **and** mol dm^{-3}/ M (1) NOT secs • Calc of mean (1) **check each for correct rounding and use of standard form** Accept use 10^{-x} in heading (except if use standard form in body of table also - lose heading mark)	1 1	 1		3	1	3
	(b)			A. X (time) and Y (mean concentration of phenolphthalein) axes correctly labelled (1) **ecf from table if plotted all results then accept no reference to mean in title (but lines should be labelled)** B. Over half the grid used in both directions (including range bars)(1) C. Correct units both axes [minutes/ seconds/ s/ e/ min/ mins **and** mol dm^{-3}/ M] (1) ecf from table D. Suitable linear scale on *x* axis (1) E. Suitable linear scale on *y* axis (1) **should include number at origin for each axis accept correct breaklines** F. Accurate plotting of plots (2) ± ½ small square G. Suitable drawing of line (1) Accept dot to dot with a ruler (line must pass through point, no tolerance reject extrapolation) and lines of best fit (some extrapolation allowed). H. Range bars plotted correctly (1) Allow this mark if all values for each time are identical or if three lines plotted correctly	1 1 1 1	1 1 2 1		9	2	9

	(c)	(i)		Relevant comment on {length of range bar(s) or absence of range bars}(1) Comment on variation in {repeats/ readings /reliability of mean} (1) must match raw data			2	2		2
		(ii)		• Temperature <u>may vary</u> – use thermostatically controlled water bath/ OWTTE (1) • Matching colour to chart <u>is subjective/ OWTTE</u> – use colorimeter (1) • Syringe only measures to e.g. 1cm^3 use burette/ graduated pipette/ automatic pipette accurate to smaller interval (1) • Enzyme extract may settle out/ change in concentration – use enzyme of known concentration / stir before use (1) NOT reference to time that sodium carbonate is added			2	2		2
	(d)			**Test1** Repeat at {different/ named/ range of} pH values using <u>buffers</u> (1) Keeping {all other factors the same/ 2 relevant named factors}(1) **Test 2** Repeat at <u>different</u> temperatures using a thermostatically controlled waterbath/ OWTTE (1) Keeping {all other factors the same/ 2 relevant named factors}(1)			2	2		2
				Question 1 total	**5**	**9**	**6**	**20**	**4**	**20**

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
1	*(a)*	(i)		**Any one (x1) from** • incoming tide + method of preventing getting cut off • rocks/algae slippery (when wet)/ uneven rocks + wear suitable footwear • Allergy to shellfish + wear gloves		1		1		1
		(ii)		**Any two for one mark** • measure dogwhelks on site / do not remove from site / replace where found Accept shells • avoid stepping on eggs/ adults • avoid stepping on algal growths/ other living organisms • replace {rocks / seaweed} • minimise {litter/ pollution}		1		1		1
		(iii)		measure to 0.1 mm rather than nearest mm / smaller divisions on {ruler/callipers} (1)	1			1		1
		(iv)		**Any two (x1) from:** • increase size of sample / measure more dogwhelks (1) NOT repeat more times unqualified Reject increase size of sample to make mean more accurate • take samples from more sheltered and exposed sites/ more sites on the same beaches (1) • make sure that all dogwhelks are {same species/ adults} (1) • measure at same time of year (1) • same height above low water line/ other fixed point (top of beach) (1)		2		2		2
	(b)	(i)		no <u>significant</u> difference in (mean) (shell) heights between {Porth Trecastell / exposed shores} and {Porthaethwy / sheltered shore}/ no <u>significant</u> difference in (mean) shell heights between the two sites	1			1		1
		(ii)		$\bar{x}_2$ = 23.5 (1) s_2^2 = 12.5 / 15 = 0.83 (1) **if use n-1** s_2^2 = 12.5/14 = 0.89 (1)		2		2	2	

	(b)	(iii)		**if use n for s_2^2 and formula as given** t = $\frac{32.7 - 23.5}{\sqrt{((6.88 / 15) + (0.83 / 15))}}$ (1) = 12.83 (1) **if use n-1 for s_2^2 and formula as given** t = $\frac{32.7 - 23.5}{\sqrt{((6.88 / 15) + (0.89 / 15))}}$ (1) = 12.78 (1) **if use n-1 for $s_1^2 + s_2^2$ and formula as given** t = $\frac{32.7 - 23.5}{\sqrt{((7.37 / 15) + (0.89 / 15))}}$ (1) = 12.40 (1) **if use n for s_2^2 but square standard deviation again** t = $\frac{32.7 - 23.5}{\sqrt{((6.88^2 / 15) + (0.83^2 / 15))}}$ (1) = 5.14 (1) **if use n-1 for s_2^2 and square standard deviation again** t = $\frac{32.7 - 23.5}{\sqrt{((6.88^2 / 15) + (0.89^2 / 15))}}$ (1) = 5.14 (1) **if use n-1 for $s_1^2 + s_2^2$ and square standard deviation again** t = $\frac{32.7 - 23.5}{\sqrt{((7.37^2 / 15) + (0.89^2 / 15))}}$ (1) = 4.80 (1) Depending where rounding occurs 2nd dp may vary. if only given to 1 dp award 1 mark **ECF FROM TABLE**		2		2	2	
		(iv)		df = (15-1) + (15-1) = **28** (1) critical value at 0.05 = **1.70** (1)		2		2		2

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
		(v)		• value of t is greater than critical value (1) • reject null hypothesis (1) • significant difference in mean shell heights between the shores / mean shell height at Porthaethwy significantly greater than at Porth Castell/ any difference between the heights on the different shore is not due to chance alone (1) **Accept error carried forward from (i)(iv)**	1		2	3		3
	(c)			**Any five x (1) from:** A. Porthaethwy greater food source/ owtte so more nutrients to grow larger/ ORA (1) B. Porthaethwy greater {algal density/ owtte } so more {protection from predators/ refuge}/ORA (1) C. Trecastell - wave action is greater therefore being shorter/ smaller means less affected by waves/ORA (1) D. Trecastell – may not live as long (due to greater exposure to waves) so do not grow as big/ORA (1) E. {wave action/ predators/ food sources/ competition for food} act as <u>selection pressures</u> (1) F. Reference to {survival of the fittest/ best adapted able to pass on (advantageous) <u>alleles</u>} related to suitable named selection pressures(1) G. (Geographical isolation resulting in) {reduced transfer of alleles between populations / reduced frequency of alleles} (1)		3	2	5		
				Question 1 total	3	13	4	20	4	11

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
2	*(a)*	(i)		A = Epidermis / exodermis B = Endodermis C = Cortex/ parenchyma D = Phloem **all correct = 2 marks** **2/3 correct = 1 mark** **0/1 correct = 0 marks**	2			2		2
		(ii)		low power plan because no cells shown/ tissue layers only	1			1		1
		(iii)		**From Plan** Correct answer G-H = **195/195.1 µm** or G-H = **193/192.6 µm** award 3 marks E-F = 80/81mm, G-H = 13mm, Calculate proportion measurement of E-F/ G-H or vice versa (1) Accept incorrect measurements Conversion of mm to µm for eye piece units or final answer (1) Accept different number of dp **From Photo** Correct answer G-H = 1200/6.47 = **185.47/ 185.5/ 185.6 µm** award 3 marks E-F = 97mm, G-H = 15mm, Calculate proportion measurement of E-F/ G-H or vice versa (1) Accept incorrect measurements Conversion of mm to µm for eye piece units or final answer (1) **Award two marks for correct answer in mm**		3		3	3	3
		(iv)		stem – around periphery(whereas the root – central) can be shown in diagram		1		1		

	(b)	(i)		**P** Chloroplast/ thylakoid **Q** cell wall **R** tonoplast/ vacuolar membrane **S** nuclear {membrane/ envelope} **all correct = 2 marks** **2/3 correct = 1 mark** **0/1 correct = 0 marks**	2			2		2
		(ii)		**Any one (x1) from** • Diffusion distance for gases smaller • Less interference to light entry/ allows more light into cell/ less opaque.			1	1		
				Question 2 total	**5**	**4**	**1**	**10**	**3**	**8**

A2 UNIT 5 – PRACTICAL EXAMINATION - SUMMARY OF ASSESSMENT OBJECTIVES

	Question	AO1	AO2	AO3	TOTAL MARK	MATHS	PRAC
Experimental Task	**TOTAL**	**5**	**9**	**6**	**20**	**4**	**20**
Practical Analysis Task	1	3	13	4	20	4	11
	2	5	4	1	10	3	8
	TOTAL	**8**	**17**	**5**	**30**	**7**	**19**
	OVERALL TOTAL	**13**	**26**	**11**	**50**	**11**	**39**