GCE AS MARKING SCHEME

SUMMER 2018

AS (NEW)
BIOLOGY - UNIT 2
2400U20-1

INTRODUCTION

This marking scheme was used by WJEC for the 2018 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 AS BIOLOGY(NEW)

UNIT 2 - Biodiversity and Physiology of Body Systems

SUMMER 2018 MARK SCHEME

GENERAL INSTRUCTIONS

Recording of marks

Examiners must mark in red ink.

One tick must equate to one mark (apart from the questions where a level of response mark scheme is applied).

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 and relevant alternative responses which are not recorded in the mark scheme.

Extended response question

A level of response mark scheme is used. Before applying the mark scheme please read through the whole answer from start to finish. Firstly, decide which level descriptor matches best with the candidate's response: remember that you should be considering the overall quality of the response. Then decide which mark to award within the level. Award the higher mark in the level if there is a good match with both the content statements and the communication statement. Award the middle mark in the level if most of the content statements are given and the communication statement is partially met. Award the lower mark if only the content statements are matched.

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

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
1	(a)	(i)		Any **two** × (1) from: Flow <u>rate</u>/speed/current (1) temperature (1) (named) {ion/mineral} <u>concentration</u> (1) NOT content conductivity (1) oxygen <u>concentration</u> (1) light <u>intensity/exposure</u> (1) vegetation {on banks/in water}(1) Accept algae in water time of year/season/time of day (1) Reject pH/width/depth/stream bed/any ref to method/technique		2		2		2
		(ii)		Any **two** × (1) from: A. (same) sampling area (1) NOT distance B. {time spent/force/power/speed/amount} <u>of kicking</u>/number of kicks (1) C. net mesh size (1) NOT area of net/same net D. Distance from bank/distance of kicking from the net (1) Reject any reference to stream conditions/time net is in water		2		2		2
		(iii)		would <u>kill</u> them/animals die(1) preserve diversity/effect on food chains/endangered species(1) Accept reverse answers for riverside identification		2		2		2
	(b)	(i)		Remove {bias/experimenter choice} (1) Reject fair test/accuracy/reliability/validity	1			1		1

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
		(ii)		Any **two** × (1) from: A. Animals not caught by net/ Missed net/passed through net/net removed too soon (1) B. Animals not dislodged from stream bed/not kicked hard enough to dislodge them/organisms moved away from sample area (1) C. Not kicked entire area/uneven kicking (1) D. Unable to identify animals/animals too small to identify (1)		2		2		2
		(iii)		*D* = 0.7/0.699 = 3 marks *If incorrect rounding e.g. 0.69 award 2 marks* *If incorrect answer award* *D = 0.3/0.301 = 2 marks* *OR* *N(N-1)* = 6972 (1) *Σn(n-1)* = 2098 (1)		3		3	3	
		(iv)		Forest stream: Lower <u>species</u> richness/fewer <u>species</u>(1) Accept correct use of numbers Lower <u>species</u> evenness/dominated by {single (named) <u>species</u>/stonefly nymph} (1) ORA moorland stream			2	2		
	(c)	(i)		More (than five) sample sites/{more/larger} area sampled(1) More (than two) streams (1) Not forest unqualified			2	2		2
		(ii)		Create buffer zone between forest and stream/cut down trees next to stream/{<u>increase pH of</u>/neutralise} stream (eg liming)/OWTTE (1) NOT cut down trees Introduction of more species = neutral			1	1		1
				Question 1 total	**1**	**11**	**5**	**17**	**3**	**12**

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
2	(a)	(i)		Holozoic (1) NOT heterotrophic unqualified	1			1		
		(ii)		*Hydra* Receives oxygen/glucose/products of photosynthesis/sugars/amino acids(1) *Chlorella* Receives {carbon dioxide/glucose/sugars/amino acids/products of digestion/minerals/protection/place to live/habitat} (1)		2		2		
	(b)			**Similarity:** {Both/owtte} are autotrophic (1) **Difference:** For *Nostoc* Photosynthetic/photoautotrophic/phototrophic/ ref to use of light energy (1) For *Nitrosomonas* Chemosynthetic/chemoautotrophic/chemotrophic/ref to use of energy from chemical reactions (1) Correct use of photoautotroph and chemoautotroph = 3 marks		1	2	3		
	(c)			**Similarities:** {Both/owtte} are heterotrophic (1) **Difference:** For *R. stolonifer* Saprotrophic/saprobiontic/saprophytic (1) For *R. oryzae* Parasitic (1) Extracellular digestion/suitable description (1) Accept reference to {either/both} species carrying out extracellular digestion		2	2	4		
				Question 2 total	**1**	**5**	**4**	**10**		

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
3	(a)			Phylogenetic tree/Evolutionary tree/phylogenic (1) Accept Cladogram NOT Family tree/pedigree diagram	1			1		
	(b)	(i)		Diagram B (1) Hippo closest relative/shares most recent common ancestor with the hippo (1) Fewest differences/most similarities/or use of data (1)		1	2	3		
		(ii)		Classification {may change/not fixed/not permanent} (1) As more {information/knowledge/techniques} becomes available/OWTTE (1)	2			2		
	(c)			Family (1)	1			1		
	(d)	(i)		Increase from Antarctic circle to the tropics (1) Accept as latitude decreases numbers increase Reject references to latitude increasing Reject reference to Arctic levels off/slight decrease in the tropics (1)		2		2		
		(ii)		Temperature/food availability (1)		1		1		
		(iii)		Two peaks/OWTTE (1) Accept two modes		1		1	1	
				Question 3 total	**4**	**5**	**2**	**11**	**1**	

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
4	(a)	(i)		**Both needed for one mark** X = (gill) filaments Y = (gill) arch/bar	1			1		1
		(ii)		{Filter/sieve/remove/catch} {food/particles/solids NOT molecules} /protection from debris/preventing damage to the gill filaments (1)		1		1		
		(iii)		A. normally water separates {filaments/lamellae/plates/gills}/Gills dry out (when out of water) (1) B. {Filaments/lamellae/plates/gills} {stick together/collapse} (1) C. Reduced Surface Area for {diffusion/gas exchange} (1) D. Water needed for diffusion (of gases)/{oxygen/gases} need to be in solution to diffuse (1)	4			4		
	(b)			Accept reverse argument for any point A. Countercurrent more efficient (1) B. Maintains {diffusion/concentration} gradient/or description of/equilibrium not met (1) C. Across {entire/whole} {gill/filament/lamellae/plate} (1) D. {Higher/more} {saturation/oxygen absorbed} (1) Accept correct references to higher percentages in counter current/use of values e.g. 80% compared to 50%	4			4		
	(c)	(i)		C = parallel flow **and** A = countercurrent flow (1)		1		1		
		(ii)		Correct insertion of arrows on A only (1) **NOT ECF**	1			1		

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
	(d)	(i)		Positive (1)			1	1	1	
		(ii)		Range of m = 0.6 – 0.65 = 2 marks Accept correct fraction on answer line number of dp = neutral If incorrect award one mark for sight of dy/dx (dy is smaller than dx) (1)		2		2	2	
		(iii)		Accept range 96-104 a.u. (1) (value from (ii) x 160) + 0 ECF		1		1	1	
		(iv)		Any two (x1) from A. wider the { lumen/blood vessel} faster {velocity/flow rate/speed} (1) Reject faster velocity the wider the lumen B. so blood can be returned to the heart as quickly as possible (1) C. without {losing velocity/slowing down} due to decreased blood pressure/because no contractions to increase pressure (1)			2	2		
				Question 4 total	**10**	**5**	**3**	**18**	**4**	**1**

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
5	(a)	(i)		electrocardiogram (1) reject electrocardiograph/echocardiogram	1			1		
		(ii)		75 (1)		1		1	1	
		(iii)	I	SAN generates {electrical impulse/wave of excitation/electrical signals} (1) (causes) depolarisation of atria (1) (causes) contraction of atria/atrial systole (1)	3			3		
			II	Any three (x1) from: A. AVN {transmits/relays/passes on} {electrical impulse/electrical signals/wave of excitation}(1) B. Passes through {Bundle of His/Purkinje tissue/septum}(1) C. Depolarisation of ventricles(1) D. Causes contraction of ventricles/ventricular systole(1)	3			3		
			III	Repolarisation of ventricles (1) Causes ventricular diastole/relaxation of ventricles (1)	2			2		
	(b)			Shorter/closer together (1) NOT quicker/faster (due to) shorter isoelectric line/flat part/PR segment/P-QRS interval/T-P interval/less time between {atrial systole and ventricular systole/ventricular systole and ventricular diastole/ventricular systole and atrial systole} (1)		1	1	2		
	(c)	(i)		Circle at any point around the PR segment/flat section of the graph between the endpoint of the P wave and the onset of the QRS complex (1) Circle may extend slightly into QRS complex (NOT further than letter Q) but may extend to the start of the P wave (NOT further than start)		1		1		
		(ii)		AVN (1) Accept bundle of His/Purkyne tissue			1	1		
		(iii)		Slow heart rate/bradycardia/longer for a heart beat/longer between atrial systole and ventricular systole (1)		1		1		
				Question 5 total	**9**	**4**	**2**	**15**	**1**	

Question	Marking details	Marks Available					
		AO1	AO2	AO3	Total	Maths	Prac
6	Indicative content **Definitions**: mesophyte – adapted to conditions of {adequate/moderate/sufficient/owtte} water supply xerophyte – adapted to conditions where water is scarce/groundwater is frozen/named example/dry conditions. hydrophyte – adapted to aquatic conditions/live in water/float on surface of water **Pinus/xerophyte** Adaptations to reduce transpiration/water (vapour) loss **Comments must relate to image Reject adaptations not visible** **Linked points:** • Sunken stomata/stomata in pits **+** trap humid air/to reduce {diffusion/concentration/water potential} gradient • Small leaves/needle shaped/compact **+** reduce surface area/SA:vol • {fewer/smaller} stomata **+** {fewer/smaller} gaps for water loss • Thick cuticle/epidermis **+** reduce evaporation/water loss • Fibres/sclerenchyma/lignified tissue **+** provides support/prevents wilting **Potamogeton/hydrophyte** **Linked points:** • Cuticle thin/absent + no need to reduce water loss/evaporation • Stomata on {upper/adaxial} surface/no stomata on {lower/abaxial} surface **+** for gas exchange with air • Air spaces/Aerenchyma/lacunae **+** provide { buoyancy/flotation} for {light/photosynthesis}/{act as gas reservoir/for gas exchange} • {Little/no} {lignified tissue/xylem} **+** water provides support • Poorly developed/little xylem **+** water provided by surroundings	3	6		9		

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
				7-9 marks Correct Definitions of xerophytes **+** hydrophytes **+** mesophytes. + Full description of Pinus xerophytic adaptations + Full description of Potamageton hydrophytic adaptations The candidate constructs an articulate, integrated account, correctly linking relevant points, such as those in the indicative content, which shows sequential reasoning. The answer fully addresses the question with few irrelevant inclusions or significant omissions. The candidate uses scientific conventions and vocabulary appropriately and accurately. **4-6 marks** Any two from: definitions of mesophytes/xerophytes/hydrophytes description of adaptation of the xerophyte description of adaptation of the hydrophyte The candidate constructs an account correctly linking some relevant points, such as those in the indicative content, showing some reasoning. The answer addresses the question with some omissions. The candidate usually uses scientific conventions and vocabulary appropriately and accurately. **1-3 marks** A definition of xerophyte/hydrophyte/mesophyte or an adaptation of xerophytes or an adaptation of hydrophytes *The candidate makes some relevant points, such as those in the indicative content, showing limited reasoning. The answer addresses the question with significant omissions. The candidate has limited use of scientific conventions and vocabulary.* **0 marks** *The candidate does not make any attempt or give a relevant answer worthy of credit.*						
				Question 6 total	**3**	**6**		**9**		

UNIT 2 - Biodiversity and Physiology of Body Systems

SUMMARY OF MARKS ALLOCATED TO ASSESSMENT OBJECTIVES

Question	AO1	AO2	AO3	TOTAL MARK	MATHS	PRAC
1	1	11	5	17	3	12
2	1	5	4	10		
3	4	5	2	11	1	
4	10	5	3	18	4	1
5	9	4	2	15	1	
6	3	6		9		
TOTAL	**28**	**36**	**16**	**80**	**9**	**13**