GCSE MARKING SCHEME

SUMMER 2018

GCSE (NEW)
BIOLOGY - UNIT 2
3400U20-1 and 3400UB0-1

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 GCSE BIOLOGY

UNIT 2

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.

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)		Mammals (1) *Lepus* (1) *arcticus* (1) spelling of latin must be correct	2	1		3		
		(ii)		unique/ universal/ always the same or equivalent wording/ avoid confusion Accept common names are different in different {countries/ languages} Reject easier for scientists	1			1		
	(b)	(i)		False/ × True/ ✓ True/ ✓ False/ × *4 correct = 3 marks* *3 correct = 2 mark* *2 correct = 1 marks* *0/1 correct = 0 marks*		3		3		
		(ii)		Bacteria / viruses/ protists/ fungi/ pathogen/ microbe/ microorganism (1) (Able spread from) by contact/ aerosol/ insects/ body fluids between animals (1)		2		2		
	(c)			(Thick fur –) to reduce heat loss/ keeping warm/ traps heat/ insulation (1) (White –)cannot be seen / idea of camouflage(1) 'blends in' neutral Reference to fat is neutral		2		2		
				Question 1 total	**3**	**8**	**0**	**11**	**0**	**0**

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
2	(a)			Pancreas Reject Pancrease	1			1		
	(b)	(i)		Arrow drawn at 160 mg/100cm^3 (1) All plots correct = 2 marks 5 plots correct = 1 mark 0/1/2/3/4 plots correct =0 marks <1 small square tolerance Line quality(1)		4		4	4	
		(ii)		From 1 hour (1) ecf when {glucose level/ concentration/ it} starts to fall/ decreases (1) Accept glucose changed to glycogen			2	2		
		(iii)		Blood glucose rises above {the normal range/ 160}		1		1		
		(iv)		1. Kate's blood glucose {reaches higher level/rises more rapidly/goes on rising after 1 hour} (1) 2. falls more slowly (1) 3. does not go back to {the start/normal level} (1)			3	3		
		(v)		Repeat the test/ do more tests(on Kate)			1	1		1
	(c)	(i)		Any one (x1) from • Insulin injections/ insulin pump • Pancreas tissue transplants/ • {low sugar/ low carbohydrate/ low fat} diet • Metformin tablet	1			1		
		(ii)		Type 2 diabetes	1			1		
				Question 2 total	**3**	**5**	**6**	**14**	**4**	**1**

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
3	(a)	(i)		sugar and phosphate	1			1		
		(ii)		A,C (1) T and A (1)		2		2		
		(iii)		(The order of the bases) form a <u>code</u> (1) For the amino acids (1)	2			2		
	(b)	(i)		Suspect 3 has same {bands as profile/ DNA profile/ profile/ DNA}			1	1		
		(ii)		Establishing paternity/ family relationships/ classification	1			1		
		(iii)		Issues of privacy/ ownership		1		1		
				Question 3 total	**4**	**3**	**1**	**8**	**0**	**0**

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
4	(a)	(i)		B		1		1		
		(ii)		(biodiversity) reduce **and** Other species do not survive/killed/out-competed		1		1		
	(b)	(i)		Biological control/biocontrol	1			1		
		(ii)		Correct answer = 10 (m) = 2 marks If incorrect allow 0.6 x 25 =15 (1)		2		2	2	
	(c)	(i)		Any one (x1) from (louse) does not affect any other (non-target) species Reproduces well <u>in summer</u> (when needed)		1		**1**		
		(ii)		By other scientists undertaking the same investigation/ comparing with other scientists		1		1		1
				Question 4 total	**1**	**6**	**0**	**7**	**2**	**1**

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
5	(a)			ureter (carries urine out of kidney) correct spelling	1			1		
	(b)	(i)		Urea		1		1		
		(ii)		Less protein {in blood /leaving kidney}/ owtte (1) No change in glucose concentration/ owtte (1)			2	2		
		(iii)		I Biuret (reagent) (1) (Blue to) Lilac/ purple colour (1) II Benedict`s (reagent) (1) (brick) red/ orange/ green (1)	2 1	 1		4		4
	(c)			Any three (x1) from: 1. Survival declines with years after transplant 2. People survive longer with transplants from living donors 3. People survive longest with transplants from relatives/family 4. <u>Difference</u> between family donors and others increases with years after the transplant			3	3		
	(d)			Dialysis (not kidney machine, unqualified)	1			1		
				Question 5 total	**5**	**2**	**5**	**12**	**0**	**4**

Question				Marking details (QER)	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
6	(a)			***Indicative content:*** • Working close to Bunsen flame/disinfect bench • Label the base of the petri dish(es) to indicate antibiotics • Flame forceps (then cool) • Pick up each antibiotic disc in turn and place on agar surface • Minimum lifting of lid /Seal dish with tape • Incubate • {for 2-3 days/ at 20 – 25 °C} • (Observe results and) measure diameter of clear area around each disc • compare the results for the antibiotic **5-6 marks** At least seven correct points from indicative content *There is a sustained line of reasoning which is coherent, relevant, supported by evidence and logically structured. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar.* **3-4 marks** At least four correct points from indicative content *There is a line of reasoning which is partially coherent, largely relevant, supported by some evidence and with some structure. The candidate uses mainly appropriate scientific terminology and some accurate spelling, punctuation and grammar.*	6			6		6

Question				Marking details (QER)	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
				1-2 mark Any one correct point from indicative content *There is a basic line of reasoning which is not coherent, largely irrelevant, supported by limited evidence and with very little structure*. *The candidate uses limited scientific terminology and inaccuracies in spelling, punctuation and grammar.* **0 marks:** *No attempt made or no response worthy of credit.*						
	(b)			Improved hygiene practices/ named example e.g. {hand washing/ use of gels}/ thorough cleaning of hospital wards/ {isolation/ screening} of infected patients (1) Restraint in use of antibiotics {in hospitals/by doctors}/ owtte (1) Accept restraint in use of antibiotics in agriculture/ farming	2			2		
				Question 6 total	**8**	**0**	**0**	**8**	**0**	**6**

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
7/1	(a)			Traditional: can stand sooner/ after two days (1) Reject stand sooner because bone healed Stem cell: faster healing/ higher percentage of bone healing / less invasive (1)		2		2		
	(b)	(i)		2 (1) 46 (1)	2			2		
		(ii)		Differentiate/ specialise/ become bone cells	1			1		
		(iii)		cancer	1			1		
	(c)			(The belief that) {taking/destroying} a {(potential) life/ embryo} (is wrong) Reject references to babies/the foetus/emotive expressions	1			1		
				Question7/1 total	**5**	**2**	**0**	**7**	**0**	**0**

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
8/2	(a)	(i)		**A** pupil **B** Iris **both for one mark**	1			1		
		(ii)		In brighter light (1) {Muscles/ iris} (contract to) reduce pupil {diameter/size} (1) Restricts light entering the eye, so retina is protected (from damage) (1)	1	2		3		
		(iii)		Fast **and** {involuntary/ automatic} Reject reference to protection	1			1		
	(b)	(i)		Reduced reaction time/ faster reactions		1		1		
		(ii)		66.7 = 2 marks Incorrect answer but correct method = 1 mark (25 – 15)/15 x 100 = 66.7(%)= 1 mark 67/ 66.666° % = 1 mark		2		2	2	
		(iii)		Any two (x1) from: • the older the person {the fewer notes hit in 0.2 seconds/ the slower the reactions /the increased reaction time/ ORA • after {practice/repeats} {age 50/ older people} {improvement doubles/ improve more}, (this is more than for younger ages)		1	1	2		
		(iv)	I	Any two (x1) from Equal numbers male/female OR one gender only Same experience of keyboard playing Handedness Eyesight No alcohol/ caffeine			2	2		3
			II	Larger sample size/ wider range of ages/ more people of different ages (1)			1	1		
				Question 8 total	**3**	**6**	**4**	**13**	**2**	**3**

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
3				***Indicative content:*** • Two long chains • alternating sugar and phosphate • connected by bases • (twisted to form) double helix • four types of bases/ Adenine, thymine, cytosine, guanine • complementary base pairing/ A -T; C - G • order of bases forms a code for making proteins • each triplet code identifies a particular amino acid • amino acids are linked together to form proteins. **5-6 marks** At least 7 points from indicative content *There is a sustained line of reasoning which is coherent, relevant, substantiated and logically structured. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar.* **3-4 marks** At least 4 points from indicative content *There is a line of reasoning which is partially coherent, largely relevant, supported by some evidence and with some structure. The candidate uses mainly appropriate scientific terminology and some accurate spelling, punctuation and grammar.*	6			6		

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
				1-2 marks • Two long chains • connected by bases • double helix • four types of bases At least 1 points from indicative content *There is a basic line of reasoning which is not coherent, largely irrelevant, supported by limited evidence and with very little structure. The candidate uses limited scientific terminology and inaccuracies in spelling, punctuation and grammar.* **0 marks:** *No attempt made or no response worthy of credit.*						
				Question 3 total	**6**	**0**	**0**	**6**	**0**	**0**

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
4	(a)	(i)		Shortage of {donors/ kidneys}/ (dangers of) { surgery/ long term immunosuppresants}/ may need to be replaced in the future/ may have to wait a long time for a kidney	1			1		
		(ii)		antigens <u>on cells</u> of donor kidneys (1) white blood cells produce antibodies (specific to antigens) (1) that {destroy/ act against} the {antigens/cells} (1) Reject {kill/ fight/ attack} antigens		3		3		
	(b)	(i)		myeloma/ tumour cells/cancerous white cells/ cancer cells	1			1		
		(ii)		lymphocytes	1			1		
		(iii)		hybridoma	1			1		
		(iv)	B: C:	(Injected) antigen {stimulates/ causes} {immune response/ lymphocyte production/ cloning of lymphocytes} (1) {cells B/ lymphocytes} and {cells A/ myeloma} are {fused/ combine/ merge} together (1)		2		2		
	(c)			Any two (x1) from: • diagnosis of [disease/chlamydia/HIV] • tissue typing for transplants • monitoring of the spread of malaria • supporting chemotherapy for cancers • pregnancy testing	2			2		
				Question 4 total	**6**	**5**	**0**	**11**	**0**	**0**

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
5	(a)	(i)		60/52 = 1.1538 : 1 appropriate number of significant figures – 1.15 = 2 marks 1.153/ 1.1538/ 1.16/ 1.2/ 60/52 1.154 = 1 mark		2		2	2	2
		(ii)		named environmental difference e.g. light/ water availability/ temperature		1		1		1
	(b)			continuous (variation)		1		1		
				Question 5 total	**0**	**4**	**0**	**4**	**2**	**3**

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
6	(a)	(i)		filtration under pressure/ultrafiltration (1) small molecules/ correctly named small molecules e.g. {glucose/ urea/ water/ salts/ amino acids} {move from the capillary knot/ glomerulus/ into the Bowman's capsule} (1)	2			2		
		(ii)		It has been (selectively) reabsorbed into the {blood/ capillaries}		1		1		
		(iii)		(proximal convoluted) tubule	1			1		
	(b)			water has been {reabsorbed/ taken back into blood} (therefore % composition changed)		1		1		
				Question 6 total	**3**	**2**	**0**	**5**	**0**	**0**

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
7	(a)			Growth of a plant (organ) in response to a (one sided) stimulus Reject movement/ bending	1			1		
	(b)			Any three (x1) from: 1. they have not used a control 2. Plant subjected to both light and gravity/more than one variable being tested / plant could be showing negative gravitropism 3. set up {identical/same} experiment in the dark 4. to test only one variable/to eliminate light as a variable			3	3		1
	(c)			Auxin	1			1		
				Question 7 total	**2**	**0**	**3**	**5**	**0**	**3**

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
8	(a)	(i)		{kill/prevent growth} of bacteria (in wounds)	1			1		
		(ii)		virus	1			1		
		(iii)		possible side effects/ unknown long term effects	1			1		
	(b)			Any one (x1) from pH **+** {add/use} acid/alkali reservoir oxygen **+** sterile air in temperature **+** water jacket/ cold water in		1		1		1
	(c)	(i)		0.5 = 2 marks 15/30 or (23-8)/30 = 1 mark		2		2	2	
		(ii)	I	Accept any figure between 96-100 <u>hours</u> (1) Mass of penicillin is at its {maximum/ remains constant/ levels off}/ no more penicillin is being produced/ penicillin production has stopped/ OWTTE (1)		1	1	2		
	(d)			Needs to start at same point, end same level but to left of existing curve for Penicillium			1	1		
				Question 8 total	**3**	**4**	**2**	**9**	**2**	**1**

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
9	(a)			A change from {optimal/normal} (internal conditions) (1) resulting in the body {compensating/responding} and restoring {balance/optimal conditions/normal conditions/set level} (1)	2			2		
	(b)	(i)		Temperature decreased		1		1		
		(ii)		1. Receptors (on skin) detect a drop in (body) temperature (1) 2. Blood vessels get {narrower/ constrict}/ vasoconstriction (1) Reject blood vessels contract 3. less blood flows to the skin (1) 4. less heat is lost (from the surface of skin) (1)			4	4		
	(c)			more blood remains in core of body/less blood in the extremities		1		1		
	(d)			the {response/change in temperature} (to placing hand in cold water) would be slower/ reaction time would increase Temperature of sensor(s) would be higher		1		1		
				Question 9 total	**2**	**3**	**4**	**9**	**0**	**0**

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
10	(a)			They {have the same <u>genus</u> / are both *<u>Apis</u>*}(1) They {are closely related/ have similar genes/ are similar/ are similar species}(1)		2		2		
	(b)	(ii)		5%/5.0%/4.97%/4.970%/4.9697/ 4.969696969697% = 2 marks Accept 4.9696 recurring If answer incorrect or incorrect rounding accept 82/1650 x 100 or 4.96= 1 mark		2		2	2	
	(c)	(i)		Any one (x1) from • Using pesticides causes more (winter) losses • Pesticides do not reduce percentage (winter) loss • Pesticides are harmful to bees • 2014/2015 losses are the same/ no difference between losses in 2014 and 2015			1	1		1
		(ii)		Any two (x1) from: • Survey only involves {small number/ 5%} of beekeepers/ small sample size/ not enough beekeepers took part • only carried out in North Wales/ does not represent other parts of the country/ only in one area • Has not been reproduced by any other people			2	2		2
	(d)			Any four (x1) from: 1. Mutation 2. (in a gene) that gave rise to resistance <u>to chemical/ pyrethroid / pesticides</u> 3. allowed some (Varroa) to survive/non-resistant (varroa) died / survival of the fittest 4. that breed and pass {advantageous / resistance} gene on to next generation/ that /breed and pass the mutation on 5. natural selection	2	2		4		
				Question 10 total	**2**	**6**	**3**	**11**	**2**	**3**

FOUNDATION TIER
SUMMARY OF MARKS ALLOCATED TO ASSESSMENT OBJECTIVES

Question	AO1	AO2	AO3	TOTAL MARK	MATHS	PRAC
1	3	8	0	11	0	0
2	3	5	6	14	4	0
3	4	3	1	8	0	0
4	1	6	0	7	2	1
5	5	2	5	12	0	4
6	8	0	0	8	0	6
7 SD	5	2	0	7	0	0
8 SD	3	6	4	13	2	3
Target	32	32	16	80	8	12
TOTAL	32	32	16	80	8	14

HIGHER TIER
SUMMARY OF MARKS ALLOCATED TO ASSESSMENT OBJECTIVES

Question	AO1	AO2	AO3	TOTAL MARK	MATHS	PRAC
1	5	2	0	7	0	0
2	3	6	4	13	2	3
3	6	0	0	6	0	0
4	6	5	0	11	0	0
5	0	4	0	4	2	3
6	3	2	0	5	2	0
7	2	0	3	5	0	3
8	3	4	2	9	2	3
9	2	3	4	9	0	0
10	2	6	3	11	2	2
TOTAL	32	32	16	80	8	12
Target	32	32	16	80	8	12