GCSE MARKING SCHEME

SUMMER 2017

GCSE (NEW)
BIOLOGY - UNIT 1 (Separate Award)

3400U10-1 / 3400UA0-1

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.

WJEC GCSE BIOLOGY - UNIT 1
(Separate Award)

MARK SCHEME SUMMER 2017

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 statements.

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)		A = Cell membrane (1) B= Vacuole (1)	2			2		
		(ii)		Chloroplast , X (1) Respiration/ releases energy/ produces ATP/ provides energy (1) NOT anaerobic respiration/ produces energy Accept respire Nucleus ✓ (1)	3			3		
	(b)	(i)		Staining Ignore name		1		1		1
		(ii)		X 100		1		1	1	1
				Question 1 total	**5**	**2**	**0**	**7**	**1**	**2**

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
2	(a)	(i)		sunlight / solar/ sun NOT light unqualified/ sunshine	1			1		
		(ii)		**Any one (x1) from** (lost as) heat (1) in respiration (1) waste materials / faeces/ urine (1) NOT excretion	1			1		
	(b)			1 true 2 false 3 true 4 false 5 true 5 correct =3 marks 4 correct = 2 marks 3 correct = 1 mark 0/1/2 correct = 0 marks		3		3		
	(c)	(i)		~~Oak tree~~, beetles, spiders, small birds, weasels		1		1		
		(ii)		Pyramid with 5 layers and correct shape (1) All organisms correct (1)		2		2		
				Question 2 total	**2**	**6**	**0**	**8**	**0**	**0**

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
3	(a)	(i)		Dredging/ building/ industry		1		1		
		(ii)		B		1		1		
	(b)	(i)		D		1		1		
		(ii)		{Removes/ uses/ converts/ takes in} CO_2 / reducing acidification (of the sea) (1) Acid harms living things (in the sea) (1) accept equivalent wording in correct context Accept provides oxygen (1) for respiration (1)		2		2		
	(c)	(i)		X = Photosynthesis (1) Y= Feeding (1) Accept eating/ consuming/ ingestion	2			2		
		(ii)		starch		1		1		
				Question 3 total	**2**	**6**	**0**	**8**	**0**	**0**

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
4	(a)	(i)		Diaphragm shown as flattened , below original on diagram		1		1		
		(ii)		Arrow drawn from trachea into bronchiole NOT into alveoli	1			1		
	(b)	(i)		Diffusion (in correct context) (1)	1			3		
		(ii)		**Any two (x1) from:** large surface area (1) Thin wall / wall is one cell thick (1) NOT thin cell wall Close to {blood vessel/ blood supply/ capillary}/ {rich/ good} blood supply / surrounded by capillary(1) Layer of {moisture/ water} (1)	2					
	(c)	(i)		Increase in {cases/ cancer} with increase in age.			1	1		
		(ii)		{Highest proportion of / highest number of / most} smokers are the 20 – 29 year olds but {the highest incidence of/ most} cancer is in {older people/ 80 year olds} (1)			1	1		
		(iii)		Extend investigation to other {cities/ towns/ areas} (1) Include women in the investigation (1)			2	2		2
				Question 4 total	**4**	**1**	**4**	**9**	**0**	**2**

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
5	(a)	(i)		Drawing with Cell with inclusion(to represent nucleus) (1)Name – white blood cell/ phagocyte/ lymphocyte(1) Function – {defence/ protection} against {disease/ pathogen/ infection/ bacteria/ viruses}/ destroy bacteria/ provide immunity/ produce antibodies/ produce antitoxins/ engulf bacteria (1) NOT fight	2	1		3		
		(ii)		Plasma (1) **Any two (x1) from:** carbon dioxide (1) Urea (1) soluble food/ soluble nutrients/ glucose/ proteins/ named soluble nutrient (1) hormones (1) antibodies (1)	3			3		
		(iii)		9 (cm^3) = 2 marks must use units if answer not written on answer line If incorrect award 1 mark for: 20 x 45/100 or 20 x 0.45		2		2	2	
	(b)			Platelets present in sample (1) Cause (blood) clotting/ coagulation (1)		2		2		2
				Question 5 total	**5**	**5**	**0**	**10**	**2**	**2**

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
6	(a)	(i)		Water bath (1)	1			1		1
	(b)	(i)		6 plots correct (2) 5 plots correct (1) 0/1/2/3/4 plots correct (0) +/- ½ small square tolerance Line joining all plots no extrapolation (1)		2 1		3	4	
		(ii)	I	Increase then decrease (1) Correct reference to 40^{o}C (1)		2		2		
			II	Enzyme(s) involved (1) Correct reference to increased kinetic energy/collisions (1) 2nd mark must be in context of enzymes.			2	2		
	(c)	(i)		use lime water (1) becomes milky/ cloudy / white(1)	 1		1	2		2
		(ii)		**Any two (x1) from:** concentration/ volume/ mass of yeast (1) {concentration/ volume} of sugar solution/ mass of sugar (1) Timing of observations/ amount of time (1) pH (1) Accept volume of sugar and yeast in water for 1 mark only NOT temperature			2	2		2
				Question 6 total	**2**	**5**	**5**	**12**	**4**	**5**

<table>
<tr><th colspan="4">Question</th><th rowspan="2">Marking details</th><th colspan="6">Marks available</th></tr>
<tr><th>AO1</th><th>AO2</th><th>AO3</th><th>Total</th><th>Maths</th><th>Prac</th></tr>
<tr><td>7</td><td></td><td></td><td></td><td>Indicative content
<table>
<tr><th>Arteries</th><th>Veins</th></tr>
<tr><td>• thick {muscle/ walls }</td><td>• thin {muscle/walls}</td></tr>
<tr><td>• narrow lumen</td><td>• large lumen</td></tr>
<tr><td>• blood away from the heart</td><td>• take blood to heart</td></tr>
<tr><td>• under high pressure</td><td>• under low pressure</td></tr>
<tr><td></td><td>• have valves to prevent backflow.</td></tr>
</table>
5-6 marks
Detailed description of artery and vein
(including reference to valves for 6 marks)
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
Some detail of artery and some detail of veins
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.
1-2 marks
Some detail of artery or some detail of veins
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.</td><td>6</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td>Question 7 total</td><td>6</td><td>0</td><td>0</td><td>6</td><td>0</td><td>0</td></tr>
</table>

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
8 / 1	(a)	(i)		Allow range 1.7- 1.8		1		1	1	1
		(ii)		Transpiration Not evaporation	1			1		
		(iii)		**Any two (x1) from:** Surface area of leaves/ number of leaves (1) Fewer stomata (1) Thickness of cuticle/ presence of waxy layer(1)		2		2		
		(iv)		to stop evaporation/ ensures that any water lost was only through the plant (1)			1	1		1
	(b)			Air directed at the leaves by a fan	1			1		1
	(c)			Increase/ faster (1) Larger surface area for absorption of water (1)	1	1		2		2
				Question 8/1 total	**3**	**4**	**1**	**8**	**1**	**5**

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
9 / 2	(a)			small intestine/ Ileum/ duodenum	1			1		
	(b)			(5 x 14 =)70$\underline{mm^2}$ or 0.7 $\underline{cm^2}$		1		1	1	
	(c)			• Absorption/ absorb {nutrients/ digested food/ glucose/ soluble food/ amino acids} (1) NOT diffusion/ absorb food unqualified/ water • Digestion/ break down of {food molecules/ named molecules}/produces {digestive enzymes/ correct named enzyme} (1) NOT produces enzymes unqualified/ break down of food (unqualified)	2			2		
	(d)			Rich Blood supply / large surface area/ thin walls for absorption (1) Enzymes produced for digestion / contain glands which produce enzymes (1)		2		2		
	(e)	(i)		{Protein/gelatin/ jelly} {broken down/digested} (1) to amino acids (1) which are soluble/ can dissolve (1)			3	3		2
		(ii)		enzyme denatured(1) active site {destroyed/ changed shape} (1) No digestion of protein/ protein cannot fit/ enzyme substrate complex cannot be formed (1)			3	3		3
				Question 9/2 total	**3**	**3**	**6**	**12**	**1**	**5**

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
3	(a)			{High/too much} {fat/ carbohydrate} in diet (1) (Lack of exercise means)excess fat is not used as <u>energy</u> (1)	2			2		
	(b)			Statins	1			1		
	(c)			{Causes clot to form in/ atheroma blocks} coronary arteries (1) this prevents {oxygen/ oxygenated blood} from reaching heart <u>muscle</u> (1)	2			2		
				Question 3 total	**5**	**0**	**0**	**5**	**0**	**0**

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
4	(a)			Water would pass out of the eel (1) from where it is in high concentration (in the eel) to where it is in low concentration (in the sea) (1) Through the semi permeable membrane(1) movement of salt/ solution will negate the spm mark	1 1	1		3		
	(b)	(i)		Active transport (1) Oxygen (1) Glucose/ ATP (1)	2	1		1		
				Question 4 total	**4**	**2**	**0**	**6**	**0**	**0**

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
5	(a)	(i)		**Both for 1 mark** Tomos 9.5 dm^3 and Jeremy 16 dm^3	1			1	1	
		(ii)		To obtain more oxygen into the {bloodstream/ muscles} / get rid of lactic acid/ repay oxygen debt		1		1		
	(b)	(i)		{Almost all/ Most} energy released comes from anaerobic respiration			1	1		
		(ii)		Anaerobic bar smaller than that for 1500m but bigger than that for marathon (1) Aerobic bar bigger than that for 1500m but smaller than that for marathon (1)		2		2	2	
	(c)	(i)		Glucose + oxygen → carbon dioxide + water + {energy/ATP} Accept correct formulae	1					
		(ii)		Glucose → actic acid + {energy/ ATP} Accept correct formulae	1					
	(d)			Releases more {energy/ ATP} per glucose molecule than anaerobic/ completely breaks down glucose/ all the glucose is broken down	1			1		
				Question 5 total	**4**	**3**	**1**	**8**	**3**	**0**

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
6	(a)			(60/ 50)=1.2mm		1		1	1	1
	(b)	(i)		X – cilia (1) Y – mitochondria/ mitochondrion (1)	2			2		
		(ii)		{Provides/ releases} {energy/ATP} (1) for movement of {cilia/ part X}/ cilia {sweeping/carrying} (1) mucus away (1)		3		3		
	(c)			Dust/ tar/ bacteria/ microbes/ viruses	1			1		
	(d)	(i)		As a control/ to compare (with the active ingredient)			1	1		1
		(ii)		Chewing gum (1) Largest sample/ greatest number of people in sample (1) 2nd mark linked to 1st			2	2		2
		(iii)		Nasal spray (1) Largest percentage gave up/ biggest difference between test and placebo (1) 2nd mark linked to 1st			2	2		2
				Question 6 total	**3**	**4**	**5**	**12**	**1**	**6**

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
7	(a)	(i)		25 = 2 marks If incorrect award 1 mark for 100/400 x 100 0.25 x 100		2		2	2	
		(ii)		0.180 = 3 marks 0.180180/ 0.18/ 0.1802/ 0.18018/ 0.2 = 2 marks 0.1801= 1mark Or 400/222 000 x 100 = 1mark If use biomass instead (100/34900 x 100) 0.287 = 2 marks 0.28653295/ 0.286533/ 0.28653/ 0.2865/0.29/0.3 = 1 mark Or 100/34900 x 100 = 1 mark		3		3	3	
	(b)			C(1) because there are three {levels/ stages} **and** {there is more plankton than mussels/ the numbers decrease as you go up/ pyramid shaped} (1) 2nd mark linked to 1st		1	1	2		
				Question 7 total	**0**	**6**	**1**	**7**	**5**	**0**

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
8	(a)	(i)		A – Carbon dioxide (1) B – Oxygen (1)	2			2		
		(ii)		{Gas **A**/ carbon dioxide} is the lowest and photosynthesis is highest (at midday) (1) because carbon dioxide is used for photosynthesis (1) {Gas **B**/ oxygen} is the highest and photosynthesis is highest (at midday) (1) because oxygen is produced by photosynthesis (1)		1 1	1 1	4		
		(iii)		Cloudier / less light/ lower temperature/ colder/ less sun			1	1		
		(iv)		49.75/ 49.8/ 50 = 2 marks If incorrect award 1mark for (46+26+76+51)/4 or 199/4 or 49.7		2		2	2	
	(b)			Light		1		1		
				Question 8 total	**2**	**5**	**3**	**10**	**2**	**0**

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
9				**Indicative content** • Urea is broken down into ammonia • by urease • (in) soil decomposers/ bacteria/ fungi. • Ammonia is changed to nitrates. • The nitrates are absorbed by (grass/ plant) roots • And used to make protein in the grass/ plants. • The grass is eaten by cattle • The plant protein is changed to animal protein/ beef. **5-6 marks** All stages included in detail *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** All stages included but with lack of detail *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.* **1-2 marks** Only some stages included. *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.*	6			6		
				Question 9 total	**6**	**0**	**0**	**6**	**0**	**0**

Question				Marking details	Marks available					
					AO1	AO2	AO3	Total	Maths	Prac
10	(a)	(i)		A (left) atrium (1) B (right) ventricle (1)	2			2		
		(ii)		Arrows correct two right side (1) two left side (1)	2			2		
	(b)	(i)		Left atrium - 1.1 **and** Left ventricle - 0.7 (1)		1		1		
		(ii)		Left atrium – 0.4 **and** Left ventricle – 16.0 (1)		1		1		
				Question 10 total	**4**	**2**	**0**	**6**	**0**	**0**

FOUNDATION TIER

SUMMARY OF MARKS ALLOCATED TO ASSESSMENT OBJECTIVES

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

HIGHER TIER

SUMMARY OF MARKS ALLOCATED TO ASSESSMENT OBJECTIVES

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