

Biology GCSE Revision

Topic 7

Ecology

Booklet 1 of 3

- Habitats
- Food Chains
- Carbon Cycle

Mark Scheme

BL1HP

Question 8

question	answers	extra information	mark
8 (a)(i)	0.6 or 6×10^{-1}	for correct answer if no / incorrect answer $\frac{2.4 \times 10^4}{4 \times 10^6} \times 100$ or 0.006 or 6×10^{-3} gains 1 mark	2
8 (a)(ii)	any two from: <ul style="list-style-type: none"> reflected not absorbed or misses chloroplasts / chlorophyll wrong wavelength photosynthesis inefficient allow some lost through respiration / as heat (from respiration) 	ignore some of light is green allow transmitted or passes through leaves allow hits other plant parts accept other limiting factors / named	2
8 (b)	energy lost via faeces / not digested / waste / excreted (of insect-eating birds)		1
	energy loss via respiration / movement / muscle contraction / heat (by insect-eating bird)	accept examples of muscle contraction do not accept energy used for respiration	1
	some of (insect eating) bird not eaten <u>but</u> all / most / more of insect is eaten		1
Total			7

BLY2H

Question 5

question	answers	extra information	mark
5(a)	0.18	award both marks for correct answer irrespective of working if no answer or incorrect answer allow 1 mark for $45 \times 100 / 25000$	2
5(b)	heat / thermal	allow heat <u>from</u> respiration	1
5(c)	energy / mass / biomass lost / not passed on <u>or</u> energy / mass / biomass is used <u>or</u> not enough energy / mass / biomass left	ignore reference to losses via eg respiration / excretion / movement / heat	1
	a sensible / appropriate use of figures including heron	eg <u>only</u> 2 from frog / to heron ignore units	1
5(d)	any three from: <ul style="list-style-type: none"> • (microorganisms) decay / decompose / digest / breakdown / rot • (breakdown) releases minerals / nutrients / ions / salts / named • (microorganisms) respiration • (microorganisms / respiration) release of carbon dioxide 	accept marking points if candidate uses other terms for microorganisms ignore eat ignore food ignore other organisms respiring	3
Total			8

BL1HP

Question 8

question	answers	extra information	mark
8(a)(i)	5.2	award 2 marks for correct answer, irrespective of working or lack of it award 1 mark for $62.4 \div 12$ only with incorrect or no answer	2
8(a)(ii)	the smaller the (mass of the) bird the more energy is needed (per gram of body mass)	allow converse ignore figures	1
8(a)(iii)	smaller bird has larger surface area : volume / mass ratio so heat / energy lost more quickly	allow converse	1
		allow lose more heat / energy if (a)(ii) describes a trend of more energy with increasing body mass allow one mark for idea of more energy needed for flight	1
8(b)	larger birds spend less time feeding	accept converse allow the less energy they need per day the longer they spend feeding	1
	since they need less food per gram of body mass (to satisfy energy needs)		1
Total			7

UMS Conversion Calculator: www.aqa.org.uk/umsconversion

Question 3

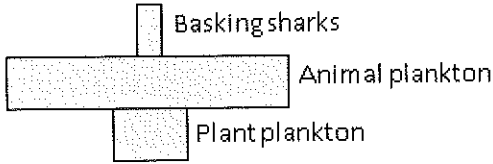
question	Answers	extra information	mark
3(a)(i)	<p>wheat → humans chain transfers 10 times more energy than wheat → pigs → humans chain</p> <p>or</p> <p>wheat → pigs → humans chain transfers 810 000 (kJ per hectare) less</p>	<p>allow 10% if given as a comparison e.g. one is 10% of the other</p> <p>ignore less unqualified</p>	1
3(a)(ii)	<p>any one reason for energy loss from pigs e.g.:</p> <ul style="list-style-type: none"> • movement • (maintaining) body temperature • waste materials • not all parts of pig eaten by human • because there is an <u>extra stage</u> (pigs) in the food chain and <u>energy is lost</u> at each stage 	<p>ignore respiration, growth</p> <p>ignore heat unqualified</p> <p>allow named examples</p> <p>allow longer food chain so more energy lost</p>	1

Question 3 continues on the next page . . .

Question 3 continued

3(b)	Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also refer to the information on page 5, and apply a 'best-fit' approach to the marking.			6
0 marks	Level 1 (1-2 marks)	Level 2 (3-4 marks)	Level 3 (5-6 marks)	
No relevant content.	There is a basic description of at least one factory farming method or identification of an advantage or disadvantage of factory farming.	There is a description of at least one factory farming method and an advantage or disadvantage is <u>explained</u> .	There is a description of factory farming methods and advantage(s) and disadvantage(s) are explained.	
<p>examples of biology points made in the response:</p> <p>factory farming methods e.g.:</p> <ul style="list-style-type: none"> Kept in cramped conditions / battery hens / calf crates / pig barns / fish tanks Controlled temperature / heating Controlled feeding / modified food given / growth hormones Controlled lighting Treated with <u>prophylactic</u> antibiotics <p>Advantages e.g.:</p> <ul style="list-style-type: none"> Increased efficiency / profit / greater food production / cheaper food / faster growth Farmer can have more livestock Less energy is lost through movement Less energy is used keeping warm (Food is high in calories / protein) so animals will grow faster / lay more eggs Easier to vaccinate all the animals Easier to protect animals from predators Antibiotic treatment stops infections in animals <p>Disadvantages e.g.:</p> <ul style="list-style-type: none"> Stress / cruelty / inhumane / unethical Restricted movement / overcrowding Faster spread of diseases Antibiotics in the food chain / residual chemicals in the food chain Wasting fossil fuels / increasing global warming Increased pollution from animal waste and from additional transport 				
Total				8

Question 9

question	Answers	extra information	mark
9(a)		if more than one box is ticked award no mark	1
9(b)	<p>increasing / higher light / temperature</p> <p>more / increased photosynthesis</p>	<p>ignore references to months other than February – April</p> <p>do not accept mineral / ions increase</p> <p>for both marks there must be a reference to 'more' at least once (e.g. 'more light for photosynthesis' gains 2 marks)</p> <p>allow 1 mark for reference to light and photosynthesis without an idea of 'more'</p>	<p>1</p> <p>1</p>
9(c)	<p>increase due to increase in plant plankton / food</p> <p>decrease due to fall in plant plankton / food or decrease as eaten by (basking) sharks</p>	<p>ignore references to months other than April – July</p> <p>allow decrease as eaten by predators / animals / fish</p>	<p>1</p> <p>1</p>
9(d)	<p>fall due to use / intake by <u>plant</u> (plankton)</p> <p>increase due to decay / decomposition / breakdown</p> <p>of dead (plant / animal) plankton</p>	<p>ignore ref to no change section of graph</p> <p>for fall allow March / April ignore May / February</p> <p>for increase allow any month in range August to November ignore December</p> <p>allow of dead organisms / waste</p>	<p>1</p> <p>1</p> <p>1</p>
Total			8

Question	Answers	Extra information	Mark	AO / spec ref.
1(a)	3-layered triangular pyramid	as blocks or layered triangle, ignore (small) gaps between layers	1	AO2 1.5.1b
	(pyramid) labelled in food chain order	all three labels are required for 2 marks the pyramid must be fully correct	1	
1(b)(i)	C		1	AO3 1.5.1c
1(b)(ii)	shortest or fewest stages / transfers / (trophic) levels	allow only if (b)(i) is C or blank	1	AO1 / AO2 1.5.1c
	less losses in waste / faeces / urine / CO ₂ / excretion	allow smaller amount uneaten	1	
	less loss in respiration / heat / movement	allow less lost keeping warm do not allow energy for respiration do not allow respiration makes energy allow less loss (of biomass / energy) or less transfer (of biomass / energy) to surroundings if neither 2 nd nor 3 rd point given, for 1 mark	1	
Total			6	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
3(a)(i)	<p>any one from:</p> <ul style="list-style-type: none"> • (same) (type of) weed killer • (same) volume / 5dm³ of solution used (on each area) • effect on daisies (not other weeds / plants) • (same) area / 10m² • (same) time or (effect after) two weeks 	<p>ignore references to same lawn / weather / soil, which are not given in the question.</p> <p>allow amount of solution used</p> <p>do not allow amount / volume / concentration of weed killer</p> <p>do not allow number of daisy plants</p>	1	AO2 1.2.3d
3(a)(ii)	more (daisies) growing after use of weed killer or after two weeks	allow it does not fit pattern (of other results)	1	AO3 1.2.3d
3(a)(iii)	<p>any one from:</p> <ul style="list-style-type: none"> • as a control • to compare (to the other areas) • to check other factor(s) are not affecting the results / daisies 	<p>ignore to see if it / water has an effect</p> <p>do not allow as a control variable</p>	1	AO2 1.2.3d
3(a)(iv)	80 (arbitrary units of weed killer) also killed all the daisies	<p>allow ref to possible experimental design flaws such as 'only tested once' or 'not repeated' or 'different number of daisies in each area at first'</p> <p>allow idea that other weed species may not respond in the same way as daisies</p> <p>allow idea that 100 (units) may also kill wanted species / grass</p>	1	AO3 1.2.3d

Question	Answers	Extra information	Mark	AO / Spec. Ref.
6(a)	any three from: <ul style="list-style-type: none"> blackbirds seen in higher % of / more gardens multiplying mean number by percentage of gardens seen in shows blackbird is higher only done on one day / month / hour only done in gardens (one bird may prefer a different habitat) problem of (correct) identification may re-count same ones people may quote false numbers / may make it up 	allow 1 additional mark for correct figures showing this, ie 264 sparrows: 305 blackbirds eg only done in January if neither point 5 or 6 given allow 1 mark for idea of error / miscounted	3	AO3 1.4.2
6(b)(i)	60.3	award 2 marks for correct answer, irrespective of working award 1 mark for $33.5 + (33.5 \times 80/100)$ or equivalent with no answer or incorrect answer or award 1 mark for 26.8	2	AO2 1.4.2
6(b)(ii)	any two from: <ul style="list-style-type: none"> change in temperature fewer predators more food or less competition for food more nesting space or less competition for nesting space less disease (in 2012) 	a comparison is required eg cooler / warmer / less frost (in 2012) allow idea that people may be better / worse at identifying birds / goldfinches allow idea of movement to gardens (due to poor food supply elsewhere)	2	AO2 1.4.2b
Total			7	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
1(a)(i)	5000	allow 1 mark for 2500 or allow 1 mark for (3500 – 1000) x 2 or equivalent	2	AO2 1.5.1b/c
1(a)(ii)	Hawks produce faeces		1	AO2 1.5.1c
1(b)	photosynthesis sugar / glucose	allow starch allow $C_6H_{12}O_6$	1 1	AO1 1.5.1a
Total			5	

COMPONENT NUMBER: BL1HP**Question 8**

question	answers	extra information	mark
8(a)	Scotland		1
	any one from <ul style="list-style-type: none"> Scotland 15 to 20% / about 1/5th to 1/7th but England and Wales / the others are less / lower / reasonable estimated figures $\frac{13.4}{79}$ is greater than England / $\frac{11.4}{130}$ and Wales / $\frac{2.8}{21}$ 		1
8(b)(i)	broadleaf woodlands have more grey squirrels or broadleaf woodlands have less red squirrels	allow converse referring to conifers	1
8(b)(ii)	Wales has more conifers and / but more grey squirrels or Wales has less broadleaf and / but more grey squirrels	allow converse for red squirrels	1
8(c)	any three from: <p>grey squirrels</p> <ul style="list-style-type: none"> have <u>wider</u> range/ more types of food are resistant to parapox (virus) but reds are not have more young <u>each year</u> / litter <u>young</u> more likely to survive (in mixed populations) 	<p>answers must be comparative they = grey squirrels</p> <p>allow converse arguments for red squirrels</p> <p>ignore reference to other disease</p>	3
Total			7

BL1HP

Question 2

question	answers	extra information	mark
2 (a)	X respiration	correct order only allow decay / decomposition / rotting ignore breakdown / disintegrate	1
	Y combustion / burning		1
2 (b)	any three from: <ul style="list-style-type: none"> • photosynthesise / absorb carbon dioxide • release carbon dioxide / respire • eaten by animals • fed on / decayed by microorganisms 	accept are producers or produce / make biomass / glucose / other named do not accept photosynthesis releases CO ₂ ignore eaten by microorganisms	3
2 (c)	any two from: (in tropical rainforest conditions are) <ul style="list-style-type: none"> • warm(er) / hot • damp / moist / wet / humid • a lot of microorganisms • a lot of material to decay 	ignore rain allow warm(er) so enzymes work faster for 2 marks	2
Total			7

COMPONENT NUMBER: BL1HP**Question 3**

question	answers	extra information	mark
3(a)(i)	triangular pyramid with 3 layers	may be as blocks or as triangle ignore food chains and arrows	1
	layers appropriately labelled: bean / plant aphid, ladybird	labelled in food chain order must not contradict correct pyramid allow correctly labelled inverted pyramid for 2 marks	1
3(a)(ii)	any two from: (for aphid / ladybird) <ul style="list-style-type: none"> • not all digested / faeces • loss in urine • loss of CO₂ • not all eaten 	ignore energy ignore loss of CO ₂ from bean plant if none of first 3 points given then allow waste (materials) / excretion for 1 mark	2
3(b)	microorganisms / microbes / bacteria / fungi / decomposers / detritivores / named	do not accept germs allow mould ignore aphids	1
	decay / breakdown / digest / decompose / rot (bean plant)	ignore eat	1
	respiration (of microorganisms etc / aphids)	allow burning / combustion	1
	carbon dioxide released (from respiration of microorganisms etc / aphids)	allow carbon dioxide released / produced (from burning / combustion) ignore other parts of the carbon cycle ignore formation of fossil fuels	1
Total			8

BL1HP

Question 1

question	answers	extra information	mark
1(a)	any correct named physical environmental condition, e.g. light / water / rain / temperature / minerals / nutrients / space (between plants)	ignore carbon dioxide / climate / weather / sun / pollution	1
	genes / inheritance OR any correct named biotic factor e.g. predation / disease	ignore 'variety'	1
1(b)	mass of crop also depends on number of pods (per plant) / size / mass of each pea	ignore number of plants	1
1(c)	microorganisms / bacteria / fungi / decomposers / detritus feeders / named		1
	decompose / rot / break down / decay / digest	ignore feed / eat	1
	(these organisms) respire	do not allow respiration by pea (plants)	1
	(decay / respiration / microorganisms etc) releases carbon dioxide	do not allow combustion / fossilisation	1
Total			7

Question 3

question	Answers	extra information	Mark
3	Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also refer to the information on page 5.		6
0 marks	Level 1 (1-2 marks)	Level 2 (3-4 marks)	Level 3 (5-6 marks)
No relevant content.	For at least one process either the organism that carries it out or the carbon compound used or the carbon compound produced is described or for at least one organism either the carbon compound it uses or the carbon compound it produces is described or at least one process is named	For some processes (at least one of which is named) either the organisms involved or the carbon compounds used or the carbon compounds produced are described	For at least one named process an organism and either the carbon compound used for the process or the carbon compound produced by the process are described and for other processes (at least one of which is named) either the organism or the carbon compounds used or the carbon compounds produced are described (as in Level 2)
examples of biology points made in the response: <ul style="list-style-type: none"> • (green) plants photosynthesise • photosynthesis takes in carbon dioxide • (green) plants use carbon to make carbohydrate / protein / fat / organic compounds / named (e.g. enzymes / cellulose) • animals eat (green) plants (and other animals) • (green) plants respire • animals respire • respiration releases carbon dioxide • (green) plants and animals die • microorganisms decay / decompose / rot / break down / feed on dead organisms • microorganisms respire 			
Total			6

Question	Answers	Extra information	Mark	AO / Spec. Ref.
2(a)	photosynthesis		1	AO2 1.6.1a/1.6.2a
2(b)(i)	140		1	AO2 1.6.1d/ 1.6.2a
2(b)(ii)	(10 billion tonnes) more added (to atmosphere) than removed	allow ecf from part (b)(i)	1	AO2 1.6.1d/ 1.6.2a
Total			3	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
4	<p>any four from:</p> <p>(living plants)</p> <ul style="list-style-type: none"> • take in carbon dioxide • (CO₂ taken in) for photosynthesis • (use carbon to make) carbohydrate / fat / protein • (plants) respire • (plant respiration) releases carbon dioxide • store / 'lock up' / sequester carbon • (provide) food for animals 	<p>ignore other parts of the carbon cycle eg decay</p> <p>allow examples</p> <p>ignore respiration of animals</p> <p>do not allow store carbon dioxide</p> <p>ignore combustion</p> <p>ignore other references to animals / microorganisms</p>	4	<p>AO1</p> <p>1.5.1a</p> <p>1.6.2a</p>
Total			4	