

WJEC (Wales) Biology GCSE
Topic 1.6 Ecosystems,
Nutrient Cycles and Human
Impact on the Environment
Questions by Topic - Mark
Scheme

1.	Question	Marking details	Marks Available
	(a)	Sun/ solar; NOT light/ sunlight	1
	(b)	<u>Energy</u> ;	1
	(c)	(i) 20; Correct answer = 2 marks If incorrect answer allow one mark for $(500/2500) \times 100$	2

2.	Question	Marking details	Marks Available					
(a)	(i)	Pike	1					
	(ii)	Pyramid correctly drawn (accept triangle) with correct labels and biomasses with units = 2 marks Pyramid correctly drawn with names of organisms on own without masses = 1 mark Pyramid correctly drawn with biomasses on own with units without named organisms = 1 mark Incorrect order or level missing = 0 marks 2 total	2					
		<p style="text-align: center;"> <table border="1" style="margin: auto;"> <tr> <td style="padding: 5px;">Pike 250 kg</td> </tr> <tr> <td style="padding: 5px;">Minnows 500 kg</td> </tr> <tr> <td style="padding: 5px;">Beetles 800 kg</td> </tr> <tr> <td style="padding: 5px;">Snails 4500 kg</td> </tr> <tr> <td style="padding: 5px;">Aquatic Plants 45000 kg</td> </tr> </table> </p>	Pike 250 kg	Minnows 500 kg	Beetles 800 kg	Snails 4500 kg	Aquatic Plants 45000 kg	
Pike 250 kg								
Minnows 500 kg								
Beetles 800 kg								
Snails 4500 kg								
Aquatic Plants 45000 kg								
	(iii)	Tier above the pike;	1					
(b)		{Single/one} {plant/ tree / named plant/ producer}; NOT aquatic plant On which {many organisms/ named organisms} {feed/ live off};	2					
	Question	total	[6]					

3.			Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept												
(a)			1	Eats meat/ other animals;																
(b)			3	<table border="1"> <thead> <tr> <th>factor</th> <th>Tick (✓) the three correct boxes</th> </tr> </thead> <tbody> <tr> <td>A disease harming the badgers</td> <td></td> </tr> <tr> <td>An increase in the number of foxes</td> <td>✓;</td> </tr> <tr> <td>The arrival of a new second stage consumer species</td> <td>✓;</td> </tr> <tr> <td>An increase in the number of beetles</td> <td></td> </tr> <tr> <td>A decrease in the area of woodland</td> <td>✓;</td> </tr> </tbody> </table>					factor	Tick (✓) the three correct boxes	A disease harming the badgers		An increase in the number of foxes	✓;	The arrival of a new second stage consumer species	✓;	An increase in the number of beetles		A decrease in the area of woodland	✓;
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An increase in the number of foxes	✓;																			
The arrival of a new second stage consumer species	✓;																			
An increase in the number of beetles																				
A decrease in the area of woodland	✓;																			
Total Mark			4																	

4.	Question	Marking details	Marks Available
	(a)	copepods;	[1]
	(b)	sandeels;	[1]
	(c)	less food for sandeels/ fewer sandeels/ no food for sandeels;	[2]
		so less food for puffins/puffins starve/ puffin has nothing to feed off;	
		must make link to food and fall in numbers at least once	
		Question Total	[4]

5.

Question		Marking details	Marks available					
			AO1	AO2	AO3	Total	Maths	Prac
(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 total			2	6	0	8	0	0

6.

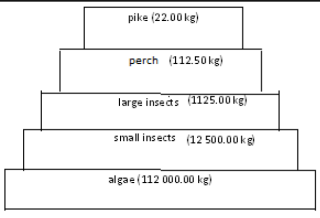
Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
(a)	(i)	2			
	(ii)	2			
(b)		2			
		6			

1353 + 2567 + 1941 = 5186
 $\frac{5186}{20000} \times 100 =$
 29.31 % Award 2 marks
 29.305/ 29.3/ 29.30% Award 1 mark
 Award 1 mark for incorrect answer but evidence of $\frac{x}{20000} \times 100$

Any 2 (x1) from:

- heat from respiration;
- excretory waste/ excretion/ named excretory waste e.g. urine;
- not all of organism digested/ eaten/ faeces/ egestion;

1 mark for 3 organisms in correct order;
 1 mark for correct masses of these 3 organisms with units; [1]

7.			Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
(b)		2			 <p>Pyramid drawn with names; Masses correct & correctly placed; kg only needed once</p>			
(c)	(i)	2			$(5.62 - 0.03 = 5.59)$; $(5.59 \div 0.03 \times 100 =) 18\ 633.3$ (%); Two marks for correct answer Allow one mark for 5.59	19 000/ 18633 for two marks		

8.			Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
(a)		1			herbivores;			
(b)		1			A;			
(c)	i	1			5 and 7;			
	ii	1			400;			
	iii	1			$5(m^2)$;	ecf (ii)		
	iv	1			220;			

9.	Question		Marking details	Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
	(a)	(i)	A: producers B: {primary/ first (stage)} consumers Ignore herbivore C: {secondary/ second (stage)} consumers Ignore carnivores D: {tertiary/ third (stage)} consumers Ignore carnivores All correct for 1 mark		1		1		
	(b)	(i)	=0.049/ 0.05/ 0.048648/0.04865/0.0486 = 2marks If incorrect award 1 mark for: 0.048/ 0.04864/ 0.04 or any other incorrect rounding or $\frac{2500}{5139000} \times 100$ (1)		2		2	2	
		(ii)	<ul style="list-style-type: none"> A pyramid of numbers shows there is a small number of producers/ example e.g. only 1 oak tree (1) A pyramid of biomass shows there is a large mass of producers/ example e.g. the 1 oak tree may have a very large mass (1) Reference to animals instead of plants negates the mark			2	2		
		(iii)	faeces/ heat/ excretory waste/ urine/ egested waste/ respiration ignore: growth/ movement/ excretion	1			1		
			Question total	1	3	2	6	2	0

10.	Question		Marking details	Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
	(a)	(i)	25 = 2 marks If incorrect award 1 mark for $100/400 \times 100$ 0.25×100		2		2	2	
		(ii)	0.180 = 3 marks 0.180180/ 0.18/ 0.1802/ 0.18018/ 0.2 = 2 marks 0.1801= 1mark Or $400/222\,000 \times 100 = 1\text{mark}$ If use biomass instead ($100/34900 \times 100$) 0.287 = 2 marks $0.28653295/ 0.286533/ 0.28653/ 0.2865/0.29/0.3 = 1\text{ mark}$ Or $100/34900 \times 100 = 1\text{ mark}$		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) 2 nd mark linked to 1 st		1	1	2		
			Question total	0	6	1	7	5	0

11.	Question	Marking details	Marks Available
	(a)	$(88/88\,000) \times 100$; 0.1%; Correct answer = 2 marks	2

12.	Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
	(b)					
	(ii)	I	1	4;		
		II	2	<ul style="list-style-type: none"> • camouflaged / blends in (with background); • from predators OWTTE/named predator/ prey OWTTE/named prey; 	Whilst hunting for food/ so they can catch their prey/ avoid being eaten	Hide/ cannot be seen
	(c)		1	<u>producers</u>		

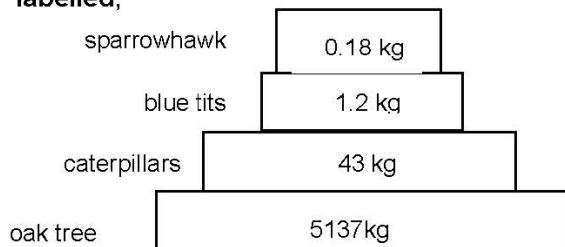
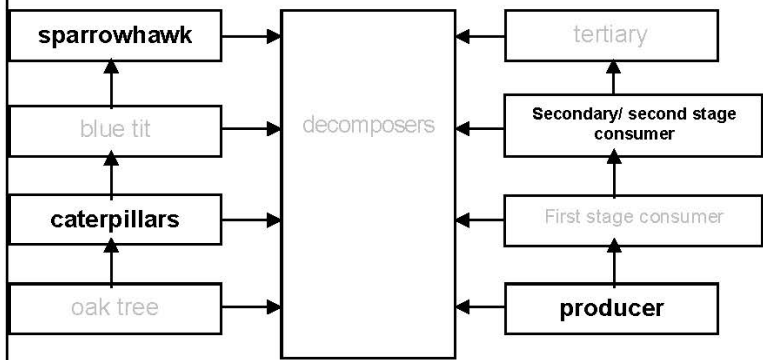
13.	Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
	(a)		1	Respiration;		
	(b)		1	1575(kJ/m ² /year)		
	(c)		2	(6300/1260000) x100; = 0.5%; 2 marks for correct answer 1 mark for method		
	Total Mark		4			

14. Question			Marking details	Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
(a)	(i)		{absorbs/ uses/ needs/ takes in} (less) light/ has leaves/ it is green/ produces sugar Reject reference to fungi		1		1		
	(ii)		reference to {sucking/ feeding/ eating} from {barley/plant/ leaves/ crops/ producer/ stem}/ get sugar from crops/ {aphids/ they} are eaten by (ladybirds which are) <u>secondary consumers</u>		1		1		
	(iii)		secondary consumers/ eat {aphids/pests/ insects/ other animals} NOT target pests	1			1		
	(iv)		pesticides {toxic to/kill} <u>harmless organisms</u> (1) ladybirds { <u>target/only eat</u> } {pests/aphids} (1)		1 1		1 1		
(b)	(i)		1.2 = 2 marks 1 mark for calculation if answer incorrect 8.0/100 x 15;		2		2	2	
	(ii)		£140.40/ 140.4 = 1 mark Ecf from (i) 1.2 (answer from (i)) x 117.00		1		1	1	
Question 14 total				1	7	0	8	3	0

15. Sub-section		Mark	Answer	Accept	Neutral answer	Do not accept
(a)						
(b)		1	birds;			
(c)	i	1	(The level/concentration of lead) decreases/ becomes less;			
	ii	2	(18/20) x 100; 90; Correct answer = 2 marks			

16. Question		Marking details	Marks Available
(a)		$655 - 280 = 375$ $\frac{375}{655} \times 100 =$ $= 57.25/ 57.3\%$ NOT 57.0/57 Correct answer = 2 marks Allow 1 mark for correct working but incorrect answer	2
(b)	(i)	Flatworms compete with hedgehogs for {food/ invertebrates}; Therefore hedgehogs eat <u>more</u> birds' eggs (avoiding the competition); (must be linked for second mark)	2
	(ii)	Numbers of { <u>some</u> birds/named birds (Snipe/Dunlin)} dropped (without introduction of hedgehogs);	1
	(iii)	{Lack of/no/less} {predators/carnivorous mammals/carnivores}; Abundance of {food/ eggs}/large variety of food/less competition for food;	2
Question 16 Total			[7]

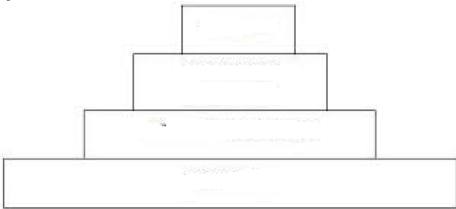
17.

Question		Marking details	Marks Available
(a)	(i)	2 17 3456 1 all correct 1 mark	1
	(ii)	<p>I Four trophic levels showing the correct shape and labelled;</p>  <p>II All masses correct including units; (independent of shape)</p>	1
(b)		<p>Food chain column correct; Trophic level column correct;</p> 	1 1
	(c)	iv	1
		Question 17 total	[6]

18.

Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
(a)	2	(pesticide) {kills/ destroys} {pests/animals/weeds/insects/fungi }; that would {eat/kill/harm/damage/compete with/ feed on} {it/them/crop/plant};	named pest	get rid of/ stop named weed	Bacteria
(b)	4	DDT; toxic; fertility; consumers;			
Total Mark		6			

19.

Sub-section		Mark	Answer	Accept	Neutral answer	Do not accept
(a)	(i)	1	Sun/ solar/ sunlight; NOT light alone			
	(ii)	1	Flow of <u>energy</u> / transfer of <u>energy</u> / description of <u>energy</u> flow;			
(b)		1	Correct shape as below – 4 layers; no labels required reject incorrect labels 			
(c)		2	{fewer/no} greenflies, so {fewer/no} ladybirds; so {{fewer/no} robins/ robins die}; OR {Pesticide/ it} builds up along food chain / bioaccumulation; So fewer robins/ robins poisoned/ robins die			
Total Mark		5				

20.

Marking details

Marks
Available

Indicative content

6

Carbon dioxide taken up by plants for photosynthesis.
Carbon used in manufacture of carbohydrates/ sugar/ starch/
protein/ fat.
Plants eaten by animals.
Plants and / or animals respire and return carbon (dioxide) to
air.
Plants and/ or animals die.
Decay/ named organisms release carbon (dioxide) to air.
Reference to fossilisation due to lack of decay.
Combustion/ burning of fossil fuels releases carbon (dioxide).

5-6 marks

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 no irrelevant inclusions or significant omissions. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar.

3-4 marks

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 uses mainly appropriate scientific terminology and some accurate spelling, punctuation and grammar.

1-2 marks

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 uses limited scientific terminology and inaccuracies in spelling, punctuation and grammar.

0 marks

The candidate does not make any attempt or give a relevant answer worthy of credit

21.

Question

Marking details

Marks
Available

(b)

Any 4 from

4

Bacteria/ microorganisms/ microbes/ decomposers;

Change {protein/urea} to ammonia (compounds);

Increase and then a decrease in ammonia;

(decrease is) due to dilution;

(Some) ammonia is changed to nitrates;

22.	Question	Marking details	Marks Available
	(a)	Bacteria/ fungi;	1
	(b)	{The <u>leaves/they</u> } have { <u>decayed/rotted/decomposed</u> }; { <u>More/faster</u> } at { <u>15 °C / the high temperature/highest temperature</u> }; ORA	2
	(c)	(i) Any two from: same type of leaves/from same tree; NOT same leaves same size of leaf; equal volumes of soil; NOT amount/ type/moisture content same {length amount} of time/both one month;	max 2
		(ii) To make a (<i>qualified</i>) conclusion (e.g. meaningful/valid)/to make a comparison/to avoid invalid results/to determine that the temperature causes the difference; NOT to make more {reliable/accurate}/ avoid bias	1
	(d)	Carbon dioxide/CO ₂ ; NOT CO ² /Co	1
	(e)	(Nitrates) released/produced by/come from the <u>leaves</u> ; during <u>decay</u> ;	2
	Question 22 Total		[9]

23.

Sub-section		Mark	Answer	Accept	Neutral answer	Do not accept
(a)	i	4	I accurate plotting;; all correct = 2 marks one error = 1 mark more than one error = 0 marks II one accurate line through centre of plots; III lines labelled – 1.0 mm and 0.1mm;			
	ii	1	{1 mm/large/larger/ higher} mesh size has {higher/more} (%) decay/ ORA;			Not quicker decay
	iii	2	any two from: mass; (leaf) area; {species/tree}; age; moisture content;	weight		type of leaf/ type of tree/ size of leaf/ amount of leaf/ same shape leaf
	iv	1	bacteria/fungi/mould;			
	v	1	too {cold/hot/dry/wet}/ hotter/ colder/ drier/ wetter;	pH too {high/ low}		Climate/ weather

24.

Question		Marking details	Marks available					
			AO1	AO2	AO3	Total	Maths	Prac
(a)								
	(ii)	B		1		1		
(c)	(i)	X = Photosynthesis (1) Y= Feeding (1) Accept eating/ consuming/ ingestion	2			2		

25.

Marking details	Marks available					
	AO1	AO2	AO3	Total	Maths	Prac
<p>Indicative content</p> <ul style="list-style-type: none"> • 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. <p>5-6 marks All stages included in detail <i>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.</i></p> <p>3-4 marks All stages included but with lack of detail <i>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.</i></p> <p>1-2 marks Only some stages included. <i>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.</i></p> <p>0 marks: No attempt made or no response worthy of credit.</p>	6			6		
Question total	6	0	0	6	0	0

26.

Mark	Answer
6 QWC	<p>Indicative content</p> <p>Bacteria and Fungi are decomposers Decomposers decay dead organisms/waste Conversion of protein to ammonia Conversion of urea to ammonia Ammonia converted to nitrate Nitrate taken up by plant (roots) Nitrate used to make protein Factors that affect the activity should include oxygen, temperature, pH and heavy metals (some factors must be present to access marks in the range 5-6)</p> <p>5-6 marks 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 no irrelevant inclusions or significant omissions. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar.</p> <p>3-4 marks 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 uses mainly appropriate scientific terminology and some accurate spelling, punctuation and grammar.</p> <p>1-2 marks 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 uses limited scientific terminology and inaccuracies in spelling, punctuation and grammar.</p> <p>0 marks The candidate does not make any attempt or give a relevant answer worthy of credit.</p>

27.	Question	Marking details	Marks Available
	27 (a)	(i) 1967;	1
		(ii) 0.27/ 0.3 / 0.266 / 0.267/ 0.26 ⁷ ; NOT 0.2/ 0.26	1
	(b)		
		(ii) G/AC;	1

28.	Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
	(a)	2	4 correct – 2 marks 2/ 3 correct – 1 mark A D B C			
	(b)	5	protein/urea in sewage; protein/urea changed to ammonia; ammonia changed to nitrate; by bacteria; (must be correct context if mentioned) reference to higher temperature (in May) affecting bacteria;			

29.	Question		Marking details	Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
	(a)		<p>Indicative content:</p> <ul style="list-style-type: none"> • Herbivores Any two from: rabbits, mice, flies, aphids, • {Second stage consumers/carnivores} Any two from: birds of prey, shrews, spiders, ladybirds <ul style="list-style-type: none"> • more plants • {Herbivore/ flies/ aphids/ mice} increase in number • {carnivores/ shrews/ spiders/ ladybirds} increase in number • Numbers of mice could decrease • mice are the <u>only</u> source of food for birds of prey • numbers of birds of prey decrease • reference to competition <p>5-6 marks <i>Herbivores and second stage consumers identified. Explanation of effect on populations if rabbits destroyed. Mice affected differently from other herbivores. 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.</i></p> <p>3-4 marks Reference to increased plant growth giving more food for named herbivores and hence secondary consumers (unnamed), Different status of mice not recognised</p> <p><i>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.</i></p>	3	3		6		
			<p>1-2 marks Any reference to increased food for herbivores with examples. OR any relevant reference to secondary consumers with an example.</p> <p><i>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.</i></p> <p>0 marks: <i>No attempt made or no response worthy of credit.</i></p>						
	(b)		Microorganisms/bacteria/fungi/ decomposers (1) Decay/ decomposition/ break down of animal bodies/ break them down (1)		2		2		
			Question 29 total	3	5	0	8	0	0

30.	Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
	(a)	i	1	photosynthesis;		
		ii	1	respiration;		
		iii	1	carbon dioxide;	CO ₂	
	(b)		1	{releases/ adds/ produces/ more} carbon dioxide;	CO ₂ / gas X if named in iii	CO ² / Co ₂
	Total Mark		4			

31.	Question		Marking details	Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
	(a)		Any 2 (x1) from <u>warm spring</u> faster growth of algae/ faster reproduction/ enzymes working faster/more photosynthesis (1) <u>still June</u> ref. nutrients not being mixed/distributed throughout whole body of water (1) <u>wet July and August</u> more {nutrients/fertilisers/ sewage} (from surrounding land) washed into lake (1) ignore pesticide		2		2		
	(b)		Any 3 (x1) from: 1. (Increased) competition for light/ light is blocked (1) 2. some {algae/ plants} (start) dying (1) 3. {bacteria/ microbes/ decomposers} {decomposing / rotting/ breaking down} dead plants (1) 4. use up oxygen for respiration (1) 5. arctic char suffocate/ owtte (1)	3			3		
	(c)	(i)	indicator species/biological indicators	1			1		
		(ii)	<u>no pollution</u> (1) <u>high level of oxygen</u> (1)			2	2		
		(iii)	sample {all/ other} rivers flowing into {llyn Padarn/ this lake} (1) ref. reasonable time period, e.g. every month from April to September (1)			2	2		
			Question 31 total	4	2	4	10	0	0

32.	Mark	Answer
	6	Indicative content:
	QWC	<p>Fertilisers (contain essential nutrients which) {increase yield/ make plants grow {bigger/ more/ quicker}}</p> <p>Fertilisers can {pollute/enter} waterways /cause {eutrophication/OWTTE}/ cause weed growth</p> <p>Pesticides destroy crop pests and therefore {increase yield/ less competition/ crops not destroyed}</p> <p>Pesticides can {build up in the food chain/ kill non target species/ harm/kill/reduce fertility in top predators}</p> <p>Battery methods increase meat/egg/ milk production NOT yield alone</p> <p>Ref to ethical issues/humane treatment of livestock/ more risk of disease/ increased use of antibiotic NOT 'not ethical' alone/ cruel</p> <p>5-6 marks 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 no irrelevant inclusions or significant omissions. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar.</p> <p>3-4 marks 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 uses mainly appropriate scientific terminology and some accurate spelling, punctuation and grammar.</p> <p>1-2 marks The candidate makes some relevant points, such as those in the indicative content, showing limited reasoning. The answer addresses the question with significant inaccuracies in spelling, punctuation and grammar.</p> <p>0 marks The candidate does not make any attempt or give a relevant answer worthy of credit.</p>

33.		Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
(a)	i		1	A has the highest % survival/ lowest percentage killed;			
	ii		3	8; No decrease in % survival above this concentration; Increased cost/ environmental reasons;			
(b)			2	Any two from time; age; temperature;			
(c)				Any four from:			

34.	Question	Marking details	Marks Available
(a)		Kills the weeds/ plants (reject animals/ pests); Reject stop weeds growing that compete (with the crop)/ {more room/ nutrients/ light} for crop;;	2

35.

Question		Marking details	Marks Available
35	(a)	<p>Any one from:</p> <ul style="list-style-type: none"> Does not kill/ harm} {insects/ organisms} {which are beneficial/ that pollinate crops/ which are useful}/ ORA; Only 1 application/ it is cheaper/ ORA; <p>NOT bioaccumulation</p> <ul style="list-style-type: none"> No (chemical) pollution/ ORA; 	1
	(b)	<p>Fertilizers/GM (crops)/ selective breeding/named fertilizer/ manure/slurry/biological control/genetic engineering;</p> <p>NOT reference to pesticide use/herbicides</p>	1
	(c) (i)	1947/ 1948 ;	1
	(c) (ii)	<p>Leaching/run off/spray carried by air onto water/(rain) {carried/ washed} it into rivers ;</p> <p>NOT DDT sprayed onto water/rain leaked it into rivers</p>	1

36.

Mark	Answer
6	<p>Indicative content:</p> <ul style="list-style-type: none"> Fertiliser run off Causes algal bloom/ excess plant growth Overgrowth of plants prevents light reaching plants in deeper water Plants die and decay Bacterial/ fungi cause decay Use oxygen for respiration Fish suffocate <p>5-6 marks 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 no irrelevant inclusions or significant omissions. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar.</p> <p>3-4 marks 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 uses mainly appropriate scientific terminology and some accurate spelling, punctuation and grammar.</p> <p>1-2 marks The candidate makes some relevant points, such as those in the indicative content, showing limited reasoning. The answer addresses the question with significant inaccuracies in spelling, punctuation and grammar.</p> <p>0 marks The candidate does not make any attempt or give a relevant answer worthy of credit.</p>

37.

Question		Marking details	Marks available							
			AO1	AO2	AO3	Total	Maths	Prac		
	(a)	(i)	Stream 1 – <u>high</u> (pollution) Stream 2 – <u>little / no</u> (pollution) Stream 3– <u>medium</u> (pollution) All correct (2) 2 correct (1) 1 or 0 correct 0 marks			2		2		
		(ii)	Any two (x1) from: Fertilizer/ NPK fertilizer (1) Manure (1) Slurry (1) silage <u>run-off/ seepage</u> (1) Sewage (1) NOT farms/ sewers			2		2		
	(b)		lichens		1			1		
			Question total		3	2	0	5	0	0

38.			Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
(a)	(i)			1	Arrow must indicate the 45 au/200 m coordinate.;			
	(ii)			2	{Microorganisms/bacteria/ decomposers} {reproduce/multiply/ divide} / {large numbers of/ more} {microorganisms/bacteria/ decomposers}; (microorganisms/bacteria/ decomposers) use oxygen {in respiration/ to respire};	microbes		
(b)	(i)			1	Group A/ rat tailed maggots and blood worms and sludge worms			
	(ii)			1	accept the following readings 0 m – 200 m or 1200 m – 1300 m;			
(c)				1	Biological indicators/ indicator species;			
Total Mark				6				

39.			Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
(a)	i			1	{organism/species/ animal/ plant} which {indicates/shows} the {presence/level} of {pollution/pollutants/ named pollutant};			
(b)				3	(greater the distance from city) pH {increases/ becomes less acidic}/ less acidic gases/ less correctly named gases}; (greater the distance from city) {lichen increases/ less lichen destroyed/ more lichen survives }; (greater the distance from city) less <u>pollution</u> ; 3rd marking point linked to 1st or 2nd marking point	reverse argument for all marking points it= lichen		