



2007 Biology

Higher

Finalised Marking Instructions

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Higher Biology 2007

GENERAL MARKING ADVICE: BIOLOGY

The marking schemes are written to assist in determining the ‘minimal acceptable answer’ rather than listing every possible correct and incorrect answer. The following notes are offered to support Markers in making judgements on candidates’ evidence, and apply to marking both end of unit assessments and course assessments.

1. There are no **half marks**. Where three answers are needed for two marks, normally one or two correct answers gain one mark.
2. In the mark scheme, if a word is **underlined** then it is essential; if a word is **(bracketed)** then it is not essential.
3. In the mark scheme, words separated by / are **alternatives**.
4. If two answers are given which contradict one another the first answer should be taken. However, there are occasions where the second answer negates the first and no marks are given. There is no hard and fast rule here, and professional judgement must be applied. Good marking schemes should cover these eventualities.
5. Where questions in data are in two parts, if the second part of the question is correct in relation to an incorrect answer given in the first part, then the mark can often be given. The general rule is that candidates should not be penalised repeatedly.
6. If a numerical answer is required and units are not given in the stem of the question or in the answer space, candidates must supply the units to gain the mark. If units are required on more than one occasion, candidates should not be penalised repeatedly.
7. Clear indication of understanding is what is required, so:
 - if a description or explanation is asked for, a one word answer is not acceptable
 - if the question asks for **letters** and the candidate gives words and they are correct, then give the mark
 - if the question asks for a word to be **underlined** and the candidate circles the word, then give the mark
 - if the result of a calculation is in the space provided and not entered into a table and is clearly the answer, then give the mark
 - **chemical formulae** are acceptable eg CO₂, H₂O
 - contractions used in the Arrangements document eg DNA, ATP are acceptable
 - words not required in the syllabus can still be given credit if used appropriately eg metaphase of meiosis
8. Incorrect **spelling** is given. Sound out the word(s),
 - if the correct item is recognisable then give the mark
 - if the word can easily be confused with another biological term then **do not** give the mark eg ureter and urethra
 - if the word is a mixture of other biological words then **do not** give the mark, eg mellum, melebrum, amniosynthesis

9. **Presentation of data:**

- if a candidate provides two graphs or bar charts (eg one in the question and another at the end of the booklet), mark both and give the higher score
- if question asks for a line graph and a histogram or bar chart is given, then do not give the mark(s). Credit can be given for labelling the axes correctly, plotting the points, joining the points either with straight lines or curves (best fit rarely used)
- if the x and y data are transposed, then do not give the mark
- if the graph used less than 50% of the axes, then do not give the mark
- is 0 is plotted when no data is given, then do not give the mark (ie candidates should only plot the data given)
- no distinction is made between bar charts and histograms for marking purposes. (For information: bar charts should be used to show discontinuous features, have descriptions on the x axis and have separate columns; histograms should be used to show continuous features; have ranges of numbers on the x axis and have contiguous columns)
- where data is read off a graph it is often good practice to allow for acceptable minor error. An answer may be given 7.3 ± 0.1

10. **Extended response questions:** if candidates give two answers where this is a choice, mark both and give the higher score.

11. **Annotating scripts:**

- put a 0 in the box if no marks awarded – a mark is required in each box
- indicate on the scripts why marks were given for part of a question worth 3 or 2 marks. A ✓ or x near answers will do

12. **Totalling scripts:** errors in totalling can be more significant than errors in marking:

- enter a correct and carefully checked total for each candidate
- do not use running totals as these have repeatedly been shown to lead to more errors

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Marking scheme

Section A

1.	A	16.	A
2.	D	17.	D
3.	B	18.	C
4.	D	19.	C
5.	D	20.	C
6.	D	21.	B
7.	D	22.	A
8.	C	23.	D
9.	A	24.	C
10.	A	25.	B
11.	B	26.	C
12.	B	27.	B
13.	A	28.	C
14.	A	29.	D
15.	C	30.	B

Marking Instructions

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Section B

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
1 (a) (i)	Transmitted (through leaf) Transmission/transmittance	1	Passes through Shines through	
	(ii) Granum (of chloroplast) Grana (of chloroplast) Thylakoids	1	Chloroplast alone Chlorophyll alone Granum of the chlorophyll Chlorophyll of granum	Photolysis in stroma
(b) (i)	Photolysis/Photolytic splitting of water	1	Photophosphorylation Splitting of water using light energy Hill reaction	
	(ii) NADP	1	NAD, GP NADPH, NADH	
(c)	Five, carbon dioxide BOTH = 1 mark hydrogen, three BOTH = 1 mark	2		

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
2 (a) (i)	0.375	1	0.4 0.37 0.38	
(ii)	Identical apparatus with no worm Same set up with dead worm experiment with glass beads with plasticene (instead of worm) suitable alternative	1	Another one with no worm Repeat with no worm Replace worm with glass beads etc Similar ≠ same The above experiment with no worm	
(b)	0.01	1		

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
3 (a) (i)	<p>0-3 (Mass increases as) <u>water</u> enters/is gained/absorbed by osmosis OR Water diffuses into cell OR Water enters from more dilute solution OR (Mass increases as) <u>water</u> enters/moves from High Water Concentration to Low Water Concentration OR (Mass increases as) <u>water</u> moves from <u>higher water concentration</u>/ hypotonic (to hypertonic) region/solution OR Osmosis from High Water Concentration to Low Water Concentration OR Water moves down a concentration gradient</p> <p>3-5 Cells/tissue/carrot turgid OR tissue/cells isotonic with the solution OR (cell) wall (pressure) stops more water entering/osmosis OR Wall has reached limits of elasticity</p>	<p>1</p> <p>1</p>	<p>Mass increases as water moves from high to low concentration Mass increases as water enters</p> <p>mass remains the same because no more water enters osmosis stopped/complete vacuole full stable concentration gradient</p>	
(ii)	<p>(Temperature/heat) denatures/destroys/damages protein in membrane 1</p> <p>Making (the membrane) fully permeable/no longer selectively permeable AND Allowing cell contents/water to escape/leak out/be lost (giving a decrease in mass) NOT diffused out 1</p>	<p>2</p>	<p>Enzyme ≠ protein Destroys membrane</p>	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
3 (b) (i)	Ion – chloride/chlorine Justification – <u>concentration</u> (of chloride) is equal/the same (inside and outside the organism)	1	level \neq concentration The same in the organism and sea water The same inside and outside the organism They are isotonic	
(ii)	Oxygen/aerobic conditions allows increased (aerobic) respiration that provides more ATP/energy for more active transport (of potassium) Idea of increased/more needed at least once All 3 = 2 marks 2 = 1 mark All 3 with no comparison = 1 mark only	2	Lots/high amounts of ATP \neq increased/more	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
4 (a) (i)	Transfer RNA/tRNA/TRNA	1	RNA/tRNA anti-codon	
(ii)	Hydrogen (bond)	1	Weak bond	
(b)	Codon	1	Triplet, Triplet code, mRNA triplet	
(c)	TTA	1		
(d)	Endoplasmic reticulum Carries/transports/transfers/sends/passes (protein) to the Golgi (apparatus) Golgi apparatus Processes/packages/modifies/adds carbohydrate to protein/ molecules/it (for secretion) OR Packages secretion OR vesicles produced containing protein	1 1	Transport alone Secretes alone	synthesising
(e)	Globular Fibrous BOTH Breaks down/degrades/digests/removes/destroys/gets rid of cell walls/cellulose OR Makes protoplasts	1 1	 2 Is an enzyme Needed in somatic fusion Breaks/Cuts open/eats open/ dissolves wall	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates								
5 (a)	<table border="1" data-bbox="421 300 1205 778"> <tr> <td data-bbox="421 300 813 336">Box 1</td> <td data-bbox="813 300 1205 336">Box 2</td> </tr> <tr> <td data-bbox="421 336 813 539">Dominant/more competitive/ faster growing/prolific grasses/plants/species are eaten more/kept in check/ prevented from taking over</td> <td data-bbox="813 336 1205 539">so other grasses/plants/species can grow</td> </tr> <tr> <td data-bbox="421 539 813 576">Box 3</td> <td data-bbox="813 539 1205 576">Box 4</td> </tr> <tr> <td data-bbox="421 576 813 778">Some species are kept in check/grow less/don't thrive/are eaten</td> <td data-bbox="813 576 1205 778">so less dominant/vigorous/fast growing/prolific/more delicate plants OR species which would normally be blocked out of light/can grow/survive</td> </tr> </table> <p data-bbox="421 818 678 986"> Box 1 + 4 = 2 marks Box 1 + 2 = 2 marks Box 3 + 4 = 2 marks Box 1 OR 4 = 1 mark Box 3 + 2 = 0 marks </p>	Box 1	Box 2	Dominant/more competitive/ faster growing/prolific grasses/plants/species are eaten more/kept in check/ prevented from taking over	so other grasses/plants/species can grow	Box 3	Box 4	Some species are kept in check/grow less/don't thrive/are eaten	so less dominant/vigorous/fast growing/prolific/more delicate plants OR species which would normally be blocked out of light/can grow/survive	2	Dominant ≠ taller/stronger/larger/ more abundant More widely spread	Dominant species are removed
Box 1	Box 2											
Dominant/more competitive/ faster growing/prolific grasses/plants/species are eaten more/kept in check/ prevented from taking over	so other grasses/plants/species can grow											
Box 3	Box 4											
Some species are kept in check/grow less/don't thrive/are eaten	so less dominant/vigorous/fast growing/prolific/more delicate plants OR species which would normally be blocked out of light/can grow/survive											
(b) (i)	<table border="0" data-bbox="421 1023 1205 1220"> <tr> <td data-bbox="421 1023 801 1220">At higher grazing intensity As grazing increases With heavy grazing With strong grazing</td> <td data-bbox="801 1023 1205 1220">graph does not fall to zero diversity never falls to zero graph starts to level off some species survive/are not extinct</td> </tr> </table>	At higher grazing intensity As grazing increases With heavy grazing With strong grazing	graph does not fall to zero diversity never falls to zero graph starts to level off some species survive/are not extinct	1	Graph never falls to zero As grazing increases diversity increases							
At higher grazing intensity As grazing increases With heavy grazing With strong grazing	graph does not fall to zero diversity never falls to zero graph starts to level off some species survive/are not extinct											
(ii)	<table border="0" data-bbox="421 1230 1205 1422"> <tr> <td data-bbox="421 1230 1205 1422">Low/basal/underground/close to ground meristems Low/basal growing points Underground stems/rhizomes Deep root (systems) OR roots lower in ground Low apical meristems</td> </tr> </table>	Low/basal/underground/close to ground meristems Low/basal growing points Underground stems/rhizomes Deep root (systems) OR roots lower in ground Low apical meristems	1	Thorns, spines, stings, resin etc. Some species less palatable/ distasteful Rosette habit Extensive powers of regeneration Long roots, corms, tubers								
Low/basal/underground/close to ground meristems Low/basal growing points Underground stems/rhizomes Deep root (systems) OR roots lower in ground Low apical meristems												

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
6 (a) (i)	June to Oct increases from 3.6g to 8.0g/by 4.4g Oct to Nov remains constant/no change/levels off Nov to Dec decreases/reduces to 7.5g/7.45/by 0.5g Allow 0.05 on figures All 3 = 2 marks Any 2 = 1 mark Penalise only once for no units eg none, kg, %	2		
(ii)	Oct to Nov	1		
(iii)	1 : 7	1	20:140	
(iv)	60%	1		
(b)	Photosynthesis decreases/less starch made AND starch used as an energy source/in respiration/as food OR Starch converted to raffinose, starch used in growth	1	More starch used than produced	
(c) (i)	Raffinose concentration is less than the total sugar concentration Use of specific figures from the graph and table (units not required) Correct answer – wrong figures not negating	1	Raffinose greater in graph than table Lots of raffinose on graph Idea of resource conservation Idea of zero in June	
(ii)	Temperatures drop/winters are extremely cold/frost is likely AND Raffinose increases to prevent frost damage/freezing of sap/needles OR Higher concentration in winter/colder months helps to prevent frost damage (to needles)	1	frostbite	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
7 (a) (i)	Gamete mother (cells)	1	Mother gamete cells Mother cells Sperm/egg cell	Sperm or egg before gamete mother cells
(ii)	Same genes/order of genes/gene sequence/gene loci/position of genes OR alleles/genes for same characteristics OR chromosomes match each other gene for gene same banding pattern	1	Same alleles/type of genes/ genetic information/genetic code/ genetic material/DNA same position of centromere same number of genes	
(iii)	(Partial) non-disjunction	1	Spindle fibre failure complete non-disjunction	
(iv)	First meiotic division Justification – (this is when) <u>homologous</u> chromosomes pair/are separating/fail to separate OR <u>homologous</u> pairs form/separate/fail to separate OR does not involve separation of chromatids	1	It is before cells become haploid Spindle fibre failure Homologous pairs not split up	
(v)	2	1	2n	
(b)	Insertion Substitution	1 1	2	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
8 (a) (i)	Barriers to gene exchange/gene flow/interbreeding/spreading of mutations between groups/sub groups/populations OR Splits the gene pool/creates two gene pools/prevents mixing of gene pool	1	between species Prevent breeding Allows a new gene pool to form Causes inbreeding	
(ii)	They have/share a common ancestor leaves selected for/adapted to/suited to/developed for different/ their growing conditions/environment/niche/climate	1 1	2 habitat	
(b)	Spines/they/it give protection from/discourage/reduce/stop grazing by herbivores/predators AND reference to low growing	1	Tolerate grazing	
(c)	Wildlife/Nature reserves, captive breeding, breeding programmes, cell/seed/gene banks, hunting/fishing quotas, poaching bans, being made a protected species, breeding in zoos, only being allowed to hunt at certain times of the year	1	On site/off site, monitoring populations, zoo, national park, conservation areas, rare breed farms, acronyms for organisations eg RSPB, laws, cloning, SSSIs, wildlife/safari park, wildlife sanctuary, animal park, conservation park	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
9 (a) (i)	2.5kg	1		
(ii)	<p>Increased/more <u>growth hormone/GH</u> (causes a growth spurt/rapid increase in growth) between 15 and 20 years/up to 20 years/through the teenage years 1</p> <p>Decrease/less/no/cessation of growth hormone/GH (causes growth to cease) after 20 years/between 20 and 22 years 1</p>	2	A lot of growth hormone between 15 and 20 years	
(b)	<p>Thyroxine</p> <p>Controls/regulates (the rate of) metabolism/metabolic rate</p>	1 1	Decreases/maintains/affects/alters/changes	Reference to growth

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
10 (a) (i)	temperature, type of soil, pH/mineral content/fertility of soil, nutrients (availability) in soil, carbon dioxide conc./availability/level (in atmosphere), distance/position/angle of spray from plant 1 mark each	1 1	Volume of GA solution humidity, anything about plants wind, colour of light time of watering, type of water, heat, pH alone, illumination, type of pot, pH of water, type of spray gun, volume of CO ₂ , quality of soil	
(ii)	Use more pea plants at each concentration/mass of GA OR Use more replicates at each conc/mass of GA	1	Repeat the experiment alone Change method of GA delivery	
(b) (i)	Labels on both axes and scale on X axis to fill most of graph grid. Scale must start at 0 or 0.01 at origin to 0.11/0.12 minimum Plotting and joining of points with a ruler, not connected to 0 Ignore extrapolations past 0.11 Accurate plot to wrong scale	1 1 2	Line of best fit	
(ii)	370-380% increase OR accurate straight line extrapolation from incorrect graph	1		
(c)	Some spray may miss the plant AND so less/unknown/inaccurate mass of GA applied	1	Spray may miss the plant alone Undersides of leaves not sprayed Some plants get more/less some parts of plants get more/less Not all plants/leaves would have the same amount of GA	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
11 (a)	T T T F F T Tick = true, x = false All three pairs = 2 marks, 2 or 1 pairs across = 1 mark	2	blanks	
(b) (i)	Phenylalanine – increases/builds up/rises/higher/more Tyrosine – decreases/falls/goes down/lower (to zero)/less	1 1	High, above normal Low, none, not enough, below normal	
(ii)	1. (Mutation) changes order/sequence of bases/nucleotides (in a gene) OR bases altered OR Change to DNA code/sequence, mRNA code/sequence OR Change to codon/codons/codon sequence 2. (Leading to) change in (order/sequence of) amino acids 3. order/sequence of amino acids determines the (shape/function/structure of) protein/enzyme order/sequence needed IN EITHER point 2 OR 3 for both marks All 3 = 2 marks, 2 = 1 mark	2	Gene code, genetic code, gene sequence RNA, tRNA chain ≠ sequence	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
12 (a)	Condition – continuous/uninterrupted/constant/period of darkness must be 12 hours or more Justification – if dark period too short/less than 12 hours or interrupted then flowering does not occur Award mark if entire answer in justification	1	complete ≠ constant solid/steady darkness 12 hours or less light Answers only covering conditions under which flowering does not occur	Wrong conditions given Incorrect justifications
(b)	Enables/allows sexual reproduction/cross pollination/interbreeding/cross-breeding OR Pollen able to fertilise/be carried to other plants	1	Pollination alone Self pollination Reproduction alone All plants release pollen at same time Idea of breeding between different species	
(c)	Changing photoperiod can affect timing of/cause breeding/mating OR small mammals/example breed when photoperiod increasing OR large mammals/example breed when photoperiod decreasing	1	Non-mammal examples Reference to hibernation or migration, nocturnal, diurnal behaviour Daylength ≠ photoperiod	

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
13 (a)	Glycogen	1	Incorrect spelling	
(b) (i)	X – insulin Y – glucagon Both = 1 mark	1	Incorrect spelling of glucagon Adrenaline	
(ii)	Pancreas	1	Islets of Langerhans	
(iii)	<p>1 Raised/High blood sugar/glucose level 2 causes release of insulin/hormone X 3 Insulin stimulates conversion of glucose to glycogen/storage carbohydrate 4 blood sugar/glucose back to normal/set point</p> <p>OR</p> <p>1 Reduced/Low blood sugar level 2 causes release of glucagons/hormone Y 3 Glucagon stimulates conversion of glycogen to glucose 4 blood sugar back to normal/set point</p> <p>OR (generic answer)</p> <p>1 Change detected 2 Corrective mechanism switched on 3 Return to set point/normal 4 Corrective mechanism switched off</p> <p>Generic answers may be correctly combined with either of other answers. All 4 correct = 2, 2/3 = 1</p> <p>Hormone must be correct either name or letter</p>	2		

Question	Acceptable Answer	Mark	Unacceptable Answer	Negates
14 (a) (i)	succession	1	Primary succession	
(ii)	Grass alters/modifies the habitat/soil so that it is more suitable/favourable for shrubs OR Grass increases humus/water retention/soil fertility/nutrient level/depth of soil	1	Grass prepares soil Grass makes soil unsuitable for itself Grass alters ground/land/environment Grass makes soil/conditions better	
(iii)	Diverse/high biomass/contains complex food webs	1	Anything to do with soil Diversity Biggest/tallest plants Not replaced by anything No further succession Final community Diverse food webs Complex food chains Largest mass At equilibrium Live a long time	
(b) (i)	Density dependent – competition, predation, disease, food supply (A, B, D and F) Density independent – rainfall, temperature (C, E) 6 = 2, 5/4 = 1	2		
(ii)	Increases decreases Both = 1 mark	1		

Extended response question C1A

Give an account of respiration under the following headings:

	(i)	glycolysis;	5
	(ii)	the Krebs (Citric Acid) cycle.	5
			(10)
1A	(i)	1 occurs in cytoplasm	1
		2 glucose broken down to/converted to/reduced to/oxidised to (two molecules of) pyruvic acid	1
		3 C6 compound broken down to 2 X C3	1
		4 step by step breakdown by enzymes OR series of enzyme controlled reactions	1
		5 net gain/production of ATP/explanation of net gain of ATP	1
		6 NAD accepts hydrogen/NADH produced and transferred to cytochrome system/ cristae/electron transfer system NOT stage 3	1
		7 oxygen not required/anaerobic Occurs in aerobic and anaerobic conditions	1
		Any 5 from 7	5
	(ii)	8 occurs in the mitochondrion <u>matrix</u>	1
		9 requires oxygen OR aerobic phase	1
		10 C2 acetyl group produced from pyruvic acid	1
		11 acetyl group joins with CoA	1
		12 acetyl CoA reacts/combines with a C4 compound to form C6 compound/citric acid	1
		13 cyclical series of reactions back to the C4 compound	1
		14 carbon dioxide produced/given off/released	1
		15 NAD accepts hydrogen/NADH produced and transferred to cytochrome system	1
		16 Krebs cycle needs/requires/is controlled by enzymes	1
		Any 5 from 8	5
		Do not award both 7 and 9, ensure that mark is given in the candidate's best interest Do not award both 6 and 15, ensure that mark is given in the candidate's best interest Do not award 4 and 16	(10)

Extended response question C1B

Give an account of cellular defence mechanisms in animals under the following headings:

	(i)	phagocytosis;	4
	(ii)	antibody production and tissue rejection.	6
			(10)
1B	(ii)	1 carried out by phagocytes/monocytes/macrophages Penalise once for lymphocyte	1
		2 non-specific nature of process	1
		3 bacteria/foreign material/virus (NOT antigen) engulfed/enveloped OR description/diagram NOT trapped	1
		4 into a vacuole/vesicle NOT pocket/pouch	1
		5 lysosomes fuse/join to vacuole AND add enzymes to vacuole	1
		6 bacteria/foreign material/virus (NOT antigen) digested/destroyed/broken down by enzymes enzymes not needed twice for 5 and 6 Penalise only once for antigen at points 3 and 6.	1
		Any 4 from 6	4
	(ii)	7 antibodies are proteins	1
		8 they are produced by lymphocytes	1
		9 production stimulated by/in response to foreign/non-self antigens/proteins	1
		10 antibodies are specific/match the shape of antigens/lock and key diagram	1
		11 antibody renders harmless/destroys/attacks/combat/neutralises/combines with antigen NOT kills antigen	1
		Maximum 4	4
		12 transplanted tissues are antigenic/have foreign antigens/proteins are recognised as foreign/non-self	1
		13 will be rejected/attacked by patient's antibodies OR antibodies made against transplant tissue NOT kills transplant	1
		14 risk of rejection is reduced by suppressors/immunosuppressors/drugs which suppress/inhibit immune system OR repressors which inhibit/suppress the immune system	1
		Maximum 2	2
			(10)

Extended response question C2A

Give an account of the problems of osmoregulation in freshwater bony fish and outline their adaptations to overcome these problems. **(10)**

2A	1	fish (tissues)/body fluids hypertonic to surroundings/description OR converse	1
	2	water enters fish through gills and/or mouth by osmosis	1
	3	potentially leading to bursting of/damage to cells OR dilutes cytoplasm OR increases water content of cells	1
		OR excess water must be removed OR water must be removed to keep water balance	1
	4	salts lost in urine through mouth linings/gills	1
		Any 2 from 4	2
	5	kidneys have many glomeruli	1
	6	kidneys have large glomeruli	1
	6a	have many large glomeruli Award only if 5 or 6 not given	1
	7	filtration rate of kidneys/glomeruli/blood is high	1
	8	urine produced is dilute	1
	9	large volume/amount/quantity of urine produced	1
	10	chloride secretory cells present in gills absorb salts	1
	11	against the concentration gradient/by active transport/uptake/actively	1
		Any 6 from 7	6
	C	divided into paragraphs or under sub-headings eg Problems and Adaptations at least one point from problems (1-4) and 4 points from adaptations (5-11) Both	1
	R	no mention of salt water fish/desert mammals at least one point from problems and 4 points from adaptations	1
			2
			(10)

Extended response question C2B

Give an account of obtaining food in animals by reference to co-operative hunting, dominance hierarchy and territorial behaviour. (10)

2B	1	(co-operative hunting means) animals/eg hunting in a social group/pack/team OR means working together in hunting/to get food	1
	2	advantage eg larger prey/more successful, less energy used/pursuit time per individual, net gain of energy is greater than by foraging alone	1
	3	another different advantage from list	1
	4	dominance hierarchy is a rank/pecking order within a social group	1
	5	consists of dominant/alpha and subordinate individuals NOT smaller, weaker, larger, stronger, leader	1
	6	in feeding dominant/alpha individuals eat first (followed by subordinate) OR dominant get bigger share of food OR converse	1
	7	ensured survival of dominant when food scarce	1
	8	subordinate animal may gain more food than by foraging alone Penalise only once for lack of dominant ie at 5	1
		Max 2 from 1 – 3 and max 3 from 4 – 8	5
	9	territory is (an area) marked/defended for feeding/hunting	1
	10	ensures a food supply/must contain enough food OR the more food available the smaller the territory OR converse	1
	11	territorial behaviour reduces competition	1
	12	energy expended in marking, patrolling, defending	1
	14	gain of energy increased by lack of competition OR foraging made more economical	1
		Any 3 from 5	3
C		divided into paragraphs eg Cooperative hunting/dominance hierarchy and Territorial behaviour at least 3 points from cooperative hunting and dominance hierarchy (1 – 8) and 2 points from territorial behaviour (9 – 13) Both	1
		Note that separate paragraphs for cooperative hunting and dominance hierarchy acceptable but not essential.	
R		no specific mention of individual foraging, mating behaviour or social defence at least 3 points from cooperative hunting and dominance hierarchy and 2 points from territorial behaviour Both	1 2
			(10)

[END OF MARKING INSTRUCTIONS]