

Question number	Answer	Additional guidance	Mark
1(a)	Box A gross primary productivity (1) Box B (plant) respiration (1)	NB Both correct for one mark ACCEPT GPP ACCEPT R energy lost by respiration DO NOT ACCEPT energy lost for respiration	(1)

Question number	Answer	Additional guidance	Mark
1(b)(i)	organisms interacting with each other AND with (physical / chemical) environment	ACCEPT species / plants and animals / biotic factors IGNORE habitat ACCEPT abiotic factors / non-living environment e.g. all organisms interacting with each other and the abiotic factors	(1)

Question number	Answer	Mark
1(b)(ii)	D $\text{kJ m}^{-2} \text{yr}^{-1}$ The only correct answer is D <i>A is incorrect because it is kJ not kg and should be m^{-2}</i> <i>B is incorrect because it is kJ not kg and should be yr^{-1}</i> <i>C is incorrect because it should be m^{-2}</i>	(1)

Question number	Answer	Additional guidance	Mark
1(b)(iii)	A calculation that shows the following steps: - percentage of NPP contained in the roots (1) - units of NPP calculated (1) OR - units of NPP in leaves and wood calculated (1) - units of NPP in leaves and wood subtracted from 11 700 (1)	Example of calculation 27 3159 3978 and 4563 / 8541 3159 Correct answer with no working gains 2 marks IGNORE any units given	(2)

Question number	Answer	Mark
1(a)(i)	The only correct answer is D. A is incorrect because cutting grass is biotic and competition is biotic B is incorrect because cutting grass is a biotic factor C is incorrect because cutting grass is biotic	(1)

Question number	Answer	Mark
1(a)(ii)	The only correct answer is C. A is incorrect because $0.7 \times 100 \div 0.3 = 233.3$ B is incorrect because $0.7 \times 100 \div 0.3 = 233.3$ D is incorrect because $0.7 \times 100 \div 0.3 = 233.3$	(1)

Question number	Answer	Additional guidance	Mark
1(a)(iii)	An answer that includes two of the following points: - in the cut field the grass is faster growing reducing the light available to other plants (1) - in the cut field the grass is faster growing and absorbing {water / mineral ions / named mineral ion} (1) - bushes are slower growing so have not got time to grow before they are cut back (1) - bushes damaged during the cutting process (1)	ACCEPT bushes become established and shade the grass ACCEPT bushes become established and take up the {mineral ions / water}	(2)

Question number	Answer	Mark
1(b)(i)	The only correct answer is D. <i>A is incorrect because P is not the middle value and this is not a bar chart</i> <i>B is incorrect because P is not the middle value</i> <i>C is incorrect because this is not a bar chart</i>	(1)

Question number	Answer	Additional guidance	Mark
1(b)(ii)	2		(1)

Question number	Answer	Additional guidance	Mark
1(b)(iii)	1 : 2.049	ACCEPT 1 : 2.05 / 1 : 2 DO NOT ACCEPT 1 : 2.1	(1)

Question number	Answer	Additional guidance	Mark
1(b)(iv)	class 2 mosses have (about) twice the genome size of class 1 mosses		(1)

Question number	Answer	Additional guidance	Mark
3(a)(i)	An answer that includes the following points: - a place where organisms live (1) (African) Plains is the place and the organisms are the {lions / giraffes / (acacia) trees} (1)	NB the African Plains is where {lions / giraffe / (acacia) trees} live = 2 marks	(2)

Question number	Answer	Additional guidance	Mark
3(a)(ii)	An answer that includes the following points: - organisms of one species found in a particular area (1) {(one from) lions / giraffe / (acacia) trees} found on the (African) Plains (1)	ACCEPT type for species	(2)

Question number	Answer	Additional guidance	Mark
3(a)(iii)	An answer that includes the following points: - a group of organisms of different species interacting in a particular area (1) - lions, giraffes and (acacia) trees on the (African) plains (1)	ACCEPT {dependent / rely} on each other for interacting ACCEPT two of the named organisms	(2)

Question number	Answer	Additional guidance	Mark
3(a)(iv)	An answer that includes two of the following points: - the role of an organism in its habitat (1) One of the following (acacia) trees provide food for giraffes (1) (acacia) trees provide shade for the lions (1) - giraffes provide food for lions (1) - giraffes keeping the {size / number} of (acacia) tree under control (1) - lions keep the number of giraffes under control (1) {lions / giraffes} are a source of mineral ions for the (acacia) trees (1)		(2)

Question number	Answer	Additional guidance	Mark
3(b)	8.42 / 8.4 / 8 (%)		(1)

Question number	Answer	Additional guidance	Mark
7(a)	83 / 83.0 / 83.3 / 83.33 (%) (1)	DO NOT ACCEPT any other values including recurring numbers e.g. 83.3 IGNORE {decrease / - / ↓}	(1)

Question number	Answer	Additional guidance	Mark
*7(b)(i)	Table: - Tasmanian devils spend less time feeding in cancer areas (D) - because there are fewer Tasmanian devils in these areas (E) - because they have died from the cancer (E) - because they are sick and get chased away by the other scavengers (E) - because they are sick and have lost their appetite (E) {ravens / quolls / cats} all spend longer feeding in cancer areas (D) - because there are fewer Tasmanian devils (E) - therefore more food to go round / less competition (E) - because there are fewer Tasmanian devils to frighten them away (E) - because sick Tasmanian devils are too ill to chase scavengers away (E) - ravens, quolls and feral cats in similar proportions in both areas (D) - because they eat different parts of the carcass (E) - so are not in competition with each other (E) Graph: - carcasses in cancer areas are lasting longer than those in the healthy area (D) - because there are fewer Tasmanian devils to feed on the carcass (E) - because they are sick and have lost their appetite (E) - because scavengers do not eat as fast as Tasmanian devils (E) - because scavengers do not eat all the carcasses (E) - but they eventually breakdown by {decomposers / other scavengers} (E)	ACCEPT converse throughout where appropriate Level 1: 1 mark = one description only 2 marks = two descriptions OR one simple explanation Level 2: 3 marks = more than one explanation from either table or graph 4 marks = explanations for both table and graph Level 3: 5 marks = explanations for both table and graph, one of which is extended 6 marks = to include extended explanations for both table and graph NB Extended explanation either offers two alternative explanations or has two steps to it	(6)

Question number	Answer	Additional guidance	Mark
7(b)(iii)	An explanation that includes four of the following points: (type or number) {microorganisms / insect species} that decompose the carcasses (1) - other species of scavengers as they would also feed on the carcasses (1) - people as this could frighten away the {scavengers / Tasmanian devils} (1) - other predators because they could affect the number of {scavengers / Tasmanian devils} feeding (1) - pathogens as they could affect the number of {scavengers / Tasmanian devils} feeding (1)	ACCEPT competing for carcass ACCEPT named activity of people and the effect NB If no marks awarded, allow 1 mark for a named biotic factor from the mark scheme	(4)