

Food Chains and Pyramids of Biomass 2 MS

QUESTION 1

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	<p>a triangular-shaped pyramid, with 4 layers – widest at the bottom labels in food chain order (from widest part) ie plankton—herring— tuna – parasitic / worms</p> <p>eg</p>	<p>either in blocks or as a triangle</p> <p>upside down labelled pyramid with producer at top gains 2 marks upside down labelled pyramid with producer at bottom gains 1 mark mark for labels unlabelled upside down pyramid = 0 marks accept separate boxes correct food chain with correct arrows if given gains 1 mark</p>	<p>1</p> <p>1</p>
a)ii)	<p>any two from:</p> <ul style="list-style-type: none"> ✗ waste / excreted / urine / faeces / CO₂ (from tuna) ✗ respiration (of tuna) ✗ movement (of tuna) / hunting ✗ used for heat (production) (of tuna) ✗ not digested / absorbed 	<p>from / of tuna not required but do not accept if of / from other organisms ignore used in reproduction if a mark is not awarded for respiration / movement / heat allow 1 mark for energy (unqualified)</p>	2
b)i	40	<p>award both marks for correct answer, irrespective of working allow $(290 - 50)/6$ or $240/6$ for 1 mark allow 48.3 / 48 1 3 / 48 for 1 mark</p>	2
b)ii)	cost of food / protein		1

c)	any one from: concern about animal welfare or examples or cruel to tuna or unethical or lack of space poorer flavour / quality	allow immoral ignore not natural	1
Total marks			8

QUESTION 2

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)	the sun / light / sunshine / solar	allow radiation from the sun ignore photosynthesis / respiration apply list principle do not allow water / minerals / heat	1
b)	2.5 (:1)	correct answer with or without working ignore rounding with correct working do not allow other equivalent ratios for both marks evidence of selection of 10(insects) and 4(frogs) or 50 and 20 or 1 and 0.4 for 1 mark if no other working allow 1 mark for 0.4:(1) on answer line	2
c)	any two from: ✘ some parts indigestible / faeces ✘ waste / examples of waste eg urea / nitrogenous compounds / urine / excretion ✘ movement / eg of movement ✘ heat ✘ not all eaten / eg of not all eaten ✘ respiration	allow for insects or frogs allow energy for biomass allow keeping warm do not accept energy for respiration	2
d)	any four from: •(bodies) consumed by animals / named / scavengers / detritus feeders •microorganisms / bacteria / fungi / decomposers •reference to enzymes •decay / breakdown / decompose / rot •respiration •carbon dioxide produced	ignore digest(ion) accept other organic molecules must be linked with fossilisation / fossil fuels	4

	<ul style="list-style-type: none"> •photosynthesis •sugar / glucose produced •fossilisation / fossil fuels / named •combustion / burning •(burning) produces carbon dioxide 	allow carbon dioxide produced once only	
Total marks			9

QUESTION 3

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)	three layer triangular pyramid soya / beans / food - trout / fish - people / human (in sequence)	either way up (as blocks or triangle) ignore reference to producers / herbivores / consumers award 1 mark only for a correct food chain with 2 correct arrows showing energy flow	1 1
b)	the trout release energy when they respire some energy will be lost in waste from the trout		1
c)	any one from eg <ul style="list-style-type: none"> • easy / easier to catch / more caught • easy / easier to feed • no / less predation •less energy loss •less movement 	allow easy / easier to monitor allow control food allow less fishing / poaching allow grow faster ignore less space to move do not allow easier to farm	1
d)	any two from: <ul style="list-style-type: none"> • microorganisms / bacteria / decomposers / microbes / fungi / detritus feeders • decay / rot / decompose / digest /break down (microorganisms) respire • turned into fossil fuels / named fossil fuels • carbon dioxide / CO2 released 	ignore biodegrade do not award this mark if response implies the trout respire	2
Total marks			7

QUESTION 3

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	6000	award 2 marks for correct answer irrespective of working allow 1 mark for 20 x 300 with incorrect or no answer	2

		allow answer in table if answer line blank	
a)ii)	bar width 6000 or to match answer to (a)(i) drawn below slugs	anywhere on scale ignore depth / height of bar label not required	1 1
b)	any three from: respiration (by hedgehog) ✗ (results in) loss of CO ₂ faeces (of hedgehog) or not digested ✗ excreted / urine / urea (by hedgehog) ✗ not all slug(s) are eaten (by hedgehogs) or some slugs eaten by other things	ignore reference to size / mass / number of organisms assume reference is to / of hedgehog unless stated otherwise do not accept idea that respiration uses / produces energy accept waste for 1 mark if neither faeces nor excretion point made ignore sweat alone ignore some slugs die ignore reference to movement / heat / growth allow references to energy losses by these methods, rather than biomass losses	3
Total marks			7

QUESTION 4

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	tick in box of FIRST pyramid		1
a)ii)	any one from: ✗ less energy / biomass lost / wasted ✗ greatest biomass / energy for humans ✗ shortest food chain or less stages or least number of different organisms or only one predator or only 2 boxes tall or least boxes	ignore human box is bigger ignore 'food' for humans allow only one stage	1
b)i)	any two from: ✗ quicker / more growth or grow	assume for pigs indoors allow converse if clear for pigs 2	2

	fatter ✕ less urine or less faeces ✕ less heat (lost) ✕ less movement	outdoors do not allow no for less ignore less space	
b)ii)	any one from: ✕ less cruelty or more ethical or better animal welfare ✕ better flavour / quality (of meat) ✕ less pollution / etc / less fossil fuel used for heating	assume for pigs outdoors allow converse if clear for pigs indoors ignore more natural ignore ideas referring to against God's will ignore pig health or free range / organic ignore quality of life	1
Total marks			5

QUESTION 5

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	20		1
a)ii)	one tenth / 0.1 / 10% / 1:9 / 1 in 10 / 1 out of 10 / 1/10	for correct answer irrespective of working 2 marks ignore any units accept equivalent fractions eg 4/40 / 2/20 do not allow eg 1:10 / 1 to 10 if answer is incorrect clear selection of 2 and 20, or equivalent or 1:4:5 / 1:5:4 gains 1 mark	2
b)	any two from: ⊖ (body) heat / maintaining body temperature ⊖ movement (max 2) growth / cell division / repair / reproduction / building molecules ⊖ accept active transport	do not accept sweating / cooling / excretion allow keep warm allow 2 different examples of movement, internally and / or externally eg breathing / exercise / eating / circulation allow muscle contraction if no other muscle action is credited movement + breathing = 1 mark allow examples eg making proteins (from amino acids) ignore 'chemical reactions' / digestion	2
c)	more movement / have to hunt /	allow converse if stated for	1

	catch food	herbivore eg herbivores food is all around ignore reference to size or predator unqualified	
d)	any two from ⊖ less movement ⊖ less heat loss ⊖ less respiration	ignore reference to food allow no movement allow less space to move ignore less space unqualified allow no heat loss or they are kept warm	2
Total marks			8

QUESTION 3

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)	16	accept correct answer for 2 marks, irrespective of working if no answer or answer incorrect accept $0.64 \times 100 / 4 (.0)$ or 0.16 for 1 mark	2
b)	insect cold-blooded / not warm blooded or does not control body temperature reference to insect 0.96 (kJ) and mammal 12.25 (kJ) transferred by respiration or relevant calculation of this transfer (less respiration) so more energy / biomass / food available (for growth of insect)	accept mammal warm-blooded / constant (high) body temperature / controls body temperature ignore references to other data (more respiration) so less energy / biomass / food available (for growth of mammal)	1 1 1
Total marks			5