

Decay 2 MS

QUESTION 1

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	without oxygen	ignore reference to air	1
a)ii)	otherwise difficult to stir / to pump/ to transfer	allow prevent 'clogging'	1
a)iii)	need to stir / pump / heat		1
b)i)	rises then falls then levels / slight rise quantitative descriptor eg to 80% / max. on day 4 / min. on day 16	accept other valid quantitative descriptor	1 1 1
b)ii)	16 (15.5 to 16.4)		1
c)	oxygen present (CO ₂ produced) by aerobic respiration or not much anaerobic respiration or not much methane / CH ₄ produced		1 1
Total marks			9

QUESTION 2

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	(initially there is) oxygen (so) aerobic respiration (by microorganisms) producing CO ₂ (which does not burn)	accept: oxygen hasn't been used up yet (so not anaerobic conditions yet) (because) methane is produced in anaerobic (fermentation) there is no methane ignore inflammable	1 1 1
a)ii)	(peelings had) the most carbohydrate / organic material	answer must be comparative accept contained more microorganisms / decomposers / bacteria ignore water do not allow fat or protein	1
b)i)	0.22 / 0.221	correct answer with or without working gains 2 marks allow 0.2 for 1 mark	2

		allow 22.1 for 1 mark allow $0.34 \times 65 / 0.65$ for 1 mark	
b)ii)	(sheep manure) produces a higher volume of biogas / almost double or produces 0.27 (m3 per kg) more (sheep manure) produces biogas with a higher percentage methane or produces 2% more methane	accept 0.408(7) / 0.41 / 0.409 (m3) from sheep for 2 marks accept 0.1877 / 0.188 / 0.19 (m3) more than cow's manure for 2 marks allow correct difference in volume calculated using 0.408(7) / 0.41 / 0.409 minus answer given in 7(b)(i) for 2 marks	1 1
Total marks			8

QUESTION 3

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)	methane / CH ₄		1
b)	any two from: <ul style="list-style-type: none"> • didn't carry out repeats • only tested four types of manure • don't know the mass of manure was the same each time • inaccuracies in measuring (diameter of) balloon • bottles might have been different sizes • temperature of the room may have been different 		2
c)	The potato contains a lot of carbohydrate		1
Total marks			4

QUESTION 4

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	(compost produced) quicker / faster / takes less time	it = tumbler bin answers should be comparative eg only 6 weeks = 1 mark 6 weeks = 0 marks	1
a)ii)	any two from:	it = fixed bin	2

	takes less space cheaper (to buy) don't need to turn / rotate it	references to space and cost should be comparative do not accept unqualified data	
b)i)	any two from: faster rise (in tumbler) higher (in tumbler) or 2 correct number readings levels off (in tumbler) or continues to rise in fixed	it = tumbler bin ignore eg faster compost	2
b)ii)	microorganisms / microbes / decomposers aerobic	allow bacteria / fungi / detritus feeders / worms / other named examples of detritus feeders / mould allow air(y) allow oxygen(ated)	1 1
b)iii)	faster respiration / decay / or microorganisms / microbes / decomposers work faster (in tumbler) so more heat produced (in tumbler) OR more air / more oxygen(ation) (in tumbler) (1) so more respiration / faster decay / bacteria work faster (in tumbler) (1)	allow converse allow bacteria / fungi / mould ignore heat produced by friction	1 1
Total marks			9

QUESTION 5

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)	8.05 / 8.1 / 8	correct answer with or without working gains 2 marks allow 1 mark for 8.0 or 8.10 allow 35/100 x 23 (million) for 1 mark if no answer or incorrect answer allow 1 mark for 805 or 8 050 000	2
b)i)	any one from: <ul style="list-style-type: none"> • less landfill sites used • less cost (of landfill sites) / saves money • less effort / cost to collect 	allow less to collect	1

b)ii)	compost can be used on garden	allow idea of compost can be used to help plant growth or compost provides minerals / named or compost improves the soil	1
Total marks			4

QUESTION 6

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)	microorganisms (microorganisms) respire (respiration / decay / microorganisms) releases (thermal) energy / 'heat'	allow microbes / bacteria / fungi / decomposers do not allow dead plants respire ignore produce 'heat' do not allow produce energy do not allow dead plants release 'heat'	1 1 1
b)i)	any three from: <ul style="list-style-type: none"> • (opening) allows oxygen in • microorganisms / eggs need oxygen • oxygen needed for respiration • (opening) allows release of carbon dioxide (from microorganisms / respiration / eggs) • (opening) allows energy / 'heat' to escape • (closing) retains energy / 'heat' if too cool / at night • (closing) retains moisture 	allow air for oxygen allow gaseous exchange (1 mark) of / for microorganisms / eggs (1 mark) if none of first four points given if no mark awarded for either of these points allow 1 mark for vents open in the day to prevent overheating and close at night to prevent it getting too cold allow (opening) releases moisture	3
b)ii)	any one from: <ul style="list-style-type: none"> • maintains sex balance • (survival of species depends on there being) males and females in population 	e.g. equal / best / correct numbers of male and female allow so the offspring are not all the same sex	1
Total marks			7

QUESTION 7

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)	any two from: <ul style="list-style-type: none"> • amount of waste on each heap • (type of) materials on each heap • put heaps in same (environmental) conditions 	allow size of heap if neither marking points one or two awarded, allow 1 mark for same waste eg keep at same (outside) temperature allow put in same place	2
b)	microorganisms / microbes / bacteria / fungi / decomposers	ignore detritivores / examples (such as worms, maggots, insects) ignore pathogens / germs do not allow viruses	1
c)i)	oxygen / air added (when turning over)	allow idea that decay will be aerobic allow bacteria / microorganisms need oxygen / air allow (microorganisms) respire faster	1
c)ii)	any two from: <ul style="list-style-type: none"> • dead leaves / fruit / plants (fall off / onto the ground) • (fallen dead leaves / fruit / plants) decay • minerals / ions / nutrients are recycled / released 	ignore references to carbon dioxide allow animal waste or dead animals	2
Total marks			6