

Photosynthesis

QUESTION 1

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	<p>the short bushes grow next to the house</p> <p>plants will grow faster if they get more light</p> <p>a conclusion</p> <p>a prediction</p> <p>an observation</p>	both correct = 2 marks one correct = 1 mark extra line from a statement cancels the mark	2
a)ii)	1st space: carbon dioxide 2nd space: glucose / sugar / starch / carbohydrate	allow CO ₂ (ignore superscript) do not allow CO alone	1 1
b)i)	any one from: ✗ move lamp or change distance between lamp and plant ✗ change wattage / power of (light) bulb ✗ change voltage / power supply to the (light) bulb ✗ change the number of lamps ✗ put translucent material between lamp and plant	ignore measure the distance do not accept just "change bulb" accept examples, eg tracing paper / filters do not accept coloured filters	1
b)ii)	rises levels off	ignore numbers	1 1
b)iii)	idea that it levels off or does not increase at all light intensities or it only increases to a certain amount	answers should relate to photosynthesis and not to bubbling	1
Total marks			8

QUESTION 2

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	light (intensity)		1
a)ii)	any one from: <ul style="list-style-type: none"> ✗ same mass/amount of grain produced when more (magnesium) provided ✗ same mass / amount of grain at 0.1 and 0.15g 		1
a)iii)	magnesium used for chlorophyll (production) for photosynthesis		1 1
b)	extra cost (of fertiliser) not matched by (much) extra productivity	accept not cost effective or waste of money / fertiliser accept answers relating to effect of leaching	1
Total marks			5

QUESTION 3

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	oxygen produced		1
a)ii)	any one from: <ul style="list-style-type: none"> • average / mean / median • some may be anomalous 	ignore reliable / precise / accurate allow some may not float	1
b)i)	any two from: <ul style="list-style-type: none"> • low intensity / below 12.5 / 2.5 – 12.5 (units of light) flat wrack / it, rate of photosynthesis faster or saw wrack rate of photosynthesis slower • high intensity / above 12.5 / 12.5 – 15 (units of light) flat wrack / it, rate of photosynthesis slower or saw wrack rate of photosynthesis faster • same (rate) at 12.5 units 	do not allow answers in terms of time only if candidate answers in terms of comparing rate of change then the rate of change of photosynthesis must be in the correct direction for 1 mark allow any value in range allow any value in range	2
b)ii)	any two from: <ul style="list-style-type: none"> • saw wrack receives less light • less photosynthesis <p>or</p>	accept converse if clear reference to bladder wrack if first and second responses, 'less' needed only once	2

	less carbohydrate / sugar / starch production • when tide is in or at high tide or any tide above low tide	accept saw wrack covered by water / submerged longer / more reference to position on shore is insufficient	
Total marks			6

QUESTION 4

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	colour of light / bulb / lamp	allow wavelength for colour allow bulb alone do not accept light / colour unqualified	1
a)ii)	any one from eg ✗ temperature ✗ light intensity or distance between lamp and plant / tube ✗ carbon dioxide ✗ other light in room ✗ mass / size / amount / age / type of pondweed ✗ volume / amount of water	allow heat allow amount / brightness of light ignore light unqualified allow symbols allow use a dark room allow same piece of pondweed ignore pondweed unqualified ignore reference to time	1
a)iii)	improved reliability or can spot anomalies / changes	allow for reliability or less likely to lose count allow reference to calculating a mean / average ignore reference to accuracy / precision / fair	1
b)i)	green		1
b)ii)	any two from: ✗ least / less bubbles / gas / oxygen / mean ✗ least / less photosynthesis ✗ least / less glucose / sugar / carbohydrate / food made	ignore references to colour reference to least / less needed only once, in context, for 2 marks only penalise no once, ie no bubbles = 0 mark no bubbles so no photosynthesis = 1 mark allow most / more green light reflected (by chloroplasts)	2
Total marks			6

QUESTION 5

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)	any one from: <ul style="list-style-type: none">• add a water bath• heat screen• use LED• low energy bulb / described	ignore 'check temperature'	1
b)i)	rate / number of bubbles decreases or less oxygen / gas released	accept converse with reference to increasing light or shorter distance ignore reference to rate of photosynthesis	1
b)ii)	temperature / CO ₂ (concentration)	accept 'it was too cool' or not enough CO ₂ accept number of chloroplasts / amount of chlorophyll allow heat allow CO ₂ do not allow CO ₂	1
Total marks			3