

# Photosynthesis 3 MS

## QUESTION 1

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)	LHS - carbon dioxide / CO <sub>2</sub>  RHS glucose / carbohydrate / sugar oxygen	allow CO <sub>2</sub> ignore CO <sub>2</sub> in either order allow starch allow C <sub>6</sub> H <sub>12</sub> O <sub>6</sub> / C <sub>6</sub> H <sub>12</sub> O <sub>6</sub> ignore C <sub>6</sub> H <sub>12</sub> O <sub>6</sub> allow O <sub>2</sub> /O <sub>2</sub> ignore O <sub>2</sub> / O	1  1 1
b)	any five from: <ul style="list-style-type: none"> <li>• factor 1: CO<sub>2</sub> (concentration)</li> <li>•effect - as CO<sub>2</sub> increases so does rate and then it levels off or shown in a graph</li> <li>•explanation: (graph increases) because CO<sub>2</sub> is the raw material or used in photosynthesis / converted to organic substance / named eg or (graph levels off) when another factor limits the rate.</li> <li>•factor 2: temperature</li> <li>• effect - as temperature increases, so does the rate and then it decreases</li> <li>•or shown in a graph</li> </ul> explanation: (rise in temp) increases rate of chemical reactions / more kinetic energy or (decreases) because the enzyme is denatured.	allow warmth / heat allow 'it peaks' for description of  both phases  allow molecules move faster / more collisions  context must be clear = high temperature allow other factor plus effect plus explanation: eg light wavelength / colour / pigments / chlorophyll / pH / minerals / ions / nutrients / size of leaves 2nd or 3rd mark can be gained from correct description and explanation	5
Total marks			8

## QUESTION 2

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)	light is trapped / absorbed / used	extra answers cancel mark ignore solar / sunshine	1
	by chlorophyll / chloroplasts	if no other marks awarded, allow 1 mark for photosynthesis / equation for photosynthesis	1
b)	(to make) starch (for storage)	ignore 'for growth' unqualified ignore respiration	1
	(to make) fat / oil (for storage)		1
	(to make) amino acids / proteins / enzymes	allow for active transport allow any other correct, named organic substances (eg DNA / ATP / chlorophyll / hormone)	1
	(to make) cellulose / cell walls	if no named examples, allow 'to make named cell structures' for max. 1 mark	1
Total marks			6

## QUESTION 3

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	LHS = water	accept H <sub>2</sub> O	1
	RHS = oxygen	do not accept H <sub>2</sub> O / H <sub>2</sub> O accept O <sub>2</sub> do not accept O / O <sub>2</sub> / O <sub>2</sub>	1
a)ii)	light / sunlight	ignore solar / sun / sunshine do not allow thermal / heat	1
a)iii)	chloroplasts	allow chlorophyll	1
b)i)	20		1
b)ii)	any one from: <ul style="list-style-type: none"> <li>• light (intensity)</li> <li>• temperature</li> </ul>		1
c)i)	To increase the rate of growth of the tomato plants		1
c)ii)	Because it would cost more money than using 0.08%		1
	Because it would not increase the rate of photosynthesis of the tomato plants any further		1
Total marks			9