

WJEC (Eduqas) Biology GCSE
Topic 5 Photosynthesis
Questions by Topic - Mark
Scheme

1.

Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
(a)	2	Water; Oxygen;	H ₂ O O ₂	Sunlight or Chlorophyll on arrow	H ₂ O O ₂
ii	I	B and C;			
	II	A and B;			

2.

Question	Marking details	Marks Available
(a)	(i) {Carbon dioxide/CO ₂ } and {oxygen/O ₂ };	1
	(ii) Chlorophyll;	1
(b)	(i) Increases then {steady/plateau/reference to constant}; (increases) up to 4 a.u.;	2
	(ii) Two correct readings (13.5 & 16.5); Correct calculation (3 a.u.); Correct answer = 2 marks Allow one mark for two correct readings if answer incorrect	2
	(iii) {Carbon dioxide/CO ₂ }; NOT light/ temperature	1
(c)	Starch; (formation of) cell walls;	2
	Question 2 total	[9]

3.

Question	Marking details	Marks Available
3 (a)	<u>carbon dioxide/CO₂</u> (not CO ² or Co ₂ etc) required for <u>photosynthesis/starch manufacture</u> ;	1
(c)	Control/ to make a comparison;	1
(d)	because you wouldn't know whether it was the lack of light or lack of carbon dioxide which prevented photosynthesis/starch production; Answer must refer to <u>both</u> carbon dioxide and light limiting photosynthesis	1

4.	Question	Marking details	Marks Available
	(a)	Carbon dioxide/CO ₂	1
	(b)	As temperature increases salt concentration increases; as water is evaporated; (only awarded if 1 st mark awarded)	2
	(c)	<ul style="list-style-type: none"> • Osmosis; (reject if salt water or salt or solutions are moving) • (When salt concentration is high) – water is lost; • Correct statement about water potential/water moves {from where it is in high concentration to where it is in low concentration/ down a concentration gradient} (related to animals/surrounding solution); • Correct mention of selectively permeable membrane/ other correct form of words; 	1 1 1 1
	Question 4 total		[7]

5.	Question	Marking details	Marks Available
	(a)	To show <u>carbon dioxide</u> / CO ₂ (not CO ₂ ²) is needed for <u>photosynthesis</u> / <u>starch</u> production;	1
	(iii)	Control/ correct ref to using B to compare to A/ to make a comparison;	1
	(iv)	Form an air tight seal/ make the apparatus air tight / prevent {gases/ carbon dioxide/ air} going in or out of the apparatus; NOT oxygen (can be neutral);	1

6.	Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
	(a)	2	palisade; spongy;			sponge
	(b)	1	photosynthesis;			

Question			Marking details	Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
7.	(a)	(i)	A – Carbon dioxide (1) B – Oxygen (1)	2			2		
		(ii)	{Gas A/ carbon dioxide} is the lowest and photosynthesis is highest (at midday) (1) because carbon dioxide is used for photosynthesis (1) {Gas B/ oxygen} is the highest and photosynthesis is highest (at midday) (1) because oxygen is produced by photosynthesis (1)		1 1	1 1	4		
		(iii)	Cloudier / less light/ lower temperature/ colder/ less sun			1	1		
		(iv)	49.75/ 49.8/ 50 = 2 marks If incorrect award 1mark for (46+26+76+51)/4 or 199/4 or 49.7		2		2	2	
	(b)		Light		1		1		
			Question total	2	5	3	10	2	0

8.	Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
	(a)	1	carbon dioxide + water glucose + oxygen	Correct symbols	Ignore chlorophyll/ light written above/ below arrow.	If these terms are written anywhere else in the equation then do not award the mark
	(b)	I	1 the sugar concentration/ it/ glucose increases; 1 because <u>light</u> is available for <u>photosynthesis</u> ; (2nd mark only awarded if 1st mark awarded)	sunlight		Sun/ daytime
		II	1 {No light/ not enough light} for photosynthesis/ it is dark so no photosynthesis takes place; 1 {Sugar/ it/ glucose} decreases; 1 Because sugar used in cell respiration or converted to starch; 3 rd mark only awarded if 2 nd mark awarded			
	Total Mark	6				

9.	Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
	(a)	1 1	Light; Water and Oxygen;	sunlight		Sun/ solar

10.	Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
	(b)	(i)	1 Carbon dioxide and Oxygen;	Correct formulae		
		(ii)	1 Absorbs/ takes in light;	trap	Uses/ sun	Picks up/ attracts/
	Total Mark	5				

11.

Question			Marking details	Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
	(a)	(i)	A – light / sunlight/ light energy/ solar energy (1) NOT sun B – carbon dioxide/ CO ₂ (1) NOT CO ² / CO2 C – chlorophyll (1) ignore chloroplast		3		3		
		(ii)	B1 should contain {a liquid which doesn't affect the experiment/ water/ sodium bicarbonate solution} (1) So that the volume in each flask is the {same/ equal} (1)			2	2		2

12.

Question			Marking details	Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
(a)	(i)		carbon dioxide + water (1) → Glucose + oxygen (1)	2			2		
	(ii)		chlorophyll	1			1		
(b)			14 = 2 marks If incorrect award 1 mark for incorrect rounding e.g. 14.333		2		2	2	
(c)			greater the distance the lower the number of bubbles (1) there is less {light/ light intensity}(1) less photosynthesis (1) Accept reverse argument for each point		1	2	3		
(d)			absorbs heat (but lets light through)/ ref. keeping temperature of experiment constant (1)			1	1		1
(e)			collect <u>volume</u> of gas (1)			1	1		1
			Question 12 Total	3	3	4	10	2	2

13.	Question	Marking details	Marks Available
13	(a)	(i) Carbon dioxide CO ₂ ; NOT Co Water/H ₂ O;	2
		(ii) Chlorophyll;	1
	(b)	(i) I suitable scale;	1
		II all plots correct; (tolerance +/- 0.5 small square)	2
		1 error = 1 mark, 2 errors = 0 mark	
		III line quality;	1
		(ii) I rises/increases;	1
		II 22-25	1
		(iii) Same plant/same time;	1
		NOT – ref to repeating/reliability	

14.

Question			Marking details	Marks Available
14			<p>Indicative content</p> <p>plants use chlorophyll to absorb light energy. convert carbon dioxide and water into glucose and oxygen glucose can be changed to starch and stored used to make cellulose/ proteins light, temperature and carbon dioxide are limiting factors</p> <p>5 – 6 marks The candidate constructs an articulate, integrated account correctly linking relevant points, such as those in the indicative content, which shows sequential reasoning. The answer fully addresses the question with no irrelevant inclusions or significant omissions. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar.</p> <p>3 – 4 marks The candidate constructs an account correctly linking some relevant points, such as those in the indicative content, showing some reasoning. The answer addresses the question with some omissions. The candidate uses mainly appropriate scientific terminology and some accurate spelling, punctuation and grammar.</p> <p>1 – 2 marks The candidate makes some relevant points, such as those in the indicative content, showing limited reasoning. The answer addresses the question with significant omissions. The candidate uses limited scientific terminology and inaccuracies in spelling, punctuation and grammar.</p> <p>0 marks The candidate does not make any attempt or give a relevant answer worthy of credit.</p> <p>Question 14 Total</p>	<p>6</p> <p>[6]</p>

15.

Question			Marking details	Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
(a)			<ul style="list-style-type: none"> photosynthesis produces {oxygen/ O₂} / {oxygen/ O₂} is a bi-product of photosynthesis (1) Not O² or o² Reject equation on own Therefore if the production of O₂ {increases/decreases}/ if there is {more/less} O₂ (1) (The rate of) photosynthesis is {increasing/decreasing}. (1) <p>The more oxygen the more photosynthesis = 2 marks This question relates to the 'rate of photosynthesis' and not to whether the plant is photosynthesising or not</p>		3		3		3
(b)			<p>Any 1 from:</p> <ul style="list-style-type: none"> Increasing light intensity has no effect on O₂ production/photosynthetic rate Increasing CO₂ concentration has no effect O₂ production/ photosynthetic rate (1) Increasing temperature increases O₂ production/ photosynthetic rate (1) <p>Any 1 from:</p> <ul style="list-style-type: none"> Therefore temperature must be the <u>limiting factor</u> the temperature is <u>too low</u> to increase O₂ production/ photosynthetic rate (1) 			2	2		2
(c)			<p>CO₂ was the limiting factor (1)</p> <p>Any 1 (x1) from:</p> <ul style="list-style-type: none"> {Increasing/ change in} temperature has no effect on O₂ production/ photosynthetic rate {Increasing/ change in} light intensity has no effect on O₂ production/photosynthetic rate Only when carbon dioxide concentration increases does the photosynthetic rate increase 			2	2		2
(d)			To prevent {gases/ air/ oxygen/ carbon dioxide} {entering/leaving}		1		1		1
(e)			<p><i>Factor</i> – light in the room/ light around the apparatus/ natural light OR temperature outside the container/room temperature (1)</p> <p><i>How factor could be controlled –</i> LIGHT – place in dark/ black out container/make the container light proof/carry out expt in a (light proof) cupboard (1) NOT turning lights off in room/ opening windows to adjust light OR TEMPERATURE – container needs thermostatic control/ OWTTE</p>		1	1	2		2
			Question 15 Total	0	5	5	10	0	10