(Photosynthesis (equation, limiting factors, uses of glucose))

Q1.(2019)

LHS:
carbon dioxide **and** water

RHS:
glucose

Q2.(2020)

before arrow
carbon dioxide **and** water

after arrow
glucose

Q3.(2020)

light

(light) is captured / trapped / absorbed by chlorophyll / chloroplasts

Q4.a)(2020)

$$\frac{18.5 + 19.3 + 19.5}{3}$$

or

$$\frac{57.3}{3}$$

19.1 (cm^3/hour)

Q4.b)(2020)

a ring around 14.2

Q4.c)(2020)

any **one** from:

- scale / value was misread
- there was air / oxygen in the syringe / measuring cylinder / apparatus
- the lamp / light was moved

- temperature changed
- had different mass / length of pondweed
- pondweed had not acclimatised

Q4.d)(2020)

did not use it in calculation (of mean)

Q4.e)(2020)

any **one** from:

- light (intensity)

- carbon dioxide (concentration)
- pondweed size / amount
- pondweed species

Q4.f)(2020)

enzyme(s) lose the shape of the active site

Q4.g)(2020)

y-axis labelled '(rate of) photosynthesis in cm^3/hour'

suitable scale on y-axis

all points plotted to within ± ½ small square

correct curved line of best fit

Q5.a)(2020)

add Benedict's (solution / reagent to the liquid)

boil / heat

(if glucose is present the blue) colour changes to yellow / green / orange / brown / (brick)red

Q5.b)(2020)

add iodine solution / reagent (to the liquid)

(if starch is present) it changes colour to blue / black (from yellow / orange / brown)

Q5.c)(2020)

glucose from photosynthesis

(excess) glucose converted to starch

Q5.d)(2020)

starch (stores) have been converted to glucose

(so the glucose can be) used for respiration / (named) metabolic reactions
or (so the glucose can be) used to release energy

(because) there is no light to make (new / more) glucose by photosynthesis

Q5.e)(2020)

any **one** from:

- test roots / stems of plants (in the light and dark)
- test other species of plant
- measure the concentrations of glucose **and** starch
- vary the time in the dark / light
- test variegated leaves

Q6.(2023)

(lhs) $H_2O + CO_2$

and

(rhs) O_2

Q7.a)(2023)

to absorb / use many / more colours / wavelengths of light

Q7.b)(2023)

chlorophyll absorbs most **or** a lot of blue light

chlorophyll absorbs least **or** very little **or** not much green light

(so) discs in blue light took the least time to rise (to surface) because they photosynthesised faster / more
or
(so) discs in green light took the most time to rise (to surface) because they photosynthesised slower / less

use of data (from **Figure 10** and **Table 6**) eg approximately 80% of blue light absorbed

Q8.a)(2024)

Leaf 1 or covered with black paper
no light so no photosynthesis (occurs)

Leaf 2 or covered with transparent plastic
no carbon dioxide so no photosynthesis

Leaf 3 or not covered
light and carbon dioxide present so leaf can photosynthesise

for either Leaf 1 / 2
(so) glucose not made

(and therefore) glucose / sugar cannot be converted to starch

Q8.b)(2024)

(green) starch / present / positive
and
(white) no starch **or** not present **or** negative

Q8.c)(2024)

green part contains chlorophyll **and** white part does not

(so) light is absorbed by green part (but not by white part) so photosynthesis occurs and starch can be formed

Q8.d)(2024)

magnesium

Q8.e)(2024)

chlorosis

Q8.f)(2024)

(measure the) volume (of oxygen) released / produced in a given time
or
(count / number of) bubbles released / produced in a given time

Q9.a)(2024)

(a factor that) if increased would increase the rate (of a reaction)
or
(a factor that) prevents the rate (of a reaction) increasing

Q9.b)(2024)

increasing temperature while keeping the carbon dioxide (concentration) constant increases the rate (of photosynthesis)

increasing the temperature increases the movement of the molecules / particles / substrate
or
increasing the temperature increases the rate of enzyme activity

increasing carbon dioxide concentration increases (the concentration of) substrate / reactants

all rates plateau at a certain point due to another factor being limiting

Q9.c)(2024)

$$\text{light intensity} \propto \frac{1}{\text{distance}^2}$$