



**CHEMISTRY ONLINE**  
— **TUITION** —

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# BIOLOGY

## ENERGY TRANSFERS IN & BETWEEN ORGANISMS

Level & Board	AQA (A-LEVEL)
TOPIC:	PHOTOSYNTHESIS
PAPER TYPE:	SOLUTION - 2
TOTAL QUESTIONS	6
TOTAL MARKS	38

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## Photosynthesis - 2

1.

(a)

1440/90 = Divide 16 times

2000 x 2<sup>16</sup>

= 1.3x10<sup>8</sup>

2.

(a)

7.7%

(b) No standard deviation which shows overlap occurs so it is not due to chance

**OR**

No error bars

To show if overlap occurs so difference (in means) is not significant/due to chance

(c)

Reduced transfer of protons across thylakoid membrane

**OR**

Reduced chemiosmotic gradient/proton gradient across thylakoid membrane

So, less ATP produced

So less reduced NADP produced

So, light-independent reaction slows/stops

**OR**

Less reduction of GP to triose phosphate

**3.**

**(a)** Idea that energy is released from excited electrons that were lost from chlorophyll

**4.**

**(a)** The rate of photosynthesis will be measured by counting the number of oxygen bubbles produced by the Elodea plants in each 2-minute trail. After completing a number of experiments, students and teachers will discuss their findings in relation to macro-level factors that affect ecosystem health and climate change.

**OR**

Oxygen production / concentration and time.

**(b)**

Intensity of light

Amount of algae / photosynthesizing cells

Carbon dioxide concentration / partial pressure

**(c)**

pH increases

As more carbon dioxide removed for photosynthesis

**(d)** It's the wavelength of light so most of it is not absorbed, so there is less photolysis (or LDR) so the rate decreases

**OR**

Less absorption/more reflection of these wavelengths of light

Light required for light dependent reaction/photolysis

Represents green light/colour of chlorophyll

**5.**

**(a)**

- Geographical isolation
- Separate gene pools

- Variation due to mutation
- Different selection pressures
- Differential reproductive success
- Leads to change in alleles

**(b)**

Collect samples, mark and release

Method of marking cannot harm lizard

Leave sufficient time for lizards to distribute before collecting the second samples

Calculate the population size

**OR**

The mark-release-recapture method can be used to estimate the number of *Anolis sagrei* lizards on a Caribbean island. This method involves capturing a sample of lizards, marking them, releasing them back into their habitat, and then recapturing another sample at a later time. By comparing the number of marked lizards in the second sample to the total number of lizards captured, an estimate of the population size can be calculated.

**(c)**

- Higher concentration of carbon dioxide linked with respiration at night
- No photosynthesis in the dark
- Decrease in carbon dioxide as you increase height
- In light net uptake of carbon dioxide / use more carbon dioxide than produced / rate of photosynthesis greater than rate of respiration
- At ground level less photosynthesis / micro-organisms produce carbon dioxide.

**6.**

**(a)** Oxygen is produced in the light-independent reaction

The faster it's produced, the faster the light-dependent reaction occurs

**(b)**

Low light= 60

High light= 200

$200-60= 140$

4x15 mins in an hour

$140/4= 35$

**(c)**

At all light intensities, chloroplasts from mutant plants:

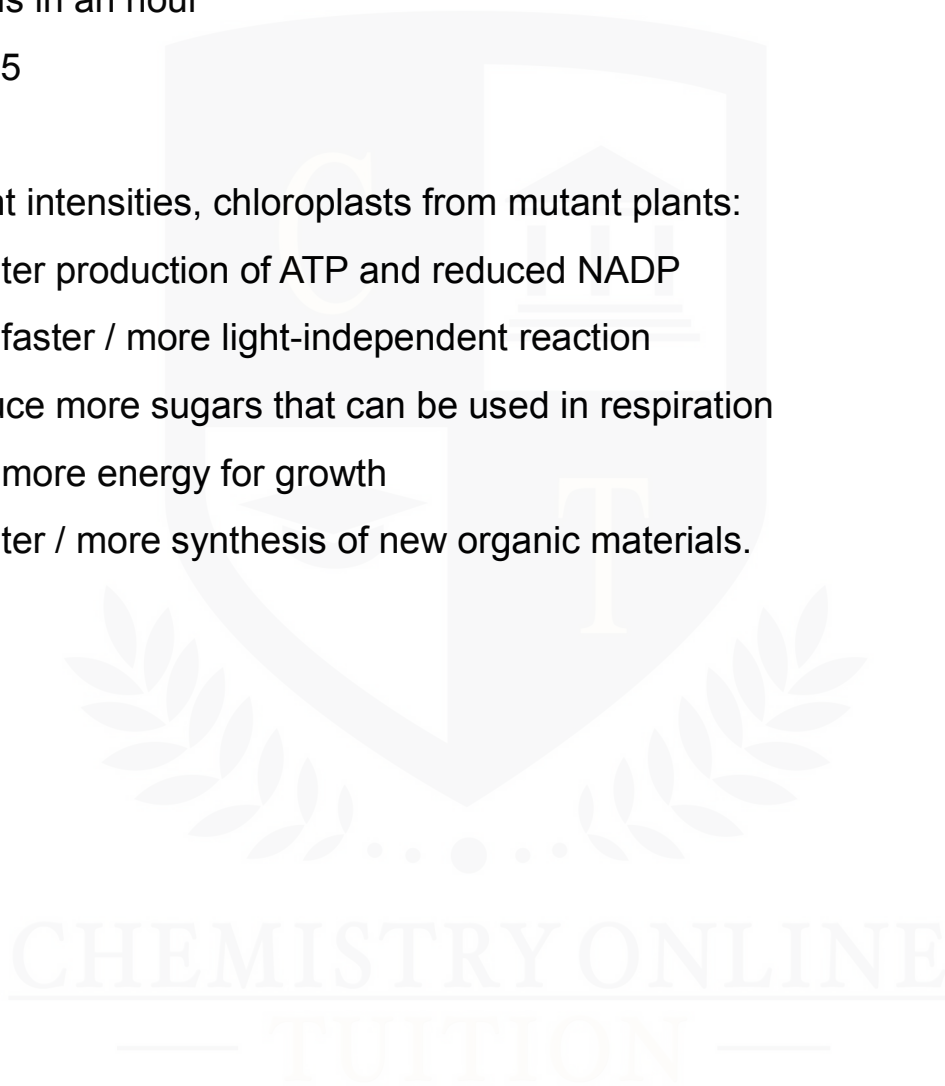
Have faster production of ATP and reduced NADP

So have faster / more light-independent reaction

So produce more sugars that can be used in respiration

So have more energy for growth

Have faster / more synthesis of new organic materials.



I am Sorry !!!!!



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- Founder & CEO of Chemistry Online Tuition Ltd.
- Completed Medicine (M.B.B.S) in 2007
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