



CHEMISTRY ONLINE
— **TUITION** —

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BIOLOGY

ENERGY TRANSFERS IN & BETWEEN ORGANISMS

Level & Board	AQA (A-LEVEL)
TOPIC:	ENERGY & ECOSYSTEM
PAPER TYPE:	SOLUTION - 1
TOTAL QUESTIONS	6
TOTAL MARKS	30

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Energy and Ecosystems - 1

1.

(a)

Explanation: due to low respiration

Advantage: more growth occurs

(b) Less nitrifications so less oxidation of ammonium ions to nitrite ions and nitrate ions.

OR

nitrifying bacteria can't function without oxygen so therefore can't convert ammonium ions into nitrites and then nitrates as this is an oxidation process by nitrification so ammonium compounds would build up nitrite and nitrate ions are converted back in nitrogen gas in the atmosphere by denitrifying bacteria in denitrification

(c)

Assumed that height is directly proportional to biomass

Plants may put biomass into other named aspect of growth other than height.

(d) 12 days

2.

(a)

3.7g/pot - AS

4.9g/pot - PN

$$3.7 - 0.5 = 3.2$$

$$4.9 - 0.5 = 4.4$$

$$3.2/20 = 0.16. \quad 4.4/20 = 0.22$$

$$0.22/0.16 = 1.4x$$

OR

$$4.9 - 0.5 = 4.4$$

$$3.7 - 0.5 = 3.2$$

$$4.4 / 3.2 = 1.4375$$

1.4 x greater

(b)

- Potassium nitrate most effective AND chicken manure least effective
- All fertilizers more effective than control
- No increase (in growth) with potassium nitrate above 30g
- Ammonium sulfate shows small/gradual increase after 30g
- Chicken manure effectiveness decreases after 45g
- Fertilizers provide nitrogen source for protein
- No statistical test to determine whether differences are significant
- Only shows results for spinach

3.

(a)

Weigh and heat

Mass is constant

4.

(a)

$$(2.1/100) \times (12.7/100) \times (58.2/100) = 0.155\%$$

(b)

$$24\ 525 \times 0.127 \times 0.057 = 177.5 \text{ kJ m}^{-2} \text{ yr}^{-1}$$

because it is total in x amount energy from vegetation to zebra x amount that becomes new tissue.

5.

(a) Phosphorus supply could enhance the plant resistance capacity to water stress by enhancement of roots system and improve accessibility of a plant to a large spectrum of water and nutrients sources.

OR

Used to produce named phosphate compound in cells

e.g. ATP / ADP / phospholipids

(b) When the AMF colonize the plant's roots, they extend their hyphae filaments into the soil, which allows them to access nutrients that are otherwise difficult for the plant to obtain. The hyphae of the AMF increase the surface area for nutrient absorption, enhancing their ability to extract nutrients from the soil.

OR

Example of a carbon-containing biological compound e.g. carbohydrate / amino acid / vitamin.

6.

(a) An increase in shoot biomass signifies more carbon captured and stored by plants, reflecting net primary productivity as it accounts for gross production minus respiratory losses in the ecosystem.

OR

Represents dry mass / mass of carbon

Represents gross production minus respiratory losses

(b)

- For the control an increase in phosphate increases plant growth
- For Entrophospora an increase in phosphate reduces plant growth
- Scutellospora reduces plant growth compared to control
- Entrophospora and Glomus increases plant growth compared to control
- No SD / statistical test to determine significance
- Only 20 weeks of growth
- Underground / root growth not known

(c)

$$e^{2.5} = 12.18$$

$$20 \text{ weeks} = 140 \text{ days}$$

$$12.18/140 = 0.087$$



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