AQA GCSE BIOLOGY (HIGHER) · 8461

BIOLOGY



MARK SCHEME

4.2.3 PLANT TISSUES, ORGANS AND SYSTEMS (PACK 2)

SCORE	PERCENTAGE
/103	%

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Q1.

(a) (i) <u>on diagram</u>:

arrow drawn from cell **X**, through air space and out through stoma above stoma

1

(ii) transpiration

1

(b) (i) 13 – 15

ignore units

1

(ii) any **two** from:

- warmest / hottest / brightest time of day
  *accept warmer / hotter **or** sun higher in sky*
- water evaporates fastest
- stomata open / more open

2

[5]

Q2.

(a) **B**

1

(**B** has) low(est) number of stomata
or no stomata on upper surface
or <u>only</u> 800 (on lower surface)

1

less transpiration / evaporation / water loss owtte
or water (vapour) is lost via stomata

only allow zero water loss if linked to no stomata on upper surface / linked to leaf B upper surface

ignore references to leaf surface area

1

(b) reduce loss / amount of water (vapour)

accept converse

or
reduced transpiration (from upper surface)

*do **not** allow <u>no</u> water is lost*

1

warmer above leaf

accept converse

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or wilted leaf folds over lower surface

or lower leaf in shade

ignore reference to dust

or less light / heat / sun on lower side

1

[5]

Q3.

(a) (i) lower – **B** loses less (water / mass) than **C**
or
described in terms of petroleum jelly

*accept converse re Leaf **C***

1

(ii) yes - **B** and **C** lose less than **D or**
B and **C** lose more than **A or**
D loses the <u>most</u> **or**
A loses the <u>least</u>

*do **not** accept just 'all leaves lose some weight'*

1

(b) (i) **X** = stoma

accept stomata / stomatal pore
*do **not** accept air space*

1

Y = guard cell

1

(ii) petroleum jelly blocks stomata / pores
or petroleum jelly prevents water loss
or petroleum jelly waterproofs

*allow pores are blocked in **B***

1

water (mainly) lost via stomata / pores / **X**
or stomata on lower surface only

1

[6]

Q4.

Quality of written communication

for ideas given in a sensible order;
comparison made for geranium and cactus for each feature
(ie not just list for geranium followed by list for cactus)
+ <u>linking</u> of feature & explanation

1

any **four** features + explanations from:

cactus has:

accept converse points for geranium plant

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Feature	Explanation
thicker cuticle	waterproof / keeps water in
smaller surface area	less water loss / less heat absorbed
fewer stomata	less water loss
stomata open at night / closed in day	(closed when warmest) – so less water loss
more widespread roots	quickly absorbs water (after rain) / access to bigger area for absorbing water / absorb more water
more water <u>storage tissue</u>	little water available in environment / can survive drought / avoids dehydration

4

[5]

Q5.

(a) water [1]

oxygen [1]

(sun) light or solar [1]

*do **not** accept sun's*

chlorophyll [1]

*do **not** accept chloroplasts*

4

(b) any **two** from:

stored as fructose
stored as sucrose
stored as starch
stored as oil **or** lipid
moved or transported away <u>in the phloem</u>

*do **not** accept "stored" by itself*

respired or burnt up for energy or
fuel changed to protein
changed to cellulose

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changed to fructose
changed to starch
changed to oil or lipid

*do **not** accept "food for plant"*
*do **not** accept "used up" by itself*

2

(c) (i) roots or root hair (cells)

1

(ii) the mineral salts are (dissolved) in water [1]

water transports salts throughout the plant
or water enables osmosis or diffusion to take place [1]

2

(d) (i) plants grow better with some nutrients than none
or
plants grow better with nitrates than without

comparison is needed
accept "faster" as equivalent to "better"
accept don't grow well with only water

1

(ii) 0.14(g)

*units **not** needed*

1

(iii) making protein **or** amino acids

*do **not** accept help them grow*
*accept named protein **or** DNA **or** chlorophyll*

1

any **two** from:

(iv) type **or** variety **or** starting weight **or**

2

(iii) size of seedlings

keep the environment the same
*only if light **or** temperature **or** day length not already credited*

light
temperature not heat
time of growth

*do **not** accept the same equipment*
*do **not** accept help them grow*

1

day length
amount of culture solution **or**/size of

accept named protein, DNA chlorophyll

boiling tube
number of seedlings per tube
pH

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CO_2
humidity

[15]

Q6.

(a) capillaries

1

(b) (oxygen) in red blood cells **or**
haemoglobin

*the candidate **must** make clear which substance is which for **2** marks*

1

(carbon dioxide dissolved in) the plasma

accept in haemoglobin in regions of high carbon dioxide concentration

*accept for **1** mark oxygen + CO_2 is transported by red blood cells **or** haemoglobin*

*do **not** credit red + white blood cells **or** combinations of right + wrong answers*

1

(c) **one** mark for each up to a maximum of **three**

red blood cells

*award **1** mark for blood cells if no red or white*

white blood cells (or named white blood cell up to **2**)

platelets

urea

accept nitrogenous waste

*do **not** credit waste substances **or** products*

minerals (**or** one named mineral)

*accept ions **or** salts*

vitamins

water

hormones (named hormone up to 3)

protein (named blood proteins up to 2)

glucose

accept other named soluble sugar

*do **not** credit sugar(s) **or** blood sugar **or** sucrose*

fatty acids **or** glycerol

amino acids

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digested food **or** nutrients (if individual foods not credited)

*do **not** credit starch **or** carbohydrates*

*do **not** credit nutrition **or** food*

*do **not** credit oxygen*

*do **not** credit haemoglobin*

carbon dioxide

accept nitrogen

antibodies

antitoxins

drugs **or** toxins (named up to 2)

bacteria **or** viruses

cholesterol

3

[6]

Q7.

(a) (i) light **or** solar

*do **not** credit sun's energy*

*do **not** credit radiant*

1

(ii) chlorophyll

1

(iii) chloroplast

1

(iv) CO_2 **+** H_2O

reactants identified (accept words)

1

$C_6H_{12}O_6 + O_2$

products identified (accept words)

1

$6CO_2 + 6H_2O \rightarrow C_6H_{12}O_6 + 6O_2$

balanced equation

1

(b) any **two** from:

increased CO_2 concentration

increased water supply

increased temperature (up to a point)

increased light intensity

*do **not** accept heat or warmth*

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altered light quality by less green **or** increasing other colours

2

(c) any **four** points

- palisade (mesophyll)
- lots of chloroplasts **or** chlorophyll **or** main site for photosynthesis **or** absorb maximum amount of light
- guard cells
- CO_2 in **or** O_2 out **or** water vapour out
- controls size of stoma **or** pores in leaf

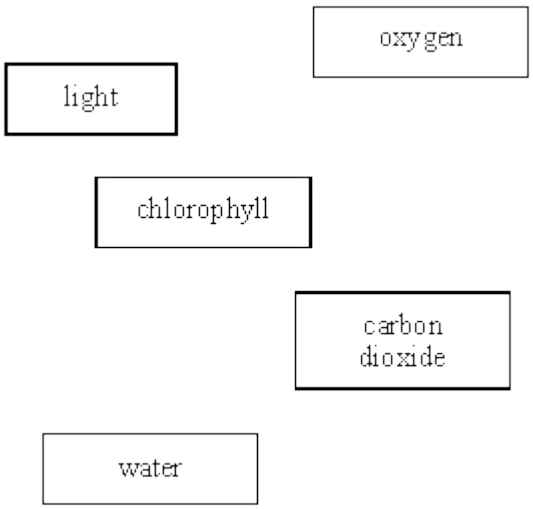
  allow *stomata*

4

[12]

Q8.

(a)



5

(b) (i) sugar **or** carbohydrate

1

(ii) it can be stored **or** it is insoluble

accept it has no osmotic effect

1

(iii) any **one** from:
respires it **or** releases **or** transfers energy
turns it **or** stores it as fructose **or** sucrose **or** lipid **or** protein **or** cellulose

1

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(c) (i) photosynthesis

1

(ii) any **one** from:
flat surface
stomata
thin
chloroplasts
veins
large surface area
air spaces

*do **not** accept chlorophyll*

1

[10]

Q9.

(i) the mass got less

accept it got lighter

*award **1** mark for water was lost from the plant*

1

water was taken into the plant **or** roots
absorbed water

*do **not** accept soaked into plant*

1

and lost through transpiration **or** the
leaves **or** evaporated from the leaves
or stomata

1

(ii) to check the effect of the plant **or** to
act as a control **or** to show that it was
not due to evaporation from water

*do **not** accept to keep it fair **or** to check that it was fair*

*do **not** accept fair test*

1

[4]

Q10.

(a) mesophyll / / / / (all correct) sperm / / x / (all correct)

for 1 mark each

2

(b) (i) absorbs light/to produce food/photosynthesis

(allow references to gaseous exchange)

for 1 mark

1

(ii) has chlorophyll/chloroplasts to absorb light/produce food

for 1 mark each

(if linked to gas exchange allow – moist surface/
dissolve gases)

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2

[5]

Q11.

(a) quick
cheap / many can be produced from one plant
cuttings produce plants identical (to parents) / outcome known

any two for 1 mark each

2

(b) *idea that* provides damp atmosphere / less likely to wilt
reduces or stops transpiration or water loss / keeps it warmer
(*reject prevents animals eating it*)

for 1 mark

1

[3]

Q12.

(a) water / damp / wet
or
suitable temperature / warm / heat / hot
or
light / sun
(*accept* rooting powder / soil qualified e.g. fine / nutrients / fertiliser / minerals)
(*do NOT allow* oxygen / carbon dioxide / food)

for 1 mark

1

(b) *advantage*
quick / cheap / several from one plant / known outcome / same as <u>parent</u>
(*reject* all the same)
disadvantage
<u>all</u> the same / all get same disease

for 1 mark each

2

[3]

Q13.

(a) (long) roots

1

(b) prevents water from evaporating

accept to reduce/stop water loss

1

[2]

Q14.

(a) 6 6 6

all required

accept a '6n 6 n n 6n' version of the balanced equation provided it is correct in every detail

1

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(b) any **two** of

- (presence of) chlorophyll **or** (amount of) chloroplasts
  accept green leaves (or other green parts)
- (sufficient) light (intensity)
- (light) of **a** suitable wavelength
  any light other than green light
  do not credit Sun's energy or sunshine or Sun

2

(c) **guard cells**

any **two** of

* control by osmosis
* the movement of gases
  *accept movement of carbon dioxide **or** oxygen **or** water vapour beware movement of CO_2 out*
  accept a diagram or description
* through the stoma

2

palisade cells

any **two** of

* near the upper surface
* contain (a great) <u>many</u> **or** <u>more</u> chloroplasts
* (so) contain the most chlorophyll

2

(d) any three of

* for respiration
* conversion to (insoluble) starch

or to food store **or** to (other)carbohydrates
* (conversion to) sucrose **or** to food store **or** to (other) carbohydrates

or polysaccharides
  *do not credit just to grow **or** live*
  ***or** survive*
  accept conversion to food store
  ***or** to (other) carbohydrates once only*

* (conversion to) lipids **or** fats **or** oils
* (conversion to) amino acids **or** (plant) proteins **or** auxins **or** (plant) hormones **or** enzymes

3

[10]

Q15.

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(a) (i) photosynthesis

1

(ii) respiration

do not credit combustion

do not credit decay

1

(iii) dry

*accept hot **or** windy **or** drought*

1

(b) any **three** from

* evaporation (of water)

***or** loss of water vapour*

* (mostly) from the leaf / leaves

do not credit incorrect reference to leaves

* through the stomata

accept through each stoma

accept through the stomas(sic)

* causing a pull

***or** causing an increase in osmotic potential (at the top of the plant)*

***or** causing an increase in water potential (at the top of the plant) **or** causing a decrease in osmotic pressure (at the top of the plant)*

* (so that) water moves up (through the plant)

do not credit water vapour moves up through the plant

* as the transpiration stream

* water enters through roots (and goes up plants)

3

[6]

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