

Plant Tissues, Organs and Organ Systems

Mark Scheme 1

Level	GCSE (9-1)
Subject	Combined Science: Trilogy - Biology
Exam Board	AQA
Topic	4.2 Organisation
Sub-Topic	Plant Tissues, Organs and Organ Systems
Difficulty Level	Silver Level
Booklet	Mark Scheme 1

Time Allowed: 60 minutes

Score: /60

Percentage: /100

Grade Boundaries:

M1.(a)	(i)	5.0	1
		(5 × 0.8) or 4	
		<i>allow ecf from distance</i>	1
		0.4	
		<i>allow ecf from 10-min volume</i>	1
	(ii)	increased (rate of uptake)	1
		more transpiration / evaporation	1
(b)	correct scales	<i>allow reversed axes</i>	1
	correctly labelled axes with units		1
	correct points	<i>one plot error = max 1 mark</i>	2
	curved line of best fit	<i>allow correct straight line</i>	1
(c)	leaves <u>wilt</u>		1
	because plants lose too much water (by evaporation)		1
	through the <u>stomata</u>		
	or		
	because cells become <u>plasmolysed</u>		
	or		
	<u>stomata</u> close		
	controlled by <u>guard cells</u>		
	to prevent <u>wilting</u>		1

M2.(a) guard cells

1

(b) (i) any **one** from:

- species / plant
 - length of time
- ignore temperature and size of leaves*

1

(ii) 20

correct answer = 2 marks

accept $\frac{1.6 - 1.28}{1.6} \times 100$

or $\frac{0.32}{1.6} \times 100$

for 1 mark

2

(c) less water loss / transpiration / evaporation

1

(d) hot

1

ignore bright / sunny conditions

dry / low humidity

1

wind(y)

1

[8]

M3.(a)	(i)	xylem	1
	(ii)	water	1
		minerals / ions / named example(s) <i>ignore nutrients</i>	1
(b)	(i)	movement of (dissolved) sugar <i>allow additional substances, eg amino acids / correct named sugar (allow sucrose / glucose)</i> <i>allow nutrients / substances / food molecules if sufficiently qualified</i> <i>ignore food alone</i>	1
	(ii)	sugars are made in the leaves	1
		so they need to be moved to other parts of the plant for respiration / growth / storage	1
(c)	(i)	mitochondria	1
	(ii)	for movement of minerals / ions <i>Do not accept 'water'</i>	1

against their concentration gradient

1

[9]

M4.(a) any **three** from:

- (water through a) partially permeable
accept 'semi permeable' / selectively permeable
- membrane
- from dilute to (more) concentrated solution
allow 'from a high concentration of water to a lower concentration (of water)'
allow 'from high water potential to low water potential'
allow 'down a concentration gradient of water'
*do **not** accept 'along a concentration gradient of water'*
- (it's a) passive (process)
allow requires no energy

3

(b) (there are) many hairs **or** thin hairs **or** hairs are one cell thick

1

(which gives) large / increased surface area **or** short diffusion pathway

1

(so there is) more diffusion / osmosis (of water into the root)

ignore absorption

1

[6]

M5.(a) any **one** from:

ignore 'check temperature'

- add a water bath
- heat screen
- use LED

- low energy bulb / described

1

- (b) (i) rate / number of bubbles decreases
*accept converse with reference to increasing light **or** shorter distance*

or

less oxygen / gas released
ignore reference to rate of photosynthesis

1

- (ii) temperature / CO₂ (concentration)
*accept 'it was too cool' **or** not enough CO₂*
accept number of chloroplasts / amount of chlorophyll
allow heat
allow CO₂
*do **not** allow CO₂*

1

- (c) Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also refer to the information in the [Marking guidance](#), and apply a 'best-fit' approach to the marking.

0 marksNo relevant content.

Level 1 (1-2 marks)There is a brief description of at least 1 tissue **or** at least 1 function of an indicated part of the leaf.

The account lacks clarity or detail.

Level 2 (3-4 marks)There is a clear description which includes at least 1 named tissue and at least 1 correct function described for an indicated part of the leaf.

Level 3 (5-6 marks)There is a detailed description of most of the structures and their functions.

Examples of responses:

- epidermis
- cover the plant
- mesophyll / palisade
- photosynthesises
- phloem

- xylem
- transport.

The following points are all acceptable but beyond the scope of the specification:

- (waxy) cuticle – reduce water loss
- epidermis – no chloroplasts so allows light to penetrate
- stomata / guard cells – allow CO₂ in (and O₂ out) **or** controls water loss
- palisade (mesophyll) – many chloroplasts to trap light
– near top of leaf for receiving more light
- spongy (mesophyll) – air spaces for rapid movement of gases

6

[9]

M6. (a) (i) water loss
extra substance(s) cancel
if transpiration stream described max 1 mark

1

as a vapour / by evaporation
ignore stomata

1

- (ii) stomata / stoma / guard cells
ignore epidermis

1

- (b) (i) 2.8

correct answer with or without working gains 2 marks
if answer incorrect:
allow 1 mark for $(8.6 - 0.2) \div 3$ or $8.4 \div 3$

2

- (ii) warmer at 16:00 / gets cooler
or reverse argument for 19.00

1

faster diffusion / evaporation
accept sun setting as equivalent to heat or light marking points

or

lighter at 16:00 / gets darker (1)
if no environmental factor still allow reason mark

stomata open / more open (1)
eg 'stomata close later in the day'

or

(more) windy at 16:00 / gets less windy (1)
removal of (more) water vapour / steeper gradient (1)

or

air is less humid at 16.00 (1)
allow rain at 19.00

faster diffusion or steeper gradient (1)

1

[7]

M7. (a) C 1

(b) (i) guard (cell) 1

(ii) temperature water movement / transpiration
through stomata / pores / holes / (region) X

or

petroleum jelly blocks / covers stomata / pores / holes / X 1

stomata / pores / holes / X found on lower surface 1

[4]

M8. (a) transpiration / evaporation / diffusion
ignore osmosis 1

(b) (i) D 1

(ii) any **two** from:

- more / faster diffusion **or** evaporation **or** transpiration
- molecules move faster
- maintains concentration gradient
or keeps water concentration low in the air
or brings in more dry air
or removes damp air / water

2

[4]

