MARK SCHEME

GCSE

BIOLOGY

AQA - COMBINED SCIENCE

B 2 - TEST 6

Organisation

Advanced

1.

(a) guard cell

ignore stoma / stomata

1

(b) Species A :

allow converse points for species B

stomata open in dark / at night **or** close in light / in day

1

stomata closed during warm(est) period **or** open when cool(er)

1

heat (energy) /warmth increases evaporation / transpiration

must give explicit link between heat and transpiration

1

reduces water loss / evaporation / transpiration

ignore photosynthesis

1

[5]

2.

(a) shape changed / destroyed (above 45 °C)

accept denatured

accept active site changed

*do **not** accept enzyme killed*

1

(shape) doesn't fit (other molecules / stain)

1

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

- can wash the clothes at higher temperature
- so wash / enzyme action will be quicker

  *do **not** accept idea of bacteria working faster*
- enzyme not destroyed at high temperature / 80 °C

  accept denaturation or description

2

(ii) high(er) temperature / 80 °C uses more energy / fuel

1

more pollution / named (eg carbon dioxide / global warming) (from electricity production)

or

increased release of hot water (into the environment)

1

[6]

3. (a) (i) doesn't have valves

allow veins have valves

1

has a thicker wall **or** thicker layer of muscle

allow has a smaller lumen

ignore references to elastic (in walls)

1

(ii) any **two** from:

- (artery has) more oxygen
- (artery has) more glucose

allow (artery has) more amino acids / fatty acids

- (artery has) less carbon dioxide
- (artery has) less lactic acid

ignore urea

ignore reference to pressure

accept converse for veins if veins is clearly stated

2

(b) any **two** from:

- no rejection

allow no tissue matching required

- abundant supply
- low risk of infection

allow named example ie HIV, CJD

- longer shelf life

allow less space needed for storage

ignore side effects

2

[6]

4. (a) plasma transports proteins / dissolved substances / food (molecules) / urea / hormones

or

blood cells are suspended in the plasma

1

platelets are involved in blood clotting

1

(b) the right side of the heart pumps blood to the lungs
and
the left side of the heart pumps blood around (the rest of) the body

1

(c) **Level 3 (5–6 marks):**
A detailed and coherent evaluation is provided which considers a range of relevant points and comes to a conclusion consistent with the reasoning.

Level 2 (3–4 marks):
An attempt to relate relevant points and come to a conclusion. The logic may be inconsistent at times but builds towards a coherent argument.

Level 1 (1–2 marks):
Discrete relevant points made. The logic may be unclear and the conclusion, if present, may not be consistent with the reasoning.

0 marks:
No relevant content

Indicative content

pros of statins:

- decreases blood cholesterol
- slows down build-up of fatty material in arteries
- (so) blood can flow to heart muscle cells

cons of statins:

- drug has to be taken regularly **or** may forget to take drug
- drug will need to be taken long-term
- side-effects of taking the drug
- effects of drug will take time to happen

pros of stents:

- blocked artery is held open
- (so) blood can flow to heart muscle cells
- will remain in place / work for a long time
- rapid recovery time

cons of stents:

- risk of infection from procedure
- risk of surgery eg heart attack
- risk of thrombosis **or** blood clot

a justified conclusion

6

[9]

5. (a) (lack of) exercise

allow description of type or amount of exercise

1

allow other risk factors not mentioned in table, eg high cholesterol levels, blood pressure, levels of obesity, diabetes

(b) the second highest death rate has the highest fruit and vegetable consumption

the lowest death rates don't have high fruit and vegetable consumption

lowest death rates have a low percentage of the population that smokes.

3

(c) (it builds up) inside the coronary arteries

1

(causing) them to narrow

1

(this) reduces blood flow

1

so less oxygen gets to the heart muscle

1

(d) (statins) reduce cholesterol in the blood

1

so there is less build up of fatty material (in coronary arteries)

allow slows the rate of fat deposit

1

[10]

6. (a) (dead hollow) tubes
or
(dead) hollow cells

1

(strengthened by) lignin (and cellulose)

1

(b) $\text{size of real object} = \dfrac{\text{size of image}}{\text{magnification}}$

allow $\dfrac{26}{800}$ *for* ***1*** *mark*

1

= 0.0325 (millimetres)

allow 0.0325 (millimetres) for ***2*** *marks*

1

= 32.5 (micrometres)

allow ***1*** *mark for incorrect length × 1000*

1

an answer of 32.5 ***or*** *33 (micrometres) scores* ***3*** *marks*

(c) water enters (the guard cells)

1

(by) osmosis

allow diffusion (of water) through a partially permeable membrane

1

(d) water is lost through leaves by transpiration / evaporation

1

(no leaves is a benefit) when low / no rainfall so less / no water lost

1

(because) temperatures are high therefore transpiration would be rapid

1

or

water is used in the leaves for photosynthesis (1)

(if there are no leaves) there is no photosynthesis then no water is needed (which is a benefit) when there is low / no rainfall (1)

(because) temperatures are high therefore photosynthesis would be rapid (1)

[10]

7. (a) solution in soil is more dilute (than in root cells)

concentration of water higher in the soil (than in root cells)

1

so water moves from the dilute to the more concentrated region

*so water moves <u>down</u> (its) concentration gradient **or** water moves from a high concentration <u>of water</u> to a lower concentration*

1

concentration of ions in soil less (than that in root cells)

1

so energy needed to move ions

or

ions are moved against concentration gradient

the direction of the concentration gradient must be expressed clearly

accept correct reference to water potential or to concentrations of water

1

(b) any **three** from:

- movement of water from roots / root hairs (up stem)
- via xylem
- to the leaves
- (water) evaporates
- via stomata

3

(c) (i) 0.67/0.7

accept 0.66, 0.6666666... or ⅔ or 0.6

*correct answer gains **2** marks with or without working*

if answer incorrect allow evidence of $\frac{100}{150}$ *for **1** mark*

*do **not** accept 0.6 or 0.70*

2

(ii) during the first 30 minutes

any **one** from:

- it was warmer
- it was windier
- it was less humid
- there was more water (vapour) in the leaves

1

so there was more evaporation

ignore 'water loss'

or

stomata open during first 30 minutes **or** closed after 30 minutes (1)

so faster (rate of) evaporation in first 30 min **or** reducing (rate of) evaporation after 30 min (1)

1

[11]

8. (a) transports water in the transpiration stream

1

(b) transports dissolved sugars using translocation

1

(c) 2/(0.1 × 0.1)
or
2/ 0.01

1

200

*an answer of 200 scores **2** marks*

1

(d) cooler around lower surface

1

more humid around lower surface

allow converse argument for upper surface of leaf if qualified

1

(so) less water evaporated

allow less breeze around lower surface

1

(e)

Level 3: Relevant points (correct processes / explanations) are identified, given in detail and linked logically to form a clear account.	5-6
Level 2: Relevant points (correct processes / explanations) are identified and there are attempts at logical thinking. The resulting account is not fully clear.	3-4
Level 1: Points are identified and stated simply, but their relevance is not clear and there is no attempt at logical thinking.	1-2
No relevant content	0
Indicative content • water is absorbed by osmosis • osmosis is a passive process, or described • water in soil is at a higher concentration than inside cell • water moves down concentration gradient • through a partially permeable membrane • phosphate ions absorbed by diffusion • diffusion is a passive process, or described • phosphate ions are in a higher concentration in soil than inside cells • magnesium ions are absorbed by active transport • magnesium ions are in lower concentration in soil than inside cells • magnesium ions move from an area of lower concentration to an area of higher concentration inside the cells • magnesium ions move up the concentration gradient • process requires energy • energy from respiration	

6

[13]