Cambridge Assessment International Education

Interactive

Interactive Example Candidate Responses
Paper 3 (May/June 2016), Question 2
Cambridge International AS & A Level Biology 9700

Version 1.0

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HIGH | MIDDLE | LOW

2 **K1** is a slide of a stained transverse section through a plant leaf.

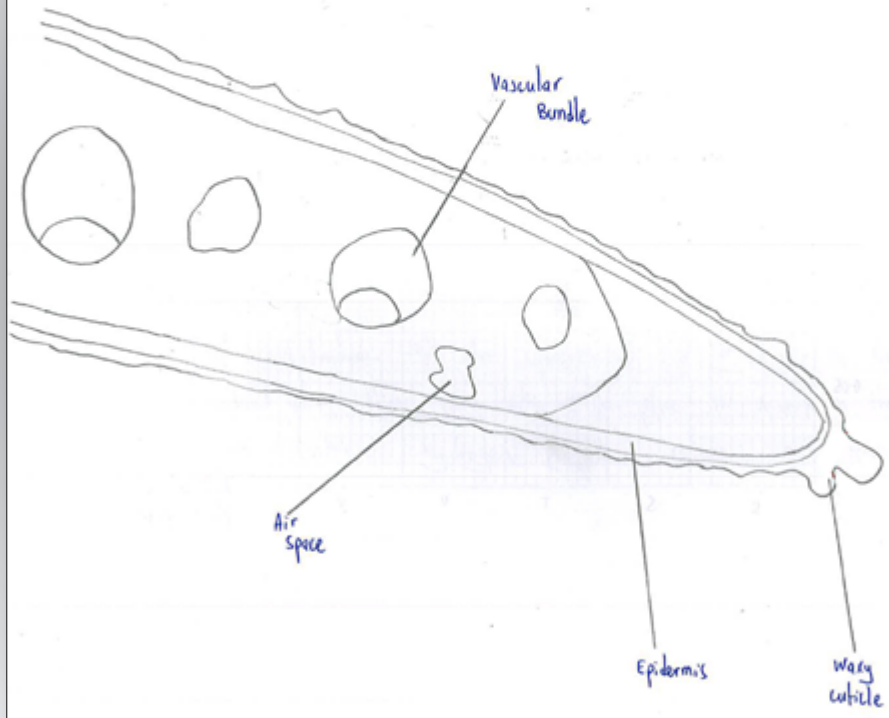
You are not expected to be familiar with this specimen.

You are required to use a sharp pencil for drawings.

(a) (i) Draw a large plan diagram of the part of the leaf as shown by the shaded area in Fig. 2.1, to include observable features and **two** vascular bundles.

Fig. 2.1

You are expected to draw the correct shape and proportions of the different tissues.



[4]

Your Mark

2(a)(i) ☐

2(a)(ii) ☐

2(b)(i) ☐

2(b)(ii) ☐

2(c) ☐

Q2	Mark scheme
(a)(i)	*(plan diagram)* 1. plan diagram of appropriate size + no shading ; 2. no cells + at least two vascular bundles + correct section drawn ; 3. epidermis drawn as two lines drawn closely together ; 4. line drawn to show area of cells located at tip of leaf; **[4]**
(a)(ii)	*(drawing)* 1. quality of line for outer wall of cells + size at least 50 mm across largest cell ; 2. only four cells drawn, each cell touching at least one other cell ; 3. cell walls drawn as two lines close together ; 4. one cell which shows a difference from other cells ; e.g. cell contains an inclusion 5. uses one label line + one label to cell wall ; **[5]**
(b)(i)	*(ratio)* 1. measures depth of midrib + diameter of the vascular bundle ; 2. records whole numbers or to 0.5 for both measurements ; 3. decides to use same units for both measurements ; 4. displays, in final ratio, larger number to smaller number ; 5. final answer as simplest ratio ; **[5]**
(b)(ii)	*(conclusion)* (habitat) water + (feature) large air spaces or more air spaces or AVP ; **[1]**
(c)	*(observable difference between leaf on* K1 *and leaf in* Fig. 2.2*)* organises comparisons into three columns with one column for features, one headed K1 and one headed Fig. 2.2 ; any three observable differences of comparison ;;; e.g. K1 has more vascular bundles than Fig. 2.2 **[4]** **[total: 19]**

EXAMINER COMMENTS

MARK SCHEME

(ii) Observe the epidermis in **K1**. These cells are not identical.

Select **one** group of **four** adjacent (touching) cells which show some of the differences between these cells.

Make a large drawing of this group of **four** cells.
Each cell of the group must touch at least one other cell.

Use **one** ruled label line and label to identify the cell wall of **one** cell.

[5]

Select page

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EXAMINER COMMENTS

MARK SCHEME

Select page

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(b) Fig. 2.2 is a photomicrograph of a stained transverse section through part of a leaf from a different type of plant.

You are not expected to be familiar with this specimen.

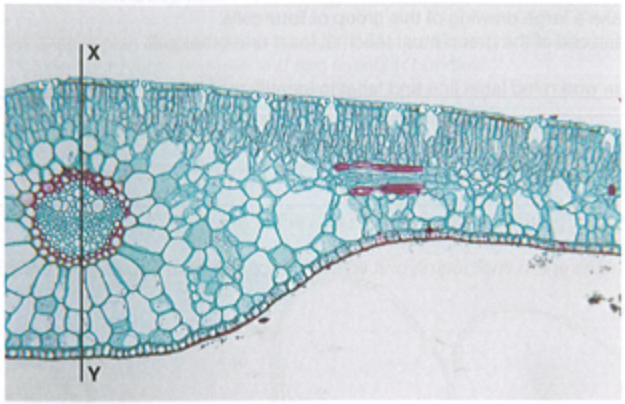

Fig. 2.2

(i) Use the line **X–Y** to determine the simplest ratio of the depth of the midrib to the diameter of the vascular bundle.

You may lose marks if you do not show your working.

X-Y : diameter of vascular bundle
54mm : 18mm
27 : 9
9 : 3
3 : 1

simplest ratio 3:1 [5]

(ii) Suggest a habitat where this plant might grow and **one** observable feature, shown in Fig. 2.2, which adapts it to this habitat.

habitat ~~Under a river~~ ~~In~~ In the river

feature Has many air spaces in the leaf [1]

Your Mark

2(a)(i) ☐

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2(b)(i) ☐

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EXAMINER COMMENTS

MARK SCHEME

(c) Prepare the space below so that it is suitable for you to record observable differences between the leaf on **K1** and the leaf in Fig. 2.2.

Record your observations in the space you have prepared.

Differences	
K1	Fig. 2.2
Palisade mesophyll cells are less packed	Palisade mesophyll cells are more packed
More air spaces between the cells	Less air spaces between the cells
~~Smaller vascular bundle~~ Doesn't have sunken stomata	~~Larger vascular bundle~~ Has sunken stomata

[4]

[Total: 19]

Select page

HIGH | MIDDLE | LOW

Your Mark

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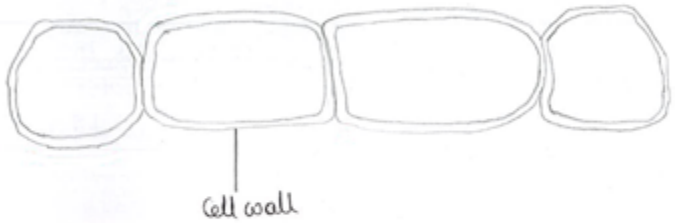

[5]

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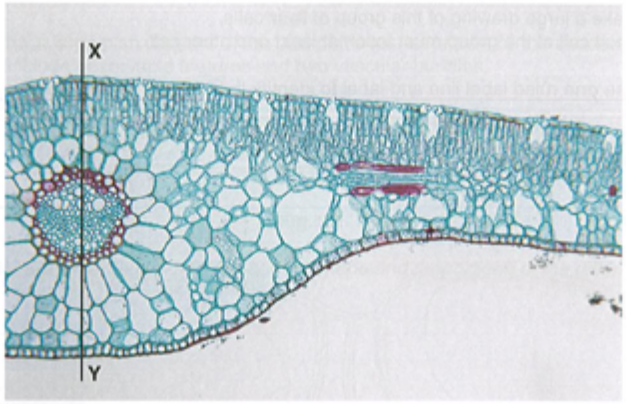

Fig. 2.2

(i) Use the line **X–Y** to determine the simplest ratio of the depth of the midrib to the diameter of the vascular bundle.

You may lose marks if you do not show your working.

From Fig. 2.2,
Depth of midrib = 50.5 mm
Diameter of vascular bundle = 1470 mm ÷ 20.0 mm

Ratio of depth of midrib : diameter of vascular bundle

$\frac{50.5\text{ mm}}{20.0\text{ mm}} : \frac{1470}{20.0} \quad \frac{20.0\text{ mm}}{20.0\text{ mm}}$

2 (2.525) : 2 (1)
5.05 : 2
5 : 2

simplest ratio 5 : 2 ..... [5]

(ii) Suggest a habitat where this plant might grow and **one** observable feature, shown in Fig. 2.2, which adapts it to this habitat.

habitat Desert .....

feature Vascular bundles far away from the epidermis ..... [1]

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EXAMINER COMMENTS

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(c) Prepare the space below so that it is suitable for you to record observable differences between the leaf on **K1** and the leaf in Fig. 2.2.

Record your observations in the space you have prepared.

Feature	slide K1	Fig 2.2
Vascular bundle	Vascular bundles are close to the epidermis	Vascular bundle present in the central part of the leaf
Air spaces	the air spaces are larger in size	the air spaces are smaller in size.
Epidermis	upper epidermis thinner	upper epidermis thicker
Palisade cells	Palisade cells are less closely packed	palisade cells are more closely packed
Collenchyma cells	less number of collenchyma cells close to the lower epidermis	more number of collenchyma cells close to the lower epidermis

[4]

[Total: 19]

Select page

HIGH | MIDDLE | LOW

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Fig. 2.1

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[4]

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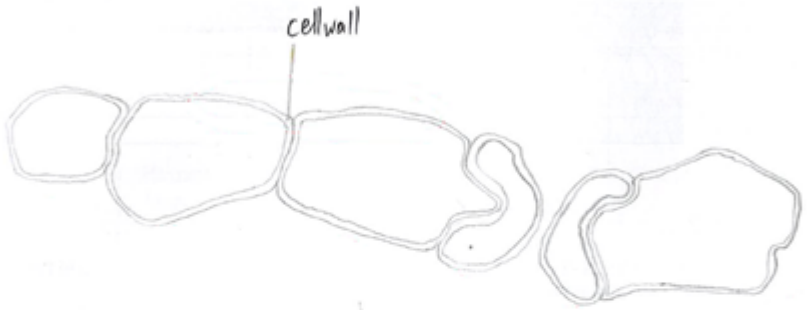

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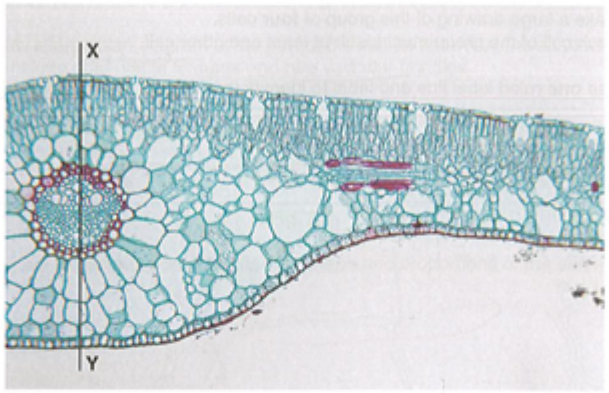

Fig. 2.2

(i) Use the line **X–Y** to determine the simplest ratio of the depth of the midrib to the diameter of the vascular bundle.

You may lose marks if you do not show your working.

Depth of midrib = 2.8 cm

Diameter of vasc. bundle = 1.9 cm

1.9 : 2.8 (×10) → 19 : 28 (×10)

simplest ratio 19 : 28 [5]

(ii) Suggest a habitat where this plant might grow and **one** observable feature, shown in Fig. 2.2, which adapts it to this habitat.

habitat cold habitat with hot climate

feature thick cuticle [1]

	Your Mark
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(c) Prepare the space below so that it is suitable for you to record observable differences between the leaf on **K1** and the leaf in Fig. 2.2.

Record your observations in the space you have prepared.

Differences	K1	Fig. 2.2
Air space	large, in the center	small, on the upper epidermis
Xylem	No	Yes, in the centre as a circle
Phloem	No	Yes, around the xylem
The size between the epidermis are and others	All the cells have nearly the same size	The cells near the lower epidermis is larger than on the epidermis

[4]

[Total: 19]

Select page

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(a)(ii)	*(drawing)* 1. quality of line for outer wall of cells + size at least 50 mm across largest cell ; 2. only four cells drawn, each cell touching at least one other cell ; 3. cell walls drawn as two lines close together ; 4. one cell which shows a difference from other cells ; e.g. cell contains an inclusion 5. uses one label line + one label to cell wall ; **[5]**
(b)(i)	*(ratio)* 1. measures depth of midrib + diameter of the vascular bundle ; 2. records whole numbers or to 0.5 for both measurements ; 3. decides to use same units for both measurements ; 4. displays, in final ratio, larger number to smaller number ; 5. final answer as simplest ratio ; **[5]**
(b)(ii)	*(conclusion)* (habitat) water + (feature) large air spaces or more air spaces or AVP ; **[1]**
(c)	*(observable difference between leaf on* K1 *and leaf in* Fig. 2.2*)* organises comparisons into three columns with one column for features, one headed **K1** and one headed **Fig. 2.2** ; any three observable differences of comparison ;;; e.g. **K1** has more vascular bundles than **Fig. 2.2** **[4]** **[total: 19]**

EXAMINER COMMENTS

MARK SCHEME

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