Cambridge International AS & A Level

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BIOLOGY **9700/33**

Paper 3 (Advanced Practical Skills 1) **May/June 2016**

MARK SCHEME

Maximum Mark: 40

Published

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Mark scheme abbreviations:

;	separates marking points
/	alternative answers for the same point
R	reject
A	accept (for answers correctly cued by the question, or by extra guidance)
AW	alternative wording (where responses vary more than usual)
underline	actual word given must be used by candidate (grammatical variants accepted)
max	indicates the maximum number of marks that can be given
ora	or reverse argument
mp	marking point (with relevant number)
ecf	error carried forward
I	ignore

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1 (a) (i) *(risk assessment)*
(hydrogen peroxide) harmful **or** irritant **+** medium **or** high **;** [1]

(b) (i) *(measures room temperature)*
whole number **or** to half a degree **+** °C **;** [1]

(ii) *(decides on interval for temperature)*
at least three additional temperatures **+** whole numbers **+** even intervals **;**
°C **;** [2]

(iii) *(recording results)*
1. table drawn **+** heading, temperature **+** °C **;**
2. heading, time **+** seconds **;**
3. records results for at least five temperatures **;**
4. correct pattern of results **;**
5. times recorded as whole seconds **;**
6. records results for repeats **+** means calculated **;** [6]

(iv) *(source of error with reason)*
appropriate error with reason **;**
e.g. concentration of hydrogen peroxide decreases
appropriate error with reason **;**
e.g. different volumes of extract on each square of filter paper [2]

(v) *(conclusions)*
(as temperature increases, activity increases) more successful collisions **or** more enzyme-substrate-complexes / ESCs **;**
(decreased / no activity) denatures **or** changed shape of active site **;** [2]

(vi) *(modification to investigate another variable)*
1. (to standardise temperature) stated temperature **+** thermostatically controlled water-bath **;**
2. (independent variable) at least five concentrations of catalase **;**
3. (method) simple dilution / proportional dilution / serial dilution **;** [3]

(c) *(chart)*
1. (*x*-axis) different plant species **+** (*y*-axis) initial rate of activity of catalase / s^{-1} **;**
2. (scale on *x*-axis) even width of bars **+** (scale on *y*-axis) 0.05 to 2 cm, labelled at least each 2 cm **;**
3. correct plotting of five bars **;**
4. five bars labelled with each horizontal line drawn as a thin line **+** each column labelled **;** [4]

[Total: 21]

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2 (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]

(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]

(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]

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