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Cambridge International Advanced Subsidiary and Advanced Level

MARK SCHEME for the May/June 2015 series

9700 BIOLOGY

9700/31 Paper 3 (Advanced Practical Skills 1), maximum raw mark 40

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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) (heading) solution(s) **or** sample **+** (heading) observation(s) **or** colour (with iodine) ;

(**S**) blue-black / black **+** (**S** and **E)** any acceptable colour (orange / brown / yellow) ;

repeats the experiment ; [3]

(ii) records time as a whole number only **+** seconds / s / sec(s) ; [1]

(iii) ref. to hydrolysis / digestion of starch ; [1]

(iv) glucose / maltose ; [1]

(v) (level of risk) medium or high ; [1]

(b) (i) (labels under correct sequence of beakers) 0.5 **+** 0.25 **+** 0.125 **+** 0.0625 **+** % ;

shows transfer of 10 cm^3 of solution from previous beaker to 3 beakers ;

adds 10 cm^3 water / **W** to 4 beakers ; [3]

(ii) 1 (heading) percentage concentration of starch solution ;

2 (heading for any column/row) time **+** s / second(s) / sec(s) ;

3 records at least 5 results for 5 different concentrations as whole numbers ;

4 records 1% as faster than lowest concentration ; [4]

(iii) correct answer calculated from students results ; [1]

(iv) reject ;

colour change fastest at 1% ; [2]

(c) (i) colour change / endpoint is difficult to judge ; [1]

(ii) systematic error **+** same syringe **or** random error **+** appropriate problem ; [1]

(iii) same concentration of starch ;

at least 5 different concentrations of **X** or fruit juice **+** serial or simple dilution ;

add Benedict's **+** heat to 80 °C / boil **+** record the time for first appearance of any colour change ; [3]

[Total : 22]

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2 (a) (i) 1 at least 3 lines **+** size at least 70 mm **+** no shading ;

2 no cells **+** correct quarter drawn ;

3 at least 5 lines drawn **+** one complete bulge ;

4 at least 3 layers **+** epidermis drawn as double lines **or** trichomes drawn ;

5 label **T** with label line ; [5]

(ii) 1 quality of outer line sharp and continuous **+** largest cell size at least 40 mm in length **+** at least 4 cells ;

2 only 4 complete cells drawn **+** each cell must touch another cell at least at one point to form one group ;

3 correct proportion of cell wall to cytoplasm (thin cell walls) ;

4 labels one cell wall ; [4]

(b) records correct number of eyepiece graticule units ;

shows multiplication by 11 ;

correct answer **+** units ; [3]

(c) (i) *orientation*
(*x*-axis) biological molecule found in fruit **+** (*y*-axis) mass (of) biological molecule in the 35 g fruit (/) g ;

scale
(*x*-axis) bars of equal width **+** equal distance apart) **+** using more than half the grid **+** (*y*-axis) even scale ;

plotting
correct plotting of each bar in the order in the table ;

line
sharp ruled lines **+** labels for **C**, **S, U**, **F**, **P** directly below bar or inside bar ; [4]

(ii) shows addition of 0.2 and 0.4 **+** division by 35 **+** multiplication by 100 ;

1.7(%) ; [2]

[Total: 18]

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