

**JUNE 2004**

**INTERNATIONAL GCSE**

**MARK SCHEME**

**MAXIMUM MARK: 40**

**SYLLABUS/COMPONENT: 0610/06**

**BIOLOGY  
(Alternative to Practical)**



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**Question 1** (a) cell diameters as marked on Figs 1.1, 1.2, 1.3 and 1.4  
range of acceptable values:-

fig	cm	mm
1.1	2.1 or 2.25	21 to 22.5
1.2	ditto	ditto
1.3	1.5 or 1.6	15 or 16
1.4	2.5 to 2.6	25 or 26

incorrect or no units given = 2 max

[3]

(b) identification of solution =2 this will be marked independently of the explanation  
cell in Fig 1.2 1.5% sugar solution  
cell in Fig. 1.3 5% sugar solution  
cell in Fig 1.4 water

explanation – up to possible 6 marks the explanation will be marked to match the diagram figures.

cell in Fig 1.2 [1.5% sugar solution]

cell in Fig. 1.2 same size/ width / not changed [as in Fig. 1.1];  
water taken in balances that lost by cell ;  
no osmosis / diffusion ;  
concentration gradient is in equilibrium;

cell in Fig 1.3 [ 5% sugar solution]

cell in Fig 1.3 smaller or has shrunk [than cell in Fig 1.1] / width or vacuole has decreased;  
water lost from cell;  
by osmosis / diffusion;  
detail re concentration difference or water potential involved / plasmolysed / become flaccid;

cell in Fig 1.4 [ water]

cell in Fig. 1.4 larger [ than in Fig. 1.1] / width has increased;  
water taken into cell;  
by osmosis / diffusion;  
detail re concentration difference or water potential involved / turgidity ;

MAX [8]  
[Total : 11]

**Question 2** (a)(i) Tube A – 12 or 13 or 12 to 13 (minutes);

Tube C – 5 or 6 or 5 to 6 (minutes);

[2]

(ii) less time / faster / speeds up enzyme reaction or activity / acts as an activator;  
7 minutes less for Tube C; [some mathematical use of values in (a)(i)]

[2]

(iii) Control ( for tube A) / comparison with the other tubes / starch does not break down by itself;

[1]

(b) 1 same amount / volume / concentration of amylase;

2 same amount / volume / concentration of starch;

3 same temperature;

4 vary pH, at least 3 for a range ;

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5 reasonable suggested detail to obtain a different pH, ideally use of buffer;

6 regular timing for testing;

7 repetition;

8 3 named items of apparatus selected;

[ to include reference to timer / white tile/ test tubes / beakers / water bath / stirrer etc]

[MAX 5]

[Total : 10]

**Question 3**

(a)(i) Drawing:-

**O** one fruit only;

**S** suitable size; [larger than original]

**A** accurate proportions and clear outline with only appropriate shading;

**L** Label – seed(s) ;

[4]

(ii) length of drawing **AND** length of fig 3.1 [accept –3.5 to 4.7cm];

correct calculation method and answer;

[only one mark for working and calculation ]

[2]

(iii) the printing of the grid is not mm<sup>2</sup> so 2 schemes

	<i>if a ruler has been used</i>	<i>if squares have been counted</i>
range of areas accepted	6.0 to 7.5 [cm <sup>2</sup> ];	170 to 220 ;
1 <sup>st</sup> detail check fig. 1.3	ruled lines on printed grid for length and width;	indication of dots or lines to count squares;
2 <sup>nd</sup> detail	a simple maths such as multiplication or l x w;	some ref to ½ squares counting empty squares;

[3]

(b) (i)

surface area of 'wing' of fruit cm <sup>2</sup>	distance fruit travelled cm mean values calculated
32	25
64	29
96	36.2
128	43
160	50

One error = -1mark and 2 errors = -2 or 0 marks

[2]

(ii) **O** orientation of axes;

**A** both axes labelled + units;

**S** even scale;

**P** plotted correctly;

**L** line of best fit or ruled line point to point;

[MAX 4]

(iii) 1. general trend - larger surface area – longer the distance travelled/ positive correlation;

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2. detail eg almost straight line / linear relationship / proportionality eg in direct proportion;

3. calculate with reference to figures;

**[MAX 2]**

**(iv)** reduce competition of seedlings/ stop crowding/ over population;

more space / light / water / minerals / nutrients;

avp, inhibition/ colonise new areas;

ignore reference to survival of fittest and extinction

**[MAX 2]**

**[Total :19]**