



**BIOLOGY**

**6884/04**

**PAPER 4** Alternative to Practical

**October/November 2018**

---

***Confidential***

***MARK SCHEME***

***{6884/04}***

***MARKS: 40***

- 1 (a) (i) A- 25 °C  
B- 72 °C; ® [1]
- (ii) Table - closed margins;  
suitable headings: e.g. sample and observations;  
observations- all three observations are correctly entered; [1]
- (iii) to give time (to the enzyme to act on the apple) [1]
- (iv) high temperature denatures the enzyme; ® kill  
active site destroyed / altered;  
substrate unable to fit to the enzyme; [max. 2]
- (v) control variables / control experiment;  
to verify that change observed was caused by the treatment;  
(A) For comparison / ref to reliability [2]
- (vi) pH lower than optimum (which is pH 5 to 7);  
enzyme inactivated / denatured / active site altered; [2]
- (vii) 1 use different fruits;  
2 cut / peel or slice the fruits;  
3 same size of fruits / same area exposed / kept at same temperature;  
4 ref to suitable temperature for browning maintained in different fruits  
5 leave for specified time / reference to time;  
6 ref to scientific measure;  
7 stated proper conclusion; compare the area covered by brown spots; [max. 4]
- (b) (i) to control heating / gently heating / avoid over-boiling / safer to handle /  
even heating; [1]
- (ii) - more time taken for chopped apple to turn brick red;  
- ref to slower reaction;  
- ref to error / stated error;  
- ref to chopping damages cell wall / contamination of cell contents;  
to accommodate error accept the following:  
- ref to chopping increases surface area / more reducing sugar exposed;  
- ref to increased rate of reaction / reaction faster;  
- ref to more collision of molecules; [4]

- 2 (a) (i) to remove water from the surfaces; ignore decrease / reduce / evaporate which will add to the water during the experiment/ ensure water released comes from the experiment; ref to validity; [2]
- (ii) osmosis has occurred in **G**;  
higher water potential in cells than outside where salt is sprinkled; ref to concentration gradient;  
water moved out;  
through partially permeable membrane [4]
- (iii) decreased in size / reduced / shrink / smaller + water lost by (osmosis);  
ref to plasmolysis / flaccid [1]
- (iv) repeat the investigation;  
use other fruit;  
increase the sample size / more identical set-ups [max.2]
- (b) (i) outline- single clear lines with no shading;  
size occupies at least half the space provided;  
detail- 2 layers shown (and thickness of layers shown); [2]
- (ii) seeds; [1]
- (c) (i) 73(mm); [1]
- (ii) more water diffused into the potato than the other samples;  
it had a lower water potential compared to the other samples; [2]
- (iii) axes- labelled with units;  
size- occupies at least half the grid and suitable even scale starting from 0  
plotting- all bars correctly plotted;  
bars- should have equal widths + equal spacing in-between bars and line graph [4]
- (iv) 70 (mm); [1]