

**CAMBRIDGE**  
INTERNATIONAL EXAMINATIONS

**NOVEMBER 2002**

**INTERNATIONAL GCSE**

<b>MARK SCHEME</b>
<b>MAXIMUM MARK : 60</b>
<b>SYLLABUS/COMPONENT : 0610/6</b> <b>BIOLOGY</b> <b>(ALTERNATIVE TO PRACTICAL)</b>

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## Question

1

- (a)(i) **Drawing** : stem tuber, D<sub>T</sub> : flower; D<sub>F</sub>  
**Label** : 'eye' / bud; L<sub>T</sub>  
: petal/ stigma / style / ovary / carpel L<sub>F</sub> ;  
drawing to show some detail, if possible equal in size or larger than original diagram of the separate tuber and flower. [4]  
Minimum detail accepted on tuber– 1 eye on acceptable outline  
R drawings of whole plants but accept correct labels.  
R drawings of stylised flowers and half flowers, no label marks
- (ii) **Tuber - asexual reproduction / vegetative reproduction/ perennation and flower - sexual reproduction; both correct for 1 mark** [1]  
R mitosis and meiosis, ignore pollination and fertilisation
- (b)(i) **formula any measurement :**  
860  
**calculation in range 0.011 – 0.017[mm given in question]** [2]
- (ii) **photosynthesis :** [1]
- (iii) **[1] destarch a plant/ put in dark/ cover with paper or foil;**  
**[2] test for starch; [no details required for this mark]**  
**[3] expose leaf to light and test for starch AGAIN;**  
**[4] detail of starch test – to refer to use of alcohol before adding iodine (solution);** [4]  
[accept ref to petrol / ethanol / meths / methanol as alternatives to alcohol but R ethane / ethene]  
[if answers describe only the starch test – award points 2 and 4 if correct details are stated.  
if tested a potato tuber for starch allow only point 2 if described use of iodine in starch test and colour for positive result.  
if the leaf is covered with paper or foil and exposed to light or two different plants, one in light and the other is placed in the dark– all points can be given if correctly presented  
if a leaf is exposed to light and tested for starch – and if no previous starch test has been mentioned also no details of starch test then award point 2 not 3.]
- [ Total 12]

## Question

2

- (a)(i) 1.1 ; [1]
- (ii) 1.0 cm<sup>3</sup>;  
the high first value of 1.5 cm<sup>3</sup> represents an 'overshoot' past the end point / test 1 too high / ref to other 4 test results; [2]

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<b>(b)(i) and (ii)</b>		<i>row 1</i>	<i>row 2</i>
	<i>lemon juice</i>	<i>0.3 cm<sup>3</sup></i>	<i>3.33 g</i>
	<i>apple juice</i>	<i>0.8 cm<sup>3</sup></i>	<i>1.25 g</i>
	<i>grapefruit juice</i>	<i>0.3 cm<sup>3</sup></i>	<i>3.33 g</i>
	<i>lime juice</i>	<i>0.4 cm<sup>3</sup></i>	<i>2.50 g</i>
	<i>grape juice</i>	<i>0.9 cm<sup>3</sup></i>	<i>1.11 g</i>

2 marks for row one reading correctly from pipette levels;;  
3 marks for row two for correct calculations;;; [5]

**ECF for graph**

iii) **B** for ANY BAR CHART with gap between columns; .  
**A** for AXES - suitable scale [ to fill ½ the grid] and labels for ascorbic acid / vitamin C with unit g [ignore cm<sup>3</sup>] and for second axis name of juices;  
**P** for PLOT accurate [ refer to row 2 figures] ;  
**C** for COLUMNS - ruled columns and parallel sides and EQUAL WIDTH; [4]

(c) storage ; [detail of time, place or condition to be given.

retesting for ascorbic acid / vitamin C;

comparison A/W; [3]

see separate page of examples

[Total :15]

Notes to explain alternative marking schemes for Q 2 (b)

Ideal for correct value of 1.0 cm<sup>3</sup> of ascorbic acid in (a)(ii)

Name of juice	row 1 volume cm <sup>3</sup>	row 2 ascorbic acid /vit C g
lemon	0.3	3.33
apple	0.8	1.25/ 1.2 / 1.3
grapefruit	0.3	3.33
lime	0.4	2.50
grape	0.9	1.11

[5]

if used value from (a)(i) of 1.1 cm<sup>3</sup> instead

Name of juice	row 1 volume cm <sup>3</sup>	row 2 ascorbic acid /vit C g
lemon	0.3	3.66 / 3.6 / 3.7
apple	0.8	1.38/ 1,4

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grapefruit	0.3	3.66/3.6 / 3.7
lime	0.4	2.75/ 2.8
grape	0.9	1.22/ 1.2

[5]

if recorded volumes of juice remaining in pipettes – row 1 no marks  
but ecf and allow row 2 calculation which can be used in plotting bar chart  
using  $1.0 \text{ cm}^3$  of ascorbic acid in (a)(ii)

Name of juice	row 1 volume $\text{cm}^3$	row 2 ascorbic acid /vit C g
lemon	0.7	1.43 / 1.4
apple	0.2	5.00
grapefruit	0.7	1.43 / 1.4
lime	0.6	1.66 or 1.7
grape	0.1	10

[3]

if recorded volumes of juice remaining in pipettes – row 1 no marks  
but ecf and allow row 2 calculation which can be used in plotting bar chart  
using  $1.1 \text{ cm}^3$  of ascorbic acid in (a)(i)

Name of juice	row 1 volume $\text{cm}^3$	row 2 ascorbic acid /vit C g
lemon	0.7	1.57/ 1.6
apple	0.2	5.5
grapefruit	0.7	1.57/ 1.6
lime	0.6	1.83/ 2
grape	0.1	11.0

[3]

### Question

3

(a) shading the surface of the teeth;

shading between the teeth and / or around the gums;  
if shading is continued on cutting edge negate this mark

[2]

(b)(i) 5.2

[1]

(ii) universal indicator solution or paper or pH paper or tape;  
to yellow, brown or red;

or ref to litmus;  
changing to red ; reject ref to orange / red.

[2]

(c) Read through answer and underline the metabolic process  
the candidate is trying to demonstrate

- **M** method of investigating principle;
- **W** workable details;
- **T** relevant test or observation;

[3]

Ignore lack of sterilisation in answers.

[Total :8]

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Notes for question 3 (c)

metabolic process	method M and workability W	test or observation T
growth	M suitable container for culture; W nutrients or specific example or agar / jelly;	count increase in number either with use of microscope or by eye for colonies;
respiration	M closed tube or gas syringe or manometer; W period of time and nutrients to breakdown;	carbon dioxide formed and limewater or hydrogencarbonate indicator / AW;
nutrition	M add suitable nutrient eg glucose; W detail of used up;	Less nutrients and perhaps Benedict's test;
excretion or production of acid	M add milk; W souring, pH drops, acid formed;	Smell, milk sets or becomes thicker, pH test

**Question**

**4**

(a) *Count all or a sample of red and white cells and compare;* [1]

(b)(i) *three differences from:*

*more cells / cells close together in Fig 4.2 or less in Fig 4.1;*

*more white cells in Fig. 4.2 or less in Fig 4.1;*

*more red cells in fig 4.2 or less in Fig 4.1;*

*higher ratio of white to red cells in fig 4.2 or lower in Fig 4.1;*

*greater variety of white cells / phagocytes and lymphocytes in fig 4.2 or converse;*

**MAX**  
**[3]**

*ignore ref to sickle cells, turgidity of cells / plasma.*

(ii)

*Second sample taken after disease / has disease / transplant of organ or transfusion / infections / high altitude or*

*First sample person was anaemic;*

**[1]**

*ignore ref to leukaemia, healthier, age, injuries such as broken arm unless infected.*

**[Total : 5]**