

**NOVEMBER 2002**

**INTERNATIONAL GCSE**

**MARK SCHEME**

**MAXIMUM MARK : 60**

**SYLLABUS/COMPONENT : 0610/6**

**BIOLOGY**

**(ALTERNATIVE TO PRACTICAL)**



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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 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	0.7	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 cm<sup>3</sup> of ascorbic acid in (a)(i)

Name of juice	row 1 volume cm <sup>3</sup>	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]

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;*

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

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

(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]**