UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the October/November 2009 question paper for the guidance of teachers

5090 BIOLOGY

5090/06 Paper 6 (Alternative to Practical), maximum raw mark 40

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1 **(a)** **A** = guard cell ;
B = stoma(ta) ; [2]

(b) **(i)** CO_2 ; [1]

(ii) O_2 and water (vapour) ; [1]

(iii) stomata/pore/guard cell closed (in darkness) ; [1]

(iv) either: cobalt chloride paper on leaf ; how held ;
(blue to) pink shows water ;
or: plant in bell-jar (etc) ; droplets (condense) ;
test for water ;
or: aquatic plant ; bubbles ; test for oxygen/glowing splint ; [max 3]

(c) **(i)** measurements of both with units (once) ;
expression $\frac{49(-52)}{8(9)} \times 400$;
magnification correctly given ; (× 2450 or c. 1100 if wrong dimension used)
R: decimal places
Look for reasonable and consistent attempts. [3]

(ii) thicker inner wall ;
causes bending/banana shape ; when cell turgid ; [3]

(iii) chloroplast ;
iodine (solution)/methylene blue ; [2]

(iv) two from:
photosynthesis in light ; produces CHO/sugar ; R: starch/food
in cell sap/solution affects water potential ; AW
ref. osmosis/water enters/turgor ; [2]

[Total: 18]

2 **(a)** Table 2.1

statement	starch test	reducing sugar test	biuret test	ethanol emulsion test
heating is required	×	✓	×	×
when test solution added contents of test-tube are blue	×	✓	✓	×
the test is completed by the addition of water	×	×	×	✓
positive result of test is contents turning black	✓	×	×	×
the test can be carried out on a solution of the test material in water	✓ **or** ×	✓	✓	×
the material being tested is a carbohydrate	✓	✓	×	×

(1 mark per line)
max 3 if words used **R: any line with ✓ and × and blank** [6]

(b) **(i)** reducing sugar test ; [1]

(ii) small amount (etc) of reducing sugar ; [1]

(c) reducing sugar test:
for gentle/even heating ; avoids spurting ; test-tube breaking ;
burning finger or other safety factor ; may change substrate ; (e.g. starch to reducing sugar)
R: ref heating alcohol or decolourising leaf [2]

[Total: 10]

3 **(a)** **(i)** all boxes reasonably filled ; [1]

(ii) table marks:
one clear method of 'tally' (etc), somewhere ;
total 'numbers' given ;
third column grouping correct and total 25 ; [3]

(iii) frequency diagram marks:
3–5 ruled, uniform columns, good size ;
axes labelled, with units ;
range of each column clear on *x*-axis ;
accurate for numbers in table ;
reversed axes: allow 1, 3 and 4 line graph allow 2 and 4 [4]

(b) (seedlings from) seeds of different sizes ;
grown in uniform conditions ;
two specified (soil/medium, light, nutrients, temperature, water) ;
seeds (collected and) measured ;
range recorded/tabulated ;
thus variation within single genotype ;
extent of range – same for shorter and longer parents?
replications ;
analysis/conclusion suggested ;
allow approach of: same size seeds ;
grown in different conditions ; and so on for other points above [max 4]

[Total: 12]