

**UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS**  
International General Certificate of Secondary Education

## **MARK SCHEME for the May/June 2007 question paper**

### **0653 and 0654 COMBINED SCIENCE**

**0653/06 and 0654/06** Paper 6 (Alternative to Practical), maximum raw mark 60

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

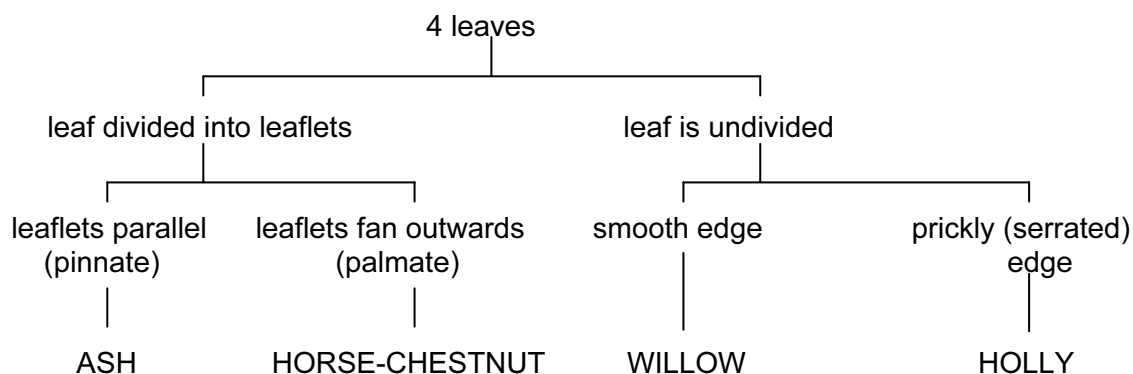
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- 1 (a) (i) diagram is correct shape and suitable size with veins showing (1)  
T labelling any vein OR the petiole (1)
- (ii) more chlorophyll (allow chloroplasts) at (near, in cells of) upper surface
- (b) air inside leaf (1) escapes through stoma/pores (on lower surface) (1) because it expands in hot water (1) (any 2) [2]  
Oxygen and Carbon Dioxide accepted
- (c) Here is an example of a correct answer. Candidates may choose other characteristics of the leaves to differentiate between them.



layout of key correct showing four leaves (2)  
one mark for each correct question (up to 3) (3)  
Subtract one mark for each incorrect question up to max 3  
all four leaves correctly identified (1)

[6]

[Total: 11]

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2	Expt no.	incident beam at	distance x/cm	reflected beam at	distance y/cm
	1	(76.5)	(26.5)	(24.0)	(26.0)
	2	83.0	33.0	16.5	33.5
	3	59.0	9.0	40.5	9.5

- (a) (i) 4 distances correctly read and recorded (ignore absence of 1st d.p.) [2]  
 (+/- 0.2) 3 or 2 correct (1) 1 or 0 correct (0)
- (ii) 4 distances x and y correctly recorded (ignore absence of 1st d.p.) [2]  
 (ecf) 3 or 2 correct (1) 1 or 0 correct (0)  
 If first d.p. is missing from one or more readings in the table, subtract 1 mark. [2]
- (b) The distances x and y are equal (allow almost equal/similar) (1) so the angle of incidence and the angle of reflection are equal. (1) OR the incident ray, reflected ray and the normal are all in the same plane, (1) i.e. the table top. (1) [2]
- (c) Incident and emergent beams are parallel (1)  
 angles of incidence and refraction are equal (1)  
 If the beam is not bent towards the normal, subtract 1 mark. (normals need not be shown) [2]
- (d) The sides of the beam meet at a focus (1)  
 The focal point is 5 cm (+/- 0.5 cm) from the mid-point of the lens (1) [2]

[Total: 10]

- 3 (a) (i) use of tongs or blue glass mentioned [1]
- (ii) magnesium oxide is insoluble in water [1]
- (iii) the mixture is (slightly) alkaline OWTTE [1]
- (b) (i) magnesium oxide dissolves/reacts in sulphuric acid  
 or is a base oxide (1) forms a salt or takes part in neutralisation  
 allow 2 [2]
- (ii) to neutralise *all* the acid OWTTE [1]
- (iii) diagram shows filter funnel and filter paper (1) and passage of mixture through it. (1) [2]
- (c) (i) to concentrate the solution/to evaporate some water/controlled heating OWTTE [1]
- (ii) the solution is saturated/the magnesium sulphate cannot be held in solution OWTTE [1]

[Total: 10]

Page 4	Mark Scheme	Syllabus
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4 (a)

tube	colour of indicator	explanation	
A	purple	decrease in CO <sub>2</sub> (concentration) (1) photosynthesis (has occurred) (1)	
B	yellow	increase in CO <sub>2</sub> (concentration) (1) no photosynthesis (1) CO <sub>2</sub> produced by respiration (1)	
C	orange	no change in CO <sub>2</sub> (concentration) (1)	[6]

(b) tube C is the control/to see if any change occurs without leaves present [1]

(c) diagram of closed tube showing woodlice suitably suspended (e.g. in muslin bag or small tube) above CO<sub>2</sub> indicator (1)  
control tube used to compare colour (1) [2]

[Total: 9]

5 (a) 3 cm<sup>3</sup>, 89 cm<sup>3</sup> (no tolerance) [2]

(b) place glowing splint in the gas: (1) splint relights (1) [2]

(c) (i) the same [1]

(ii) the black powders are catalysts OWTTE  
catalyst or catalytic must be mentioned [1]

(d) (i) chlorine [1]

(ii) copper (ions) OR Cu<sup>2+</sup> (ions) [1]

(iii) add aqueous ammonia to get a (light) blue precipitate (1)  
which redissolves to give a (dark) blue solution (1) [2]

[Total: 10]

Page 5	Mark Scheme	Syllabus
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current	0.6
voltage lamp 1	1.2
voltage lamp 2	0.6

(a) current correct (no tolerance) [1]

(b) voltages correct (no tolerance) [2]

(c) resistance of lamp 1 =  $1.2/0.6 = 2$  (ecf) (1)  
 resistance of lamp 2 =  $0.6/0.6 = 1$  (ecf) (1)  
 unit of resistance = ohms (1)

**Must be named anywhere in (c)** [3]

(d) (i) circuit shows 1 lamp in series with the cell (1)  
 another lamp in parallel with the first (1)  
 Ignore other correct components  
 Deduct Max 1 mark for incorrect component [2]

(ii) 2 lamps in series offer more resistance than 2 in parallel ORA (1)  
 OR the voltage applied to each lamp is greater (1.8 V) (1)  
 therefore the current will be greater (1) [2]

**[Total: 10]**