UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

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

0653 COMBINED SCIENCE

0653/06 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, which would have considered the acceptability of alternative answers.

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1 **(a)** **(i)** blue-black or chlorophyll area labelled in line **A** of Fig.1.3

(ii) blue/black or blue or black

(b) mark all three lines together

leaf **A** light, carbon dioxide present;
chlorophyll present; [2]

leaf **B** carbon dioxide absent [1]

leaf **C** light absent [1]

(c) **(i)** as a control / same volume (amount) of water in all three tubes (1)

(ii) to soften the cuticle / break down cell walls / allow alcohol to penetrate (1) [2]

[Total: 8]

2 **(a)** 11.5 V +/- 0.1 V;
1.55 A +/- 0.05 A; [2]

(b) **(i)** R = V/I [1]

(ii) 11.9 / 0.72 = 16.5 ohms (ecf from **(a)** and **(b)** **(i)**) [1]

(iii) 11.5 / 1.55 = 7.4 ohms (ecf) [1]
(if correct method used in parts **(ii)** and **(iii)** but calculation wrong, allow 1 mark total)

(c) the filament melted / fused OWTTE;
because the voltage was too high / resistance too low / current too great; [2]

(d) **(i)** current was too low / the voltage was too low / resistance was too high [1]

(ii) 11.5 × 1.55 = power in watts;
= 17.8 W; (ecf) [2]

[Total: 10]

3 **(a)** **(i)** use the same volume (amount) of solution each time [1]

(ii) shake / stir / mix [1]

(iii) the mixture becomes colourless / colour changes [1]

(iv) solution **B** [1]

(b) fill the pipette more than once and deliver into the measuring cylinder / place in the cylinder enough liquid to be measured OWTTE;
divide volume by the number of drops;

(c) **(i)** white / cloudy / milky / (precipitate) [1]

(ii) (light) green (precipitate) [1]

(d) **(i)** iron(III) hydroxide / ferric hydroxide
(allow mark for correct formula $Fe(OH)_3$ [1]

(ii) iron (II) is oxidised / oxidation number increased /
changed to iron(III) / loses an electron [1]

[Total: 10]

4 **(a)** 67°, 75° (no tolerance) [2]

(b) all points plotted for beaker **A** (allow 2 errors);
smooth curve drawn and labelled **A**;
all points plotted for beaker **B** (allow 2 errors);
smooth curve drawn and labelled **B**;
(if no curve labelled, deduct only 1 mark) [4]

(c) **(i)** beaker **B**,
shows a greater drop in temperature OWTTE / the curve is steeper (both correct) [1]

(ii) heat conducted by the copper OWTTE (mention of conduction essential) [1]

(d) large area loses heat more quickly;
by radiation;
hot conditions in Africa;
helps control body temperature OWTTE;
(reject: elephants lose heat by flapping ears / shading body) [max 2]

(e) same starting temperature;
temperature taken at same time (periods);
same volume of water used;
same containers; [max 2]

[Total: 12]

5 **(a)** **(i)** correct path drawn showing three straight lines, meeting at boundaries of glass

(ii) line at right angle to block where line **AB** meets glass

(iii) **i** and **r** labelled correctly at change of direction of line (even if diagram not correct) [1]

(iv) 30; 20; +/- 2
(give marks for any labelled angles correctly measured) [2]

(b) axes labelled and sensible scale chosen;
points correctly plotted (allow one error);
smooth line drawn;
(–1 mark if axes reversed) [3]

(c) line or point shown on graph;
42° +/- 1 degree (depends on candidates's graph); [2]

[Total: 10]

6 **(a)** **(i)** the black deposit is carbon;
not enough oxygen / air for complete combustion OWTTE; [2]

(ii) the centre of the flame contains gas that is not burning;
but the outside ring of the flame scorches the paper OWTTE; [2]

(b) **(i)** melts / liquefies [1]

(ii) decomposes [1]

(c) a glowing splint;
rekindles OWTTE; [2]

(d) there is enough air (oxygen) mixing with the butane for complete combustion /
to burn efficiently OWTTE;
so more heat (energy) is given out OWTTE; [2]

[Total: 10]