UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2007 question paper

0653 COMBINED SCIENCE
0654 CO-ORDINATED SCIENCES

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) raisin has become bigger and rounder [1]

raisin	mass at start/g	mass at end/g	change in mass/g
A	(0.9)	1.4	(+)0.5
B	(0.8)	0.7	(−)0.1

    (ii) masses correctly written in table (no tolerance) [2]

    (iii) change in mass correctly calculated (ecf) [2]

    (iv) solution A was less concentrated (has a higher water potential) than the raisin OWTTE
    (1) water has entered (1) by osmosis (1) until raisin cells become turgid (1)
    (any three points) [3]

    (v) it lost water (by evaporation) [1]

(b) weigh raisins (1) immerse in the solutions(for a suitable time) (1) weigh again (1) use several
raisins (1) use the same volumes of solutions (1)
the ones gaining more mass were in the less concentrated solution OWTTE (1)
any 4 points including the last point [4]

[Total: 13]

2 (a) solution X = acid (1) Y and Z (both needed) are alkaline/alkali (1) [2]

  (b) (i) barium chloride (nitrate) (solution) [1]

    (ii) white (precipitate) (independent mark) [1]
    accept milky/chalky

    (iii) sulphuric acid [1]
    accept correct formula where given but not hydrogen suphate

  (c) (i) not enough of solution X had been added to react with all of solution Y (OWTTE)
    (an understanding that sufficient acid must be added) [1]

    (ii) the colour changed from pink to colourless [1]

    (iii) neutralisation [1]

  (d) solution Y = (sodium/ammonium) hydroxide (1)
solution Z = (sodium) carbonate (1) [2]
(accept lithium or potassium as the metal and allow a correct formula, do not allow calcium
carbonate for Z, it is not a solution)

[Total: 10]

3 (a) (i) 0.65, 0.53, 0.43 (+/– 0.01 A)   [3]

(ii) 25 x 0.045 = 1.1
60 x 0.045 = 2.7 (ohms) (one or both correct, read first decimal place)   [1]

(iii) 1.1 x 0.65 = 0.72
1.8 x 0.53 = 0.95
2.7 x 0.43 = 1.05 (errors carried forward)
2 or 3 values correct (2), 1 correct (1)   *[2]

(b) at least one of axes labelled and sensible choice of scale (1)
points correctly plotted (ecf) (allow one error, +or- 1 small square) (1)
line drawn through the origin (1)   [3]
(use of OHP overlay can assist marking)

(c) curve is above the first curve, passing through origin   *[1]
*not as on question paper

[Total: 10]

4 (a) line 2 and line 3 correct: [4]

test	D	E	F	G
Benedicts	blue	blue	blue	red
biuret	blue	blue	blue	lilac
chloride	colourless	white	white	white

(b)(i)(ii) silver nitrate (1) line 4 correct (1)   [2]

(c) same volume of urine each time, same volume of reagent, same temperature (any 1)   [1]

[Total: 7]

5 **(a)** **(i)** Bunsen burner or other source of heat (1) thermometer (1) [2]

(ii) fill with water [1]

(iii) carbon dioxide (or formula) [1]

(b) 125 s, 39 s no tolerance [2]

(c) measure the volume(amount) of the gas/measure the volume of acid used/ use piece of marble of equal mass(size)/other sensible suggestion [1]

(d) use of data to show that at higher temperatures time to react is shorter (1) higher temperatures give faster reaction (1) [2]

(e) at higher temperatures the particles move faster/collide with the marble more often [1]

[Total: 10]

6 **(a)** aluminium = 45s, (1) nickel = 79 s (1) [2]

(b) **(i)** metal softens (melts) when heated/is malleable [1]

(ii) steel (1) it is an alloy (1) [2]

(c) hydrocarbon (1) petroleum/crude oil (1) [2]

(d) magnesium could ignite OWTTE [1]

(e) lag the metal bars to prevent heat loss/use a controlled form of heating/other sensible suggestion [1]

(f) metal will conduct heat, glass will not conduct heat
(must be a reference to both materials) [1]

[Total: 10]