UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2010 question paper

for the guidance of teachers

0653 COMBINED SCIENCE

0653/62 Paper 62 (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) Length of leaves / mm

Leaf No	Length	Leaf no	Length
1	39	11	45
2	48	12	42
3	55	13	49
4	43	14	50
5	36	15	34
6	47	16	32
7	39	17	44
8	51	28	35
9	53	29	34
10	35	20	39

;; [2]

(b) correct method of working (e.g. 856/20 =) ;
correct answer inside range 40.8 – 44.8 ; [2]

(c) (i) correct numbers entered e.g. 3, 6, 3, 4, 2, 2 ;
numbers add to 20 ; [2]

(ii) suitable scale and label on vertical axis ;
ranges labelled on bars of equal width ;
correct heights of bars ; [3]

(d) any suitable factor, e.g. variation in light intensity / carbon dioxide concentration / water minerals / temperature ; [1]

[Total: 10]

2 (a) (i) no colour ; [1]

(ii) calcium chloride ; [1]

(b) (i) method **A** [1]

(ii) EITHER
method **B** because ammonia is lighter (less dense) than air ;
or
method **C** because ammonia is soluble in (reacts with) water ; [max 1]

(c) (i) zinc (Zn) ; [1]

(ii) (light) blue colour ;
dark (deep) blue (both essential) ; [2]

(iii) (red to) blue ; [1]

(d) ammonia gas reacts with hydrogen chloride gas ;
(solid) ammonium chloride (NH_4Cl) is formed ;
or
equation given with **all** state symbols ; [max

[Total: 10]

3 **(a)** **(i)** 21.9 g and 23.1 g (exact) ;; [2]

(ii) 23.1 – 21.9 = 1.2 g (ecf) ; [1]

(b) **(i)** process **A** = evaporation / evaporating ; [1]

(ii) process **B** = condensation / condensing ; [1]

(c) **(i)** 1.2 cm^3 (ecf) ; [1]

(ii) volume of steam from 1 cm^3 water = $\frac{2000 \times 1}{1.2}$ (ecf) ;
= 1667 cm^3 (1670) ; [2]

(d) steam has a much greater volume than the water/water expands when it becomes steam ;
expansion causes a force / the particles of steam have a large kinetic energy / OWTTE ; [2]

[Total: 10]

4 **(a)** gas jar filled with water ;
displace water by blowing into jar ; [max 2]
blow through tube into a gas-jar ; (gas-jar must **not** be stoppered) (award 1 only)

(b) **(i)** inhaled air 7.5 s ;
exhaled air 5.5 s ; [2]

(ii) 7.0 s ; [1]
5.0 s ; (award 1 mark for '7' and '5') [1]

(c) **(i)** goes milky / cloudy ; [1]

(ii) respiration ; [1]

(iii) before exercise 8.4 s and after exercise 3.2 s ; [1]

(iv) increased respiration rate (during exercise) ; [1]

[Total: 10]

5 **(a)** 62 cm^3, 45 cm^3, 6 cm^3 (no tolerance) ;;;

(b) concentration = 1.2, 0.8, 0.4 (no tolerance) all 3 correct ;
correctly recorded in Table 5.1 ; [1]

(c) at least one axis correctly labelled and suitable scales chosen ;
all points correctly plotted, (± 1 cm^3 and 0.05 mol / dm^3) ;
suitable straight line drawn ; [3]

(d) **(i)** same mass of magnesium (NOT same amount) ;
same surface area of magnesium ; [2]

(ii) volume of hydrogen given off is **proportional to** the concentration of the hydrochloric acid. (Words in heavy type must be used.) ; [1]

[Total: 10]

6 **(a)** mass of can = 29 g (no tolerance) ;
$\mathbf{t_2}$ = 70 °C (no tolerance) ;
$\mathbf{t_3}$ = 66 °C (no tolerance) ;
volume of water = 42 cm^3 (no tolerance) ; [4]

(b) **(i)** ($\mathbf{t_3}$ – 25 =) 66 – 25 = 41 °C ; [1]

(ii) 70 – 66 = 4 °C ; [1]

(iii) specific heat = $\frac{4 \times 42 \times 4.2}{41 \times 29}$;
= 0.59 (accept 0.6) ; [2]

(c) current in amps ;
time in seconds **or** minutes ; [2]
(the order of the answers is not important)
(Allow 'power (energy used) in watts' **instead of** current in amps.)
('Time in seconds or minutes' must be **one** of the answers for two marks to be awarded.)

[Total: 10]