CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2014 series

0653 COMBINED SCIENCE

0653/62 Paper 6 (Alternative to Practical), maximum raw mark 60

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CAMBRIDGE
International Examinations

1 **(a)** (purple due to) pH above 8 / alkaline (conditions) ; [1]

(b) heading for time taken with units (allow units in table) ;
128 s for block **A** ;
72 s for block **B** ; [3]
(*allow reference to dimensions or letter or volume to identify blocks*)

(c) **(i)** diffusion ; (**NOT** osmosis) [1]

(ii) reduces pH / takes pH below 8 (so it goes colourless) ; [1]

(d) **(i)** (**B** quicker as) smaller distance / volume / size / surface area / other correct ; [1]

(ii) alveoli (walls) / lungs / capillaries one cell thick / large surface (area) / thin / shorter path(way) ; [1]

(e) **(i)** different sized blocks / greater range of block sizes ; [1]

(ii) *on either axis*:
time **and** volume / (surface) area / dimensions / size ; (ignore units, and any line drawn) [1]

[Total: 10]

2 **(a)** **(i)** carbonate / CO_3^{2-} ; [1]

(ii) either order:
(aqueous) silver nitrate / $AgNO_3$ / lead nitrate / $Pb(NO_3)_2$;
nitric acid / HNO_3 ; [2]

(iii) exothermic ; [1]

(b) **(i)** copper / Cu^{2+} ;
iron(II) / Fe^{2+} ; [2]

(ii) filtration diagram must see both funnel and paper ; [2]
two relevant labels ;

(iii) darkens / (turns) brown ;
oxidation ; [2]

[Total: 10]

3 **(a)** **(i)** 0.14 (A) ;
1.30 (V) ; [2]

(ii) 0.38
0.29
0.23
0.18 (ecf)
0.15 ;; [2]

(iii) (lamp is) less bright / dimmer ; [1]

(b) **(i)** 0.18 (0.181)
0.09 (0.086)
0.04 (0.038)
0.02 (0.022)
0.01 (0.015) ;;
(**all** correct = 2 marks, one error = 1 mark BUT max 1 if any rounding error) [2]

(ii) straight line, positive slope ;
passing through origin ; [2]

(iii) disagree (no mark)
$\frac{V}{l}$ not constant / as length / l increases, V decreases ; [1]

[Total: 10]

4 **(a)** *process* –
transpiration ; [1]
explanation –
evaporation of water (at mesophyll cells) ;
loss of water vapour from leaves (through stomata) / water given off by leaves ; [1]

(b) means of varying wind speed e.g. hairdryer / fan ;
record start / end distance ;
timing / use of a stopclock;
repeats / more than one experiment ;
other (or one) conditions constant e.g. same plant, plant size, temp, light (looking for experimental method not the effect) ; [max 4]

(c) **(i)** reading from left, right or middle of bubble (1.0, 1.5 or 2.0 at start) to match (2.5, 3.0 or 3.5) at end ; [1]

(ii) 4.5 (high) ;
1.5 (low) ; (ecf) [2]

(d) (environmental) temp ;
humidity ;
water availability ;
rainfall ; [max 1]

[Total: 10]

5 note: for part **(a)** and part **(b)(i)** allow letter or name

(a) add **A** to **B** will produce / gas / bubbles / CO_2 therefore **C** is $BaCl_2$;
add **B** to **C** will produce(white) ppt therefore **B** is Na_2CO_3 ;
therefore **A** must be HCl ; [3]
(*or any other way*)

(b) (i) **A** and **B** (either order) or names ; [1]

(ii) evaporation ; [1]

(iii) diagram ; (allow a 'series' of diagrams to show evaporation in a beaker)
two relevant labels ; [2]

(c) use of sodium hydroxide (aq) and / or (aq) ammonia ;
white ppt ;
dissolves in excess / (solution) turns colourless ; [3]
(if WRONG reagent, maximum mark 1 for white ppt)

[Total: 10]

6 **(a) (i)** 4.5 ; [1]

(ii) 3600 ; [1]

(iii) 4.5 × 12 × 3600 (ecf) ;
194 400 ; [2]

(b) (i) 83 °C ;
63 °C (ecf) ; [2]

(ii) 0.5 (× 4200 × 63 (ecf)) ;
132 300 (J) ; [2]

(c) efficiency = $\frac{\text{useful (energy) out}}{\text{total (energy) in}}$ (× 100 %) ;

$\frac{132\,300}{194\,400}$ = 68% (ecf) ; [2]

[Total: 10]