CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2014 series

0654 CO-ORDINATED SCIENCES

0654/62 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.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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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 ; [2]
63 °C (ecf) ;

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

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

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

[Total: 10]