CAMBRIDGE INTERNATIONAL EXAMINATIONS

Cambridge International General Certificate of Secondary Education

MARK SCHEME for the October/November 2014 series

0654 CO-ORDINATED SCIENCES

0654/61 Paper 6 (Alternative to Practical), maximum raw mark 60

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International Examinations

1 **(a)** 39.0 ; [1]

(b) vertical line from top of foam and bottom of test-tube to ruler ; [1]

(c) at least 4 correct plots ± 0.5 mm for **A** ;
at least 4 correct plots ± 0.5 mm for **B** ;
best fit line for **A** and labelled **A** and from 0 to 10 mins ;
best fit line for **B** and labelled **B** and from 0 to 10 mins ; [4]

(d) different temperatures (water baths) ;
named condition or all other conditions constant ;
record minimum temperature (above 40 °C) that gives no foam ;
no temperature below 40 °C / investigate intermediate values ; [4]

[Total: 10]

2 **(a)** image shows filter paper and collecting vessel ;
filtrate and residue labelled in correct places ; [2]

(b) white precipitate / solid / deposit ;
which dissolves / (colourless) solution formed (when more ammonia is added) ; [2]

(c) **(i)** (pass gas into) limewater ;
(to give) white precipitate / milky / cloudy / solid ; [2]

(ii) (light) blue **AND** precipitate / solid ;
(re-dissolves to give) dark blue solution ; [2]

(d) brown / yellow solution ;
brown / red-brown precipitate ;
OR
brown / red-brown precipitate ;
insoluble in excess ; [max 2]

[Total: 10]

3 **(a)** 0.5 ;
0.8 ; [2]

(b) (0.5 / 0.32 =) 1.6 ; (ecf)
(0.8 / 0.32 =) 2.5 ; (ecf) [2]

(c) **(i)** linear scales, vertical 0 to 6 AND horizontal 0 to 120, **AND both** axes correctly labelled with variable AND at least one with a unit ;
4 out of 5 points plotted correctly ± ½ square ;
straight line drawn must pass through 0,0 ± ½ square ; [3]

(ii) resistance is proportional / directly proportional to length ; [1]

(d) the wire heats up (and so change the resistance) ; [1]

(e) resistance will be lower / current will be greater ; [1]

[Total: 10]

4 **(a)** take in a deep breath / fill lungs with air ;
exhale / blow into the tubing ;
air displaces water in the bell jar / air goes into bell jar / water level goes down ;
measure volume of air (inside bell jar) ; [max 3]

(b) repeat ;
see if they are close together / compare results / check consistency / to confirm results ; [2]

(c) **(i)** select students of different heights ;
measure their vital capacity / measure volume ;
one factor controlled ; [max 2]

(ii) graph of height verses vital capacity / table in rank order of more than two people ; [1]

(d) candle goes out more quickly with exhaled air / ORA ;
contains less oxygen / more carbon dioxide ; [2]

[Total: 10]

5 (a) (i) temperature is constant / stops increasing ; [1]

(ii) (all) intermolecular forces broken / change from liquid to gas ;
caused by thermal energy / as thermal energy absorbed ; [2]

(iii) 118 °C ; [1]

(iv) molecules lose energy ;
AND *any 1 from:*
intermolecular forces form ;
get stronger ;
molecules get closer together ;
turn to a liquid ; [max 2]

(b) (i) solid / crystals appear ; [1]

(ii) 16.5 ; [1]

(iii) (thermal) energy is given out ;
AND *any 1 from:*
stops the temperature falling ;
strengthens / more intermolecular forces ; [max 2]

[Total: 10]

6 (a) (i) 9.9 **AND** 13.2 ; [1]

(ii) 6.5 **AND** 9.9 ; (ecf) [1]

(iii) 3.4 ;
3.3 ; (ecf) [2]

(b) (i) $9.8 \times \frac{3.3^2}{2}$;
= 53.4 ; [2]

(ii) errors ;
either:
errors evened out / decreased effect of errors ;
or
increases reliability ; [max 2]

(c) hear at same time / sound arrives at same time ;
drop and timer happen together ;
OR
sound takes time to travel (from **A** to **B**) ;
timer started late / time too small / drop before timer started ; [max 2]

[Total: 10]