

MARK SCHEME for the October/November 2014 series

0653 COMBINED SCIENCE

0653/61

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

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

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- 3 (a) 0.5 ;
0.8 ;
- (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 $\pm \frac{1}{2}$ square ;
straight line drawn must pass through $0,0 \pm \frac{1}{2}$ 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]

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- 5 (a) (i) temperature is constant / stops increasing ;
- (ii) (all) intermolecular forces broken / change from liquid to gas ;
caused by thermal energy / as thermal energy absorbed ;
- (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]**