



COMBINED SCIENCE

0653/51

Paper 5 Practical Test

May/June 2016

MARK SCHEME

Maximum Mark: 30

Published

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- 1 (a) time (in) minutes ; [2]
 volume (in) cm³ (ALLOW ml);
 time with no units and volume with no units = 1 mark
- (b) full set of results for **A** ; (ALLOW zeros if SV has zeros) [3]
 full set of results for **B** ; (ALLOW zeros if SV has zeros)
 more juice produced in **B** for at least 4 readings;
- (c) axes labelled with units (ecf from (a) but IGNORE ecf if correct) ; [4]
 suitable linear scale using at least half the grid ;
 at least 4 plots correct \pm half small square ;
 best-fit line ; (IGNORE extrapolation to zero)
 IF plot **A** and **B** IGNORE **A**
 IF plot **A** only then cannot score MP3 but can score but can score M1, M2 and M4
 IF all points are zeros then can only score M1
- (d) increases amount of juice produced per unit time / more juice / speeds extraction [1]
 process ;
- 2 (a) (i) reading for **C** (not zero) ; [4]
 readings for **D** and **E** (not zero) ;
 all readings in s ;
D>**E**>**C** ;
- (ii) **C** is 2.00 mol dm⁻³ [2]
D is 0.50 mol dm⁻³
E is 1.00 mol dm⁻³
 one correct ;
 all three correct ;
- (b) apparatus [4]
 stopwatch **AND** one of: test-tube, measuring cylinder, delivery tube as appropriate / apparatus for measuring volume of acid **AND** apparatus for adding drops of alkali ;
fair test
 add same amounts or size of Mg / marble chip / UI (to acid solutions) / same volume of acid (if doing neutralisation) same temperature ;
measurement
 count bubbles (in a certain time) / time for marble chip to disappear / time for limewater to go milky / volume of gas (in a certain time) / volume of NaOH to change UI ;

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conclusion

more bubbles is more concentrated / more volume of gas is more concentrated / shorter time is more concentrated / greater volume of NaOH is more concentrated ;

- 3 (a) (i) p value for $d = 5.0$ recorded ; [1]
ALLOW $p > 50$
- (ii) values of p increasing ; [1]
- (b) all recorded x values correct ; [2]
all recorded y values correct ;
- (c) (i) suitable choice of scales ($\geq \frac{1}{2}$ the grid used) ; [3]
at least 3 points plotted correctly to $\frac{1}{2}$ small square (penalise 'blobs') ;
good best-fit straight line judgement ;
IF plot d can only get M3
- (ii) indication on graph of how data were obtained **AND** more than half the line used ; [2]
calculation correct ;
DO NOT ALLOW either marks if gradient taken over non-linear scale part of line
IGNORE missing minus if negative gradient
- (d) m present to 2/3 significant figures and correct rounding ; [1]