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**PHYSICS**

**5054/41**

Paper 4 Alternative to Practical

**May/June 2016**

MARK SCHEME

Maximum Mark: 30

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**Published**

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) Any 2: B2  
 Insert another cell/decrease the resistance of the variable resistor/increase voltage of power supply
- (b) Table drawn with headings (Current and Number of paperclips) B1  
 Unit for current (Amps) B1  
 Correct data in table B1
- 2 (a) (i) 10.7366... C1  
 10.7 s B1
- (ii) 1.07 s B1
- (iii) Time for one oscillation very small/difficult to measure/time for tens swings is more accurate gives an average B1  
 Comparison of 0.2 s to  $T$  i.e. is a large proportion is significant B1
- (b) (i) Table completed B0
- (ii) axes labelled quantity and unit B1  
 scales linear B1  
 points plotted accurately B1  
 best fit curve drawn B1
- (iii) As  $N$  increases,  $T$  increases B1
- (iv)  $(0.65 \pm 0.01)$ s B1  
 Unit needed
- (c) Different lengths would not give a reliable (allow accurate) result/graph not smooth/introduces another variable/result for (b)(iv) not valid. B1

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- 3 (a) 22.8 C1  
23 g (2 significant figures only) B1
- (b) (i) Measuring cylinder/burette/graduated cylinder B1  
(ii) 1 Liquid P B1  
Only liquid P is denser than water B1  
(ii) 2 B because liquid P is denser than oil. B1
- (c) Wood is less dense than water but more dense than oil/density of wood between 0.9 and 1.0 B1
- 4 (a) Thermometer/pyrometer B1
- (b) Water in test tubes and thermometer/pyrometer B1  
Left for a period of time/pyrometer connected to galvanometer B1  
Readings of initial and final temperatures/temperature fall/readings taken from the galvanometer B1
- (c) Any 2: B2  
Same volume of water  
Same initial starting temperature  
Same length of time / pyrometer must be an equal distance from the test tubes.