

**UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS**

General Certificate of Education O Level

**MARK SCHEME for the June 2005 question paper**

<b>5054 PHYSICS</b>	
<b>5054/03</b>	<b>Paper 3 (Practical Test), maximum mark 30</b>

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June 2005

GCE O Level

**MARK SCHEME**

**MAXIMUM MARK: 30**

**SYLLABUS/COMPONENT: 5054/03**

**PHYSICS  
Paper 3 (Practical Test)**

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1	(a)	Sensible $l$ (approximately 80 cm to 90 cm) with unit seen here or in part (b)	M
	(b)	Correct calculation of $D$ giving sensible answer (approximately 7 cm) to 2/3 s.f. with unit seen here or in part (a)	A1
	(c)	Sensible $d$ (approximately 6 - 7 cm) and sensible $h$ (approximately 10 cm) both recorded to the nearest mm with unit	B1
	(d)	Sensible value for $M$ (approximately 100 g) and correct substitution into the formula for density provided substitution leads to a non-negative value	M1
		Density in range 0.5 to 5.0 g/cm <sup>3</sup> with unit.	A1 [5]
2	(a)	Time recorded to the nearest second or better and in the region of 75 seconds with unit	B1
	(b)	Time recorded to the nearest second or better and significantly smaller than the time in (a) with unit	B1
	(c)	Precautions; Stirring the water before taking the reading Reading the thermometer with the eye level with the meniscus Bulb of the thermometer not touching the side or base of the beaker	B1 B1 B1
	(d)	(No e.c.f. to this choice). 250 cm <sup>3</sup> beaker cools more rapidly because; the same temperature fall occurs in a shorter time/ there is a greater surface area of water in contact with the air that allows more thermal energy to escape from the water/ the greater mass of the larger beaker absorbs more thermal energy	B1 [5]
3	(a), (b), (c)	Sensible $I$ for $V = 6$ V and table with units All $V$ sensible and correct to at least 2 s.f. All $I$ sensible and correct to at least 2 s.f. Correct trend in $R$ values. ( $R$ increases as $V$ increases)	B1 B1 B1 B1
	(d)	Comment that $R$ increases as $V$ increases (no e.c.f.)	B1 [5]

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**4**     **Initial Measurements**

- (a)            Sensible  $h$  (approx 5 cm) recorded to the nearest mm     **B1**  
Set square correctly placed between desk and rule or  
vertical rule and ball     **B1**
- (b)            10  $T$  repeated and averaged     **B1**  
Sensible  $T$  determined from 10  $T$  with unit     **B1** [4]  
(Not allow nearest second in 10  $T$ )

**Table**

- (c)            Table with units for  $h$ , 10  $T$ ,  $T$  and  $T^2$      **B1**  
 $h$  varied over a range of at least 20 cm     **B1**  
At least 5 points with correct trend ( $T$  decreases as  $h$   
increases)     **B1**
- (d)            Correct calculation of  $T^2$  values to  $\geq 3$  s.f.     **B1** [4]

**Graph**

- (e)            Axes labelled with units and correct orientation     **B1**  
(penalise if graph of  $T/s$  plotted against  $h/cm$ )  
Suitable scale, not based on 3, 6, 7 etc. with data  
occupying more than half the page in both directions     **B1**  
Two points plotted correctly - check the two points  
furthest from the line. This mark can only be scored if the  
scale is easy to follow     **B1**  
Best fit line and fine points     **B1** [4]

**Calculations**

- (f)            Use of large triangle with base  $\geq 8$  cm or height  $\geq 12$  cm     **B1**  
Correct reading of sides of triangle with straight  
hypotenuse     **B1**  
Negative sign and value in range 0.038 to 0.042 ( $s^2/cm$ )  
to  $\geq 2$  s.f.     **B1** [3]  
(Allow 0.04 for 0.040 and ignore missing unit)