

**UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS**

General Certificate of Education O Level

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

**5054 PHYSICS**

**5054/03**

**Paper 3 (Practical Test), maximum mark 30**

These mark schemes are published as an aid to teachers and students, to indicate the requirements of the examination. They show the basis on which Examiners were initially instructed to award marks. They do not indicate the details of the discussions that took place at an Examiners' meeting before marking began. Any substantial changes to the mark scheme that arose from these discussions will be recorded in the published *Report on the Examination*.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

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**June 2005**

**GCE O Level**

**MARK SCHEME**

**MAXIMUM MARK: 30**

**SYLLABUS/COMPONENT: 5054/03**

**PHYSICS  
Paper 3 (Practical Test)**



Page 1	Mark Scheme	Syllabus	Paper
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1	(a)	Sensible $l$ (approximately 80 cm to 90 cm) with unit seen here or in part (b)	M1
	(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  Density in range 0.5 to 5.0 g/cm <sup>3</sup> with unit.	M1  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
	(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]

Page 2	Mark Scheme	Syllabus	Paper
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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 **B1**  
vertical rule and ball
- (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  $h$  **B1**  
increases)
- (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 **B1**  
occupying more than half the page in both directions  
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 **B1**  
hypotenuse  
Negative sign and value in range 0.038 to 0.042 ( $s^2/cm$ ) **B1 [3]**  
to  $\geq 2$  s.f.  
(Allow 0.04 for 0.040 and ignore missing unit)