

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**

Cambridge Ordinary Level

## **MARK SCHEME for the May/June 2015 series**

### **5054 PHYSICS**

**5054/32**

Paper 3 (Practical Test), maximum raw mark 30

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.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the May/June 2015 series for most Cambridge IGCSE<sup>®</sup>, Cambridge International A and AS Level components and some Cambridge O Level components.

® IGCSE is the registered trademark of Cambridge International Examinations.

Page 2	Mark Scheme	Syllabus	Paper
	Cambridge O Level – May/June 2015	5054	32

- 1 (a) Sensible values for  $m_E$ ,  $m_T$  and  $m$ , with  $m$  numerically greater than  $V$ . All values to be recorded to the nearest gram or better and unit seen somewhere. B1
- $V$  with unit and  $90 \text{ cm}^3 < V \leq 100 \text{ cm}^3$ . B1
- (b) Diagram showing meniscus with eye level with the bottom of the meniscus. B1
- (c) Correct calculation of density with unit with density in the range  $1.0 < \rho < 1.2 \text{ g cm}^{-3}$  to  $> 1$  s.f. B1
- (d) Large volume also gives a large mass and the 2 together give a more accurate value for the density. B1
- 2 (a)  $V_{AC}$  measured to 0.1 V or better with unit seen here or in (b) and in the range 3.5 V to 5.5 V. and  $V_{BC}$  measured to 0.1 V or better with unit seen here or in (b) and in the range 1.7 V to 2.8 V. M1
- $F_1$  calculated correctly to 2 or more s.f. with no unit and in the range 0.45 to 0.55. A1
- (b)  $V_{AC}$  measured to 0.1 V or better with unit seen here or in (a) and in the range 3.5 V to 5.5 V. and  $V_{BC}$  measured to 0.1 V or better with unit seen here or in (a) and in the range 1.1 V to 1.7 V. M1
- $F_2$  calculated correctly to 2 or more s.f. with no unit and in the range 0.28 to 0.34. A1
- (In (a) and (b) penalise, missing unit of  $V$  once only, unit of  $F$  once only, incorrect precision of  $V$  once only and incorrect s.f. for  $F$  once only.)
- (c) Sensible statement, e.g. higher resistance in circuit, so lower current, hence  $V_{BC}$  decreases/larger resistance between A and B so its share of the voltage increases hence  $V_{BC}$  decreases. B1
- 3 (a)  $V$  in the range  $20 \text{ cm}^3$  to  $60 \text{ cm}^3$  with unit and corresponding  $m_W$  with unit. B1
- (b) Sensible  $\theta_1$  with unit in the range  $15^\circ\text{C}$  to  $35^\circ\text{C}$ . B1

Page 3	Mark Scheme	Syllabus	Paper
	Cambridge O Level – May/June 2015	5054	32

(c)  $\theta_2 > \theta_1$  by between  $2^\circ\text{C}$  and  $10^\circ\text{C}$  with unit. B1  
(In (b) and (c) penalise missing or wrong unit once only)

(d) Correct substitution of all values. M1

Correct calculation of  $c_B$  with unit with  
 $0.40 \leq c_B \leq 3.00 \text{ J/(g } ^\circ\text{C)}$ . A1

#### 4 Preliminary results

(a)  $u$  and  $v$  both recorded to the nearest mm with unit on one of the quantities with  $40.0 \text{ cm} < v < 90.0 \text{ cm}$  and  $19.5 \text{ cm} < u < 20.5 \text{ cm}$ . B1

Repeat measurements of sensible  $v$  seen with mean value found. B1

Value in the range  $45.0 \text{ cm} < v < 80.0 \text{ cm}$ . B1

(b) Approach the focus position from both directions. (Leave screen in the same position and move the lens in both directions) B1

#### Table

(c) Column headings for  $u$ ,  $v$ ,  $u v$  and  $u + v$  and units for  $u v$  and  $u + v$ . and results from (a) included. B1

Correct calculation of  $u + v$  and  $u v$ . B1  
(Check one set of data that yields a point that is not on the straight line)

1 result for  $u + v \leq 70.0 \text{ cm}$ . B1

1 result for  $u + v \geq 95.0 \text{ cm}$ . B1

At least 5 points with correct trend. (As  $u$  increases  $v$  decreases). B1

Page 4	Mark Scheme	Syllabus	Paper
	Cambridge O Level – May/June 2015	5054	32

### Graph

(d) Axes labelled with units and correct orientation. B1  
 (Allow e.c.f. from wrong unit in table but not no units)

Suitable scale, not based on 3, 6, 7 etc. with plotted data occupying  $\geq$  half the page in both directions. B1  
 (Expect the scale not to start at the origin particularly in the  $u + v$  direction).

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  
 (Points must be within  $\frac{1}{2}$  small square of the correct position)

Best fit fine line and fine points or crosses. B1  
 (Line thickness to be no greater than the thickest lines on the grid)

### Calculations.

(e) Correct calculation. M1

Use of a triangle that uses more than half the drawn line, answer to 2/3 s.f. and in the range 13.0 cm to 17.0 cm with unit. A1