Light

Mark Scheme 9

Level	IGCSE
Subject	Physics
Exam Board	CIE
Topic	Properties of Waves. Including Light and Sound
Sub-Topic	Light
Paper Type	Alternative to Practical
Booklet	Mark Scheme 9

Time Allowed: **58 minutes**

Score: **/48**

Percentage: **/100**

1 **(a** *f* 14.95 ± 0.05 (cm) [1]
unit to match number [1]

(b) more than one value shown [1]
d 6.5 ± 0.1 [1]

(c) *t* 0.85 ± 0.05 (cm) [1]
d and *t* both with correct unit [1]

(d) diagram showing blocks correctly placed [1]
rule shown correctly touching both blocks [1]

(e) *f* 10.9 – 13.1 (cm) (or 109 – 131 (mm)) [1]
no, too far out to be explained by experimental inaccuracy (wtte) [1]

[Total: 10]

2 **(a** lens between object and screen (not mirror) [1]
lens at least 2 cm from object and screen [1]
metre rule on bench or clamped [1]

(b) any two from:
use of darkened room/brighter object
slowly moving lens back and forth to obtain good image
avoid parallax, action given
lining up object and lens
object and lens at same height from bench/object on principal axis
repeats
screen/lens perpendicular to bench
mark centre of lens position on block [2]

[Total: 5]

3 Trace:

(a) all lines present, thin, neat and in correct area [1]
normal at 90° (by eye)
and EF at 30° to normal (by eye) [1]
line KJ to at least beyond P_4 [1]

(b) (i) a = 12–13 (mm) no ecf [1]

(ii) b = 40 (mm) no ecf [1]
a and b both with appropriate unit [1]

(c) (i) & (ii) c recorded and d = 44 (mm) [1]

(iii) correct calculation of n, value 1.43 (ecf) [1]
2/3 significant figures with no unit [1]

[Total: 9]

4 (a f = 14.9(4), or 15 [1]
correct unit for f [1]

(b) (i) x_s = 5.0(cm) and y_s = 5.2(cm) [1]

(ii) factor of ×6 [1]
y = 31.2(cm) (ecf) [1]

(iii) 15.29, 15.3, 15 (ecf) [1]

(iv) correct method [1]
2 or 3 significant figures and correct unit [1]
average f 15.1 (correct answer only) [1]

(c) inverted image [1]

[Total: 10]

Question	Answer	Marks
5	Circuit diagram: **MP1** Sample of wire must be clearly identifiable by a label on the diagram or by letters on the diagram with an explanation in the text **MP2** All circuit symbols correct (even if circuit is incorrect) Method: **MP3** Take readings of V and I **MP4** For 5 or more lengths **MP5** Range of lengths must be between 5 cm and 2 m **with the largest length at least twice the smallest** Table drawn with headings: **MP6** l / m, V / V, I / A, R / Ω Key variables to control: **MP7** Any one from • Material / resistivity / conductivity / type of wire • Diameter / radius / thickness / cross sectional area • Temperature of wire	**1** **1** **1** **1** **1** **1** **1**
		Total: 7

6 **(a** Measuring cylinder
Tape measure
Newtonmeter (spring balance)
Electronic balance
Manometer

1 mark each [5]

(b) (i) Viewing scale perpendicularly (owtte) [1]

(ii) Any one from:
Moving lens back and forth
Dark area (owtte)
Object and lens at same height from bench
Object lens and screen at right angles to bench [1]

[Total: 7]