

Light

Mark Scheme 8

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 8

Time Allowed: 52 minutes

Score: /43

Percentage: /100

- 1 (a) $x = 3.9$ and $y = 5.4$ (any answer correct when rounded to 2 sf) [1]
 both with correct unit [1]
 $m = 1.38$ no unit, 2 or 3 significant figures (allow x for unit)
 or correct calculation from correct x and y [1]
- (b) any two from:
 clamp rule or place on bench
 use area away from direct sunlight/dark room/bright object
 ensure object and lens same height (from bench)
 mark on lens holder (accept on lens)
 screen and lens perpendicular to bench/aligned/in straight line/on principle axis
 move lens slowly (backwards and forwards)
 repeats
 avoid parallax (or wtte) with action given 2
- (c) scale drawn on paper on screen/graph paper on screen/
 mark on screen (then) measure/clamp ruler on scale/
 use translucent screen and measure from other side [1]

[Total: 6]

- 2 (a) (i) – (iii)
 EF extended correctly and neat [1]
 P_3P_4 line drawn correctly and neat [1]
 G labelled [1]
 P_1 and P_2 at least 5cm apart [1]
- (iv) and (v) 40 – 42 (ecf) [1]
 $(\theta - 2i)$ correct (ecf) [1]
- (b) (i) 2 and unit ($^\circ$) present at least once [1]
 (ii) yes (or No, ecf) [1]
 reference to 'within limits of experimental accuracy'
 (or close enough or wtte) [1]
- (c) no concern about pins being vertical (or wtte) [1]

[Total: 10]

- 3 (a) (i) m value correct 1.8/1.84 (2/3 sf) [1]
no unit [1]
- (ii) size = 2.9 – 3.1 cm high
3.9 – 4.1 base
(diagonal from RH top 48 – 52mm) [1]
rectangle shape(by eye) with wire (seen in any rotation) [1]
inverted [1]
- (b) placed on bench, related to vertical line on block
OR clamped immediately above lens
(either seen on diagram or in narrative) [1]
- (c) any two of:
use of darkened room/bright light (wtte)
moving lens back and forth to spot best image/move lens slowly
marking position of centre of lens on block
object & lens same height/all perpendicular to bench/all straight (parallax) if explained
(allow 'look perpendicularly' but NOT 'eye level')
repeats/take averages [2]
- [Total 8]**
- 4 (a) a correct 9.9 – 10cm [1]
- (b) y correct ($3 \times a$) 30cm allow ecf from (a) [1]
- (c) at least two readings recorded [1]
 $d = 2.8\text{cm}$ [1]
- (d) s^2 values correct 4.84, 5.76, 6.76, 7.84, 9.61 [1]
consistent number of significant figures (2 or 3) [1]
- (ii) statement matching results (expect YES) [1]
justification matches statement (expect within limits of experimental accuracy,
or 'close enough', or wtte) [1]
- (e) any two of:
use of darkened room
how to avoid parallax when measuring distances
use of marks paper on screen to aid measurements
repeat (and average)
screen/object card perpendicular to bench [2]

[Total: 10]

- 5 (a) 4.0 (cm) [1]
6.0 (cm) [1]
- (b) 20, 30 ecf allowed [1]
 f values 11.88 (11.9), 12.00 (12.0) [1]
 f consistent 3 or more significant figures [1]
- (c) average f 11.9, 11.94, 11.95, 12.0, 12 (cm) ecf allowed [1]
2/3 significant figures [1]
- (h) Any two from
use of darkened room
slowly moving lens back and forth to get good image
clamp rule or place on bench
avoid parallax action given
object/lens/screen perpendicular to bench
object and lens same height from bench
repeats [2]

[Total: 9]