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Cambridge Ordinary Level

MARK SCHEME for the October/November 2015 series

5054 PHYSICS

5054/42 Paper 4 (Alternative to Practical), maximum raw mark 30

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1 **(a)** use of distant object and screen B1

(b) **(i)** *u* marked correctly B1
D marked correctly B1

(ii) 96.3 cm unit required B1

(iii) avoid parallax in reading (ruler) / view perpendicularly
lens / screen close to ruler
use darkened room
check for zero error
clamp ruler
move screen (**not** lens) backwards and forwards (until sharp image found)
object **and** lens same height (above bench)
object **and** lens **and** screen perpendicular to bench / vertical B1

(c) **(ii)** axes correct way round, labelled quantity and unit B1
scales linear, sensible B1
points plotted accurately within ½ small square
neat crosses or small points (in circle) B1
best fit smooth curve drawn B1

(iii) **1.** 39 to 41 (cm) B1

2. 20 ± 2 (cm) B1

(iv) both values for f correctly calculated and sensible comment B1

[Total: 12]

2 **(a)** pulling string tight and squashing ball
ball not spherical
sensible comment about marking string
holding string straight / taut to measure length B1

(b) **(i)** method mark:
ball placed between two planes M1

practical detail mark:
use a ruler / tape to measure A1

(ii) any two from:
repeat and average
how planes made parallel described
not squash ball
avoid parallax in reading metre rule B2

[Total: 5]

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3 **(a)** metre rules laid end to end (from one wall to other) B1
can accept from a diagram

(b) one end fixed against wall (however expressed) **and** measure to the opposite wall / the other side B1

(c) **(i)** speed (of light) B1
length of device
position of laser / detector within the device

(ii) can see what it is reflecting off / you can see it / I.R. cannot be seen / is not coloured
to make sure it is horizontal / level B1

(iii) places it **touching wall** and pointing at opposite wall B1

(iv) expensive
uses batteries / batteries run down / need recharging
needs clear line of sight / other objects might get in the way
laser hazard with eyes
some surfaces may not reflect the light B1

[Total: 6]

4 **(a)** circuit containing **one** cell and resistor, with ammeter in series B1

voltmeter in parallel with resistor / cell B1

(b) **(i)** it matters which way round it is **connected**
so you can **connect** it the right way round B1

(ii) ammeter terminal connected to –ve of cell labelled B B1

(c) **(i)** 3 (V), 4.5 (V) and 6 (V) B1

(ii) four cells drawn in series B1

(d) no change / same value **and** B1
resistance independent of voltage / depends only on the resistor
OR
resistance increases **and**
resistor becomes hot

[Total: 7]

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