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 October/November 2015 series for most Cambridge IGCSE®, Cambridge International A and AS Level components and some Cambridge O Level components.
1 (a) use of distant object and screen

(b) (i) $u$ marked correctly

(ii) 96.3 cm unit required

(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

(c) (ii) axes correct way round, labelled quantity and unit

- scales linear, sensible
- points plotted accurately within ½ small square
- neat crosses or small points (in circle)
- best fit smooth curve drawn

(iii) 1. 39 to 41 (cm)

2. 20 ± 2 (cm)

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

[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

(b) (i) method mark:

- ball placed between two planes

- practical detail mark:

- use a ruler/tape to measure

(ii) any two from:

- repeat and average

- how planes made parallel described

- not squash ball

- avoid parallax in reading metre rule

[Total: 5]
3 (a) metre rules laid end to end (from one wall to other) can accept from a diagram B1

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

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

(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 resistance independent of voltage / depends only on the resistor OR resistance increases and resistor becomes hot B1

[Total: 7]