

**MARK SCHEME for the May/June 2012 question paper**  
**for the guidance of teachers**

**0625 PHYSICS**

**0625/61**

Paper 6 (Alternative to Practical), maximum raw mark 40

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 must be read in conjunction with the question papers and the report on the examination.

- Cambridge will not enter into discussions or correspondence in connection with these mark schemes.

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- 1 (a) 50–250 g (or 0.05–0.25 kg) correct unit required [1]
- (b) Centre of mass marked close to centre of cylinder [1]  
Clear indication of how centre of mass is placed above the 90.0 cm mark [1]
- (c) Rule unlikely to exactly balance/ difficult to balance  
OR rule could slide on pivot  
OR mass could slide  
OR centre of mass of rule not at 50.0 cm mark  
OR rule not uniform1  
  
Do not accept comments about poor/careless technique [1]
- (d) Repeat readings (wtte) [1]  
OR a reference to finding exact position of centre of mass of metre rule  
OR a reference to dealing with centre of mass of rule not being at 50.0 cm mark
- (e) Good/ fine/ reasonable/ same to 3 significant figures  
OR Within limits of experimental accuracy (wtte)  
OR Too many significant figures in experimental result [1]
- [Total: 6]**
- 2 (a)  $\theta_R = 22(^{\circ}\text{C})$  [1]
- (b) Table:  
mm,  $^{\circ}\text{C}$  [1]  
Correct  $d$  values 100, 80, 60, 40, 20, 10 [1]
- (c) Temperature difference =  $3(^{\circ}\text{C})$ , higher [1]
- (d) Draughts [1]  
Room temperature/humidity [1]
- (e) One from:  
Relevant avoidance of parallax explained, in using rule or thermometer  
Waiting time between readings  
Wait for steady thermometer reading  
Allow lamp to cool/warm up  
Repeats and average [1]
- [Total: 7]**

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- 3 (a) (i) (cm, V, A) [no mark awarded]
- (ii) Graph:
- Axes correctly labelled with quantity and unit and correct way around [1]
  - Suitable scales – plots occupy at least half the grid [1]
  - All plots correct to  $\frac{1}{2}$  small square [1]
  - Good line judgement (ecf for curve if  $d$  plotted) [1]
  - Single, thin, continuous line [1]
- (iii) Triangle using at least half of candidate's line clearly indicated on graph [1]
- Evidence of subtraction seen [1]
  - G value 1.5 when rounded to 2 significant figures [1]
- (b) Same as G, rounded to 2 or 3 significant figures [1]
- unit  $\Omega$ /ohms [1]
- [Total: 10]**
- 4 (a)  $d$  in range 79 to 80 (mm), 7.9 to 8.0 (cm) [1]
- $x = 61$  (mm) and consistent correct unit for both (mm or cm) [1]
  - $D = 80$  (cm),  $X = 61$  (cm) ecf from (i) and (ii) [1]
- (b)  $f = 14.5$ (cm) allow ecf from (a) [1]
- 2 or 3 significant figures and correct unit [1]
- (c) Correct statement for results (expect Yes or wtte) [1]
- Idea of within (or beyond) experimental accuracy or wtte [1]
  - Can only score if previous mark is scored*
- (d) Any one from:
- Use of darkened room
  - How to avoid parallax when taking readings
  - Movement of lens back and forth to obtain clearest image
  - Mark lens holder to show position of centre of lens
  - Metre rule clamped or on bench
  - Object, lens and screen all perpendicular to bench
  - Object and lens same height above bench [1]
- [Total: 8]**

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- 5 (a)  $V_1 = 74$  [1]  
Line of sight perpendicular to scale [1]  
Perpendicular line continues to measuring cylinder at surface level [1]
- (b)  $V_2 = 81$ ,  $V_G = 7$  (ecf allowed) [1]  
All volumes in  $\text{cm}^3$ , unit given at least once, not contradicted [1]
- (c)  $(V_3 - V_1) = 24$ ,  $V_A = 17$  (ecf allowed) [1]
- (d) Any three from:  
 $V_A$ : Finger increases  $V_3$  / tube not pushed in far enough  
Some water in test-tube/air is compressed  
 $V_W$ : Water remaining in tube  
Water remaining in measuring cylinder  
Tube overfilled, wtte (surface tension effect) [3]  
Either  $V_A$  or  $V_W$  (accept only once):  
Measuring cylinder readings not very sensitive  
Subtraction produces large percentage uncertainty

[Total: 9]