

**CAMBRIDGE INTERNATIONAL EXAMINATIONS**  
GCE Ordinary Level

## **MARK SCHEME for the October/November 2013 series**

### **5054 PHYSICS**

**5054/42**

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

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.

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- 1 (a) (i) measuring force just before it jumps  
reading meter and pulling magnet at same time  
force varies/not constant B1 [1]
- (ii) sensible suggestion, e.g.  
use of two people explained  
pull slowly  
repeat  
video newton meter B1 [1]
- (b)  $5.5 \pm 0.1$  N unit required B1 [1]
- (c) (i) axes: correct way round, labelled quantity and unit (on y-axis only) B1  
  
scales: linear, not awkward  
x-axis: e.g. 2 cm  $\equiv$  1 y-axis: e.g. 2 cm  $\equiv$  1 N B1  
  
points plotted accurately within  $\frac{1}{2}$  small square  
neat crosses or small points (in circle) B1  
  
smooth curve of best fit drawn B1 [4]
- (ii) increasing  $n$  decreases  $F$   
inverse relationship B1 [1]
- (d) newton meter not sensitive enough  
scale too big  
no change/same reading  
reading/force is too small (for this meter)/no force B1 [1]
- (e) (i) new paper/second expt (thicker) as force smaller (or reverse argument)  
paper that gives 3.0 N force B1 [1]
- (ii) more sensitive  
more readings  
larger values for  $F$  B1 [1]
- (f) **yes +** aluminium non-magnetic B1 [1]
- 2 (a) diagram showing paper and plain mirror  
**plus** incident and reflected rays **OR** four roughly correct pins B1  
  
2 pins placed on incident ray B1  
  
pins or image (of pins) viewed in/through mirror B1  
  
lines drawn **and** angles  $i$  and  $r$  **measured** to normal B1 [4]

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- (b) sensible suggestion, e.g.  
view bottom of pins  
pins vertical  
pins far apart, e.g. greater than 5 cm  
repeat for different angles/repeat experiment  
sharp pencil B1 [1]
- 3 (a) (i) 0.9 V cao (unit required) B1 [1]
- (ii) crocodile clips  
tight connections explained, e.g. wrap wire and tape B1 [1]
- (iii) same value/0.9 V and needle to right B1 [1]
- (b) sensible suggestion, e.g.  
e.m.f./voltage too small  
run down quickly/small amount of energy  
voltage not steady  
current too small  
resistance too large B1 [1]
- (c) (i) 1. 2.7 (V) ecf  $3 \times (a)(i)$  B1 [1]  
2. correct wiring in series **and** connected to voltmeter B1 [1]
- (ii) 1. 0.9 (V) ecf = (a)(i) B1 [1]  
2. correct wiring in parallel **and** connected to voltmeter B1 [1]
- 4 (a) measures all ten together and divides by ten B1
- how stops marbles moving, e.g.  
in a groove  
between two rulers  
5 or more in a line shown touching each other B1
- how ends are marked, e.g.  
use of blocks  
correct use of set squares B1 [3]
- alternative methods:**  
methods of measuring one marble can score **max. 2**
- measuring all 10 and averaging (B1)
- technique, e.g.  
set squares/blocks with one marble  
circumference from:  
string/paper rolled round marble then  $\div \pi$   
ink dot on marble and roll then  $\div \pi$  (B1)
- (b) (i) 16.8(0) mm / 1.68(0) cm cao (unit required) B1 [1]
- (ii) diameter (of same marble) measured more than once in different direction(s) B1 [1]