

**MARK SCHEME for the May/June 2011 question paper
for the guidance of teachers**

5054 PHYSICS

5054/41

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

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- 1 (a) (i) capacitor is (fully) charged / can hold no more charge B1
- (ii) Z and no resistor / capacitor short circuited / current largest B1
- (b) 88 mA cao B1 [1]
- (c) (i) axes: labels correct way round, labelled quantity and unit B1
scales: more than 1/2 grid, sensible B1
y-axis: 2 cm \equiv 10 mA x-axis: 2 cm \equiv 10 s
points plotted accurately B1
best fit smooth curve neatly drawn B1 [4]
- (ii) as t increases I decreases (non-linearly) / inversely related / exponential decrease B1 [1]
- (iii) 13 (mA) seen \pm 1.0 C1
1.3 V \pm 0.10 ecf graph A1 [2]
- [Total: 10]**
- 2 (a) (i) immerse stopper in water/can B1
measure volume/collect water from spout B1
measuring cylinder / balance to find mass hence volume B1 [3]
- (ii) diameter too small for stopper/object B1
object not (fully) immersed B1 [2]
- (iii) any TWO sensible comments, e.g.:
wait for can to stop dripping before immersing stopper / filled exactly to spout
place stopper in without splashing / tie on thread / lower slowly
use sensitive measuring cylinder
stopper dry before immersing
measuring cylinder dry before use
use level bench
avoid parallax reading measuring cylinder
repeat and average B2 [2]
- (b) (i) mass B1 [1]
- (ii) balance / top-pan balance / beam balance B1 [1]
- [Total: 9]**

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3	<p>(a) (i) suitable arrangement of apparatus described or on diagram reads meter / notes weight when just moves</p> <p>(ii) sensible comment, e.g.: increase force slowly / adds weights gently use same part of bench choice of newton meter described repeat readings to find average string horizontal check for zero error in meter sensible comment on friction over pulley</p>	B1 B1	[1]
	(b) use different sides of the same block	B1	[1]
	(c) (i) F / N and W / N	B1	[1]
	(ii) plot F against W (or W against F) / finds gradient of graph gradient = k (or gradient = $1/k$)	B1 B1	[2]
			[Total: 7]
4	<p>(a) (i) straight line from lamp to bench just above/touching top of card</p> <p>(ii) correct indication of region of shadow</p>	B1 B1	[1] [1]
	(b) shadow becomes longer	B1	[1]
	(c) multiple sources e.g.: moon out reflections more street lamps lights from other sources such as cars/houses larger lamp size	B1	[1]
			[Total: 4]