

**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.

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

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1	(a) (i)	capacitor is (fully) charged / can hold no more charge	B1	[1]
		Z and no resistor / capacitor short circuited / current largest	B1	[1]
	(b)	88 mA cao	B1	[1]
		(c) (i)	axes: labels correct way round, labelled quantity and unit	B1
	scales: more than $\frac{1}{2}$ grid, sensible		B1	
	y-axis: 2 cm \equiv 10 mA x-axis: 2 cm \equiv 10 s		B1	
	points plotted accurately		B1	
	(ii)	best fit smooth curve neatly drawn	B1	[4]
		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	
	(ii)	diameter too small for stopper/object	B1	
		object not (fully) immersed	B1	
	(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]	
	balance / top-pan balance / beam balance	B1	[1]	
			[Total: 9]	

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3	(a) (i)	suitable arrangement of apparatus described or on diagram reads meter / notes weight when just moves	B1 B1	[2]
	(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	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	(a) (i)	straight line from lamp to bench just above/touching top of card	B1	[1]
	(ii)	correct indication of region of shadow	B1	[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]