UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS GCE Ordinary Level

MARK SCHEME for the October/November 2009 question paper for the guidance of teachers

5054 PHYSICS

5054/04

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)	of N	ss / weight difference between two halves / rule not uniform / C of G or C // not in centre of rule / not at 50 cm mark / one end (not A) worn away / naged / holes drilled in one end		
			nore comments on forces / moments / fulcrum / prism)	B1	[1]
	(b)	(i)	88.4 ± 0.2 (cm) unit not required	B1	
		(ii)	38.4 ± 0.2 cm OR (b) (i) – 50 correct unit required	B1	[2]
	(c)		es: correct way round, labelled quantity and unit nimum two values (excluding 0,0) on each axis	B1	
			les: more than ½ page, sensible, linear xis: 2 cm = 100g or 80g y-axis: 2 cm = 10 cm or 8 cm	B1	
		_	iven points plotted accurately, ± ½ smallest square sensible scales only) / ignore point at 50g	B1	
			sonable attempt at best fit curve neatly drawn n 75g to 400g, not going below 4cm / ignore line outside points	B1	[4]
	(d)	(i)	points on graph should be evenly spaced/uniform / large gap (between 200g and 400g) explained somehow allow more accurate with reference to graph / curve / results / experiment / conclusion / allow clearer graph / fewer gaps in graph	B1	[1]
		(ii)	6.5 ± 0.5 cm or answer correct from their graph correct unit required allow 6-7 cm / allow even if scale not sensible	B1	
			marking clearly shown on graph at their value minimum requirement: clear mark on curve at 300g	B1	[2]
	(e)	allo	50 cm / metre rule not long enough w distance too large/ too close to end of ruler / value of d too high ore distance large / cannot balance ruler / comments relating to graph	B1	[1]
				[Total:	11]
2	(a)		ndle wheel / measuring tape / more than one metre rule / metre tape ore 10 m ruler	B1	[1]
	(b)	knc	w when to start stopwatch / when sound is made / when pistol fired	B1	[1]
	(c)		oid echoes / reflections / sound bouncing off buildings ore noise from surroundings / sound hits buildings	B1	[1]

Page 3	Mark Scheme: Teachers' version	Syllabus	Paper
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(d) mark 1 and 2 together any TWO sensible suggestions, e.g.

reactions too slow

ignore just human error

stopwatch faulty / failed to start / stop / not at zero

time interval too short / speed too fast / distance too short

poor hearing / could not hear the bang

poor eyesight / could not see the smoke

different distances (from teacher)

lack of concentration / not paying attention B2 ignore faulty pistol

NOT parallax error

(e) faster / larger / speed quicker
ignore takes less time / hears sound quicker

[1]

[Total: 6]

[2]

3 (a) uses light from a distant object allow parallel light mentioned / at least 2 parallel rays drawn (not including axis unless arrow shown)

B1

moves lens/focuses light onto a screen allow f/F/15 correctly marked on ray diagram

B1

[3]

[2]

measures from lens to screen / image / repeats for all 3 lenses max 2 if concave lens drawn

(b) N increases, f decreases / inverse relationship

C1

inversely proportional / N x f = constant allow max 1 mark if focal point used for focal length A1

allow one mark if inversely proportional stated then incorrect description

[Total: 5]

Page 4	Mark Scheme: Teachers' version	Syllabus	Paper
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(a) circuit containing power supply, wire, resistor (allow variable R), (switch) and

ammeter drawn in series with wire В1 voltmeter drawn in parallel with wire **B1** [2]

allow any representation clearly ammeter and voltmeter / meters drawn on Fig 4.1 ignore gaps in circuit max 1 if resistor drawn as fuse

(b) makes current small / stops wire heating up / overheating / melting B1 [1] allow controls / limits current / protects ammeter ignore resists the current / varies the current / no damage to wire / comments on safety

(c) (i) 1.4 V cao unit required **B1** (ii) 78 mA / .078 A **B1** [2]

B1 **(d)** 0.33 (0.326) (mm) ecf (c) (i) and (ii) В1 Their answer correctly rounded to 2 s.f.

cao unit required

ecf 78 A in (c) (ii) gives 10(.3) mm so 10 scores 2 marks

В1 [1] (e) micrometer / screw gauge allow caliper ecf (d) ≥ 9 mm

[Total: 8]

[2]