UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS GCE Ordinary Level

MARK SCHEME for the May/June 2008 question paper

5054 PHYSICS

5054/02

Paper 2 (Theory), maximum raw mark 75

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.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

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

• CIE will not enter into discussions or correspondence in connection with these mark schemes.

CIE is publishing the mark schemes for the May/June 2008 question papers for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

Page 2	Mark Scheme	Syllabus	Paper
	GCE O LEVEL – May/June 2008	5054	02

Section A

1	(a)	(a) turbine in first box or transformer in third box turbine, generator, transformer					
	(b)	pollution (e.g. smoke, fumes, toxic gases e.g. CO, SO ₂ not ozone layer affected) global warming, greenhouse effect, acid rain					
	(c)	(i)	cannot be replaced, not being renewed/made, will run out, many years to form, finite (not cannot be used again/reused/recycled)	B1			
		(ii)	solar/Sun, wind, tidal, geothermal, biomass, hydro-electric, wave	B1			
			[Tota	l: 5]			
2	(a)	•	attempt at a moment calculation, e.g. any $F_1d_1 = F_2d_2$ seen, or answer 0.9 N (0) N	C1 A1			
	(b)		F/A formula stated × 10 ⁵ Pa (2.571 × 10 ⁵ Pa)	B1 B1			
	(c)		on and reaction are equal and opposite or every force has an equal and opposite e or force on body A is equal and opposite to force on body B	В1			
			[Tota	l: 5]			
3	(a)	(i)	molecules/atoms/particles escape/leave or liquid molecules change to gas/	B1			
			vapour fastest/high energy molecules evaporate/energy needed to break bonds/latent heat	B1			
		(ii)	hot air less dense or cold air more dense or air expands or body heat conducted into air	B1			
	(b) trapped air air is a bad conductor/good insulator convection current reduced or (air) flow reduced						
			ny) heat/IR/radiation reflected or shiny less radiation/heat emitted poration reduced/air more humid, etc. ANY 3 lines 1 each	ВЗ			
			[Tota	l: 6]			

: 3		Syllabus	Paper
	GCE O LEVEL – May/June 2008	5054	02
itrogen	change starts at 1 min or stops at 4 min or lasts 3 min		B1 min) B1 B1
(°C) se	en rect calculation 3060 or 14400 (J)		B1 C1 C1 A1
			[Total: 7]
nfrared amma (rays/waves)		B1 B1
•	· , . • ,	nductor/photoele	ctric/GM B1
	• ,	•	•
		•	
			[Total: 5]
? = <i>V/I</i> ir 200 Ω	any algebraic (e.g. $V = IR$) or numerical form		C1 A1
			M1 A1
nger o ı	thinner or hotter or material/made of poorer conducto	or (higher resistiv	vity) B2
			[Total: 6]
i) from	N to S or towards right		B1
) dow	nwards		B1
	h circle around each wire (_1 any crossing lines)		B1
corre	ect shape around both wires or large circle around both tion of field correct on any one correct line and no direction of field correct on any one correct line and no direction of field correct on any one correct line and no direction of field correct on any one correct line and no direction of field correct on any one correct line and no direction of field correct on any one correct line and no direction of field correct on any one correct line and no direction of field correct on any one correct line and no direction of field correct on any one correct line and no direction of field correct on any one correct line and no direction of field correct on any one correct line and no direction of field correct on any one correct line and no direction of field correct on any one correct line and no direction of field correct on any one correct line and no direction of field correction of field co		B1 B1
corre	ect shape around both wires or large circle around bot		B1
	om liquitrogen by trogen by 1 con 7000 J frared amma () fluoritube) (X-railess or electronstate or ele	trogen change starts at 1 min or stops at 4 min or lasts 3 min kygen boils/liquid to gas starts at 4.8 min or stops at 5.6 min or care algebraic (or words) formula (°C) seen yet a correct calculation 3060 or 14400 (J) frared amma (rays/waves)) fluorescent (screen), photographic (plate), CCD/semicor tube) (X-rays) absorbed/stopped by bone or do not penetrate bo less absorption/pass through flesh/skin/body, etc. or trave or effect on detector, e.g. ionisation, photo black (on devel = V// in any algebraic (e.g. V = IR) or numerical form 200 Ω ecreases a constant value/to 0.2 A nger or thinner or hotter or material/made of poorer conductors from N to S or towards right) downwards	In any algebraic (e.g. $V = IR$) or numerical form 200 Ω (X-rays) absorbed/stopped by bone or do not penetrate bone (not reflected less absorption/pass through flest), in any algebraic (e.g. $V = IR$) or numerical form 200 Ω Will in any algebraic (e.g. $V = IR$) or numerical form 200 Ω Great of thinner or hotter or material/made of poorer conductor (higher resistive) from N to S or towards right Month or to S or towards right Month or the state of the size

Syllabus

Paper

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	Page 4			Syllabus	Paper		
			GCE O LEVEL – May/June 2008 5054				
8	(a) the	rmion	ic emission or hot (filament/metal)		В1		
	(b) (i)		В1				
	 (ii) no obstruction/interference or electrons reach screen/travel through CRO or otherwise electrons collide (with atoms)/lose energy/deflected 						
			⁴ × 1.6 × 10 ⁻¹⁹ ⁴ or 1.28 × 10 ⁻⁴ A		C1 A1		
					[Total: 5]		
			Section B				
9		a) K.E. (at start) to heat (+ sound)		B1 B1			
					[Total: 2]		
	(b) (i)	30 m	n cao		B1		
	(ii)	area 60 m	under graph or average speed × time or (u + v).t / 2 ด เ	or 30 × 4/2	C1 A1		
	(iii))/t or $v = u + at$ or 30/4 or gradient or rise/run ± 0.1) m/s ²		C1 A1		
	(iv)	F = 1 6000	ma or 800 × (iii) ON ecf (iii)		C1 A1		
					[Total: 7]		
	(c) (i)	or de	e friction/grip/traction or more deceleration ecelerates faster or decelerates in less time (braking) distance		B1 B1		
	(ii)		friction or less deceleration or decelerates slower/longe (braking) distance	ger	B1 B1		
	(iii)	(iii) less deceleration or decelerates slower/longer more distance					
					[Total: 6]		

	Page 5			Mark Scheme	Syllabus	Paper		
				GCE O LEVEL – May/June 2008	5054	02		
10	(a)	(i)	trans diag	sverse-crest and troughs and longitudinal-compression sverse vibration at right angles and longitudinal along ram showing transverse wave at least one wavelength ram showing longitudinal wave (slinky/layers, etc.) at least one wavelength ram showing longitudinal wave (slinky/layers, etc.)	wave I	A1 B1		
		(ii)	high(er) pressure or denser or molecules/atoms/layers closer together low(er) pressure or molecules, etc. further apart					
						[Total: 6]		
	(b)	(i)	tank containing water/waves and labelled dipper/vibrator source of light (labelled or clear) and screen/paper/projected image					
			or stroboscope to view or illuminate					
		(ii)	plane barrier (labelled or clear) + incident waves reflected waves correct (accept circular waves with correct centres 0/2 if waves go through barrier)					
	(c)	(i)	1.5 r	m		B1		
		(ii)	5/10 0.5 H	or no of waves per second or f = 1/T Hz		C1 A1		
		(iii)	$v = f\lambda$ or (i) × (ii) allow $v = f\lambda$ anywhere in (c) 0.75 m/s ecf (i) and (ii)					

[Total: 5]

				GCE (LEVEL -	- May/June 2008		5054	02
11	(a)	(i)	alpha betw	nt/reading used a stopped by pap veen 2 mm and	in experin per/card /2 2 cm alun		stops beta		B1 B1 B1 B1
		(ii)	poin use	distance, e.g. ut source away (fra barrier, e.g. we a lead container	om user) ear lead ap	oron ansport sources			
						with film (badge)	ANY 2	lines	B2
	((iii) (otherwise) source decays/decreases (quickly)			B1				
		experiment takes longer (than 1 second) or to give time for the experiment or source has to be replaced often					B1		
									[Total: 9]
	(b)	(b) gamma no deviation						B1	
	alpha and beta opposite deflections (on diagram or stated) or beta deflected more than alpha stated alpha into paper and beta out of paper may be stated on diagram but must be clear into/out of paper for 3rd mark						B1 B1		
									[Total: 3]
	(c)		topes	/A & C) same n /A & C) differen					B1 B1 B1
									[Total: 3]

Syllabus

Paper

- Incorrect prefixes to units and errors in powers of 10 are to be treated as arithmetical errors.
- Penalise wrong or missing units once per question.
- Answers with incorrect units will normally gain preceding C marks.

MARKING SCHEME CODE

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- B1 independent mark
- C1 compensation mark; given automatically if the answer is correct, i.e. the working need not be seen if the answer is correct; also given if the answer is wrong but the point is seen in the working
- M1 method mark: if not given subsequent A marks fall (up to next B, M or C mark)
- A1 answer mark
- cao correct answer only (including unit)
- eeoo each error or omission
- ecf error carried forward; it usually is even where not specifically indicated, i.e. subsequent working including a previous error is credited, if otherwise correct