UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the June 2005 question paper

0625 PHYSICS

0625/03 **Paper 3 (Extended), maximum mark 80**

This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which Examiners were initially instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began. Any substantial changes to the mark scheme that arose from these discussions will be recorded in the published *Report on the Examination*.

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 discussion or correspondence in connection with these mark schemes.

CIE is publishing the mark schemes for the June 2005 question papers for most IGCSE and GCE Advanced Level and Advanced Subsidiary Level syllabuses and some Ordinary Level syllabuses.

Grade thresholds for Syllabus 0625 (Physics) in the June 2005 examination.

	maximum mark available	minimum mark required for grade:			
		A	C	E	F
Component 3	80	53	30	20	15

The threshold (minimum mark) for B is set halfway between those for Grades A and C.
The threshold (minimum mark) for D is set halfway between those for Grades C and E.
The threshold (minimum mark) for G is set as many marks below the F threshold as the E threshold is above it.
Grade A* does not exist at the level of an individual component.

June 2005

IGCSE

MARK SCHEME

MAXIMUM MARK: 80

SYLLABUS/COMPONENT: 0625/03

PHYSICS
Extended

1	**(a)**	acceleration, speed increases acceleration getting less acc. zero/constant speed along RT or terminal velocity	B1 B1 B1	**3**
	(b)	air resistance or friction (force) up (accept upthrust) weight/(force of) gravity down	B1 B1	**2**
	(c)	air resistance (up) = weight (down) or two forces equal no (net) force, no acceleration	B1 B1	**2**
	(d) (i)	distance = speed x time or 120 x 40 distance = 4800 m	C1 A1	
	(ii)	distance = average speed x time or 25 x 6 or area under graph distance = 150 m	C1 A1	**4** **[11]**
2	**(a)**	time a number of swings (if number stated, >5) time divided by [2 x number of swings]	M1 A1	**2**
	(b) (i)	weight of gravity and tension	B1	
	(ii)	force towards centre of circular motion or towards support point	B1	**2**
	(c)	p.e. = mgh or 0.2 x 10 x 0.05 = 0.1 J	C1 A1	**2** **[6]**
3	**(a)**	in a straight line or (vector) has direction	B1	**1**
	(b)	f = ma or f = 3.0 x 2.0 = 6(.0) N	C1 A1	**2**
	(c)	P = F/a or P = 120/0.05 = 2400 N/m^2 (or Pa)	C1 A1	**2** **[5]**
4	**(a)**	start temp. and final temp. or change in temperature mass of iron time heater on	B1 B1 B1	**3**
	(b)	P x t, VIt or in words = m x shc x cit or words	B1 B1	**2**
	(c) (i)	heat lost to surroundings/air	B1	
	(ii)	add lagging/insulate	B1	**2** **[7]**

5	**(a)**	air molecules hit particles or vice versa air molecules have speed/moment/energy hits uneven or from all directions hits (by small molecules) can move a large particle or moves particles small distances	B1 B1 B1 B1	**4**
	(b) (i)	most energetic/fastest molecules	B1	
	(ii)	need energy to overcome forces/break bonds/separate mols. so work must be done/energy used as work	B1 B1	**3** **[7]**
6	**(a)**	along normal or angle i = 0 so angle r = 0	B1	**1**
	(b)	speed reduced, wavelength reduced, frequency unchanged any two correct scores one mark third correct scores second mark	 B1 B1	 **2**
	(c)	reflected at 30° refracted at > 30°	B1 B1	**2**
	(d)	sin 30°/sin r = 0.67 sin r = sin 30°/0.67 r = 48°	C1 C1 A1	**3** **[8]**
7	**(a) (i)**	x-rays or gamma rays	B1	
	(ii)	infra red or radio	B1	**2**
	(b)	f = v/λ or 3 x 10^8/ 1 x 10^{-12} = 3 x 10^{20} Hz	C1 A1	**2**
	(c)	3 x 10^8 m/s	1	**1** **[5]**
8	**(a)**	circuit which would work with supply and resistor voltmeter in parallel and ammeter in series with resistor variable resistor in series or means of changing p.d. across resistor	B1 B1 B1	**3**
	(b)	read ammeter and voltmeter adjust rheostat/supply	B1 B1	**2**
	(c) (i)	I = V/R or V = IR or R = V/I or 0.5 = 6.0/3.0 + R R = 9(.0) Ω	C1 A1	
	(ii)	60 C	B1	
	(iii)	P = VI or = I^2R or P = v^2/R or (0.5 x 3.0) x 0.5 = 0.75 W	C1 A1	**5** **[10]**

9	**(a) (i)**	to change a.c. to d.c. or rectify (a.c.)	B1	
	(ii)	full sine wave at least 1.5 full waves	B1	
		half wave rectified at least two d.c. 'bumps'	B1	**3**
	(b) (i)	correct symbol	B1	
	(ii)	when input high or 1, output low or 0 or off	B1	
		when input low or 0 or off, output high or 1 or on	B1	**3**
				[6]
10	**(a)**	8 (mins) for value, no working shown	B1	
		8 (mins) for value with suitable working or indication on graph	B1	**2**
	(b) (i)	source, aluminium and detector, recognisable shapes	B1	
		quality and all labels correct	B1	**2**
	(ii)	count background	B1	
		source and detector, no absorber, count taken	B1	
		source, absorber and detector, count taken	B1	**3**
				[7]
11	**(a)**	magnetic field and current at right angles causes	B1	
		force on wire which deflects it	B1	**2**
		or		
		field around wire (B1)		
		interacts with the field of the magnet (B1)		
	(b)	normal to/between poles, either way however expressed	C1	
		out of paper	A1	**2**
	(c)	converts electrical energy to work/k.e./movement energy	B1	**1**
	(d) (i)	split rings and brushes or equivalent (e.g. leaning wires)	B1	
	(ii)	every half turn current passes from one ring to the other	B1	
		so current flows opposite way around coil or commutates	B1	**3**
				[8]

NOTES ABOUT THE MARK SCHEME SYMBOLS

B marks	are independent marks, which do not depend on any other marks. For a B mark to be scored, the point to which it refers **must** actually be seen in the candidate's answer.
M marks	are method marks upon which accuracy marks (A marks) later depend. For an M mark to be scored, the point to which it refers **must** be seen in a candidate's answer. If a candidate fails to score a particular M mark, then none of the dependent A marks can be scored.
C marks	are compensatory method marks which can be scored even if the points to which they refer are not written down by the candidate, provided subsequent working gives evidence that they must have known it. e.g. if an equation carries a C mark and the candidate does not write down the actual equation but does correct working which shows he knew the equation, then the C mark is scored.
A marks	are accuracy or answer marks which either depend on an M mark, or allow a C mark to be scored.
c.a.o.	means 'correct answer only'
e.c.f.	means 'error carried forward'. This indicates that if a candidate has made an earlier mistake and has carried his incorrect value forward to subsequent stages of working, he may be given marks indicated by e.c.f. provided his subsequent working is correct, bearing in mind his earlier mistake. This prevents a candidate being penalised more than once for a particular mistake, but **only** applies to marks annotated 'e.c.f.'
e.e.o.o	means 'each error or omission'
brackets ()	Around words or units in the mark scheme are intended to indicate wording used to clarify the mark scheme, but the marks do not depend on seeing the words or units in brackets. e.g. 10 (J) means that the mark is scored for 10, regardless of the unit given.
underlining	Indicates that this must be seen in the answer offered, or something very similar.
un.pen.	means 'unit penalty'. An otherwise correct answer will have one mark deducted if the unit is wrong or missing. This **only** applies where specifically stated in the mark scheme. Elsewhere, incorrect or missing units are condoned.
OR/or	Indicates alternative answers, any one of which is satisfactory for scoring the marks.