

JUNE 2002

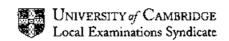
GCE Advanced Subsidiary Level

MARK SCHEME

MAXIMUM MARK : 60

SYLLABUS/COMPONENT:9702/2

PHYSICS (STRUCTURED QUESTIONS (AS))



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Categorisation of marks

The marking scheme categorises marks on the MACB scheme.

B marks: These are awarded as <u>independent</u> marks, which do not depend on other marks. For a B-mark to be scored, the point to which it refers must be seen specifically in the candidate's answer.

M marks: These are <u>method</u> marks upon which A-marks (accuracy marks) later depend. For an M-mark to be scored, the point to which it refers must be seen in the 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: These are <u>compensatory</u> method marks which can be scored even if the points to which they refer are not written down by the candidate, providing subsequent working gives evidence that they must have known it. For example, if an equation carries a C-mark and the candidate does not write down the actual equation but does correct working which shows he/she knew the equation, then the C-mark is awarded.

A marks: These are accuracy or <u>answer</u> marks which either depend on an M-mark, or allow a C-mark to be scored.

Conventions within the marking scheme

BRACKETS

Where brackets are shown in the marking scheme, the candidate is not required to give the bracketed information in order to earn the available marks.

UNDERLINING

In the marking scheme, underlining indicates information that is essential for marks to be awarded.

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1	(a)	ailo	ilow 50 g - 500 g		[1]
	(b)	allo	ow 3 MJ - 4 MJ	Bl	[1]
	(c)	allo	ow (6.0 – 8.0) × 10 ⁻⁷ m	В1	[1]
	(d)	allo	ow $(5 \times 10^4) \to (5 \times 10^5)$ Pa	BI	[1]
	(Igr	nore	sig. fig. in (a), (b), (c) and (d).		
2	(a)	OR erro	cause all readings have same error can't be eliminated by repeating and averaging or is systematic	B1 B1	[2]
	(b)	OF	crometer measures to fraction of millimetre so is precise C if repeated, reading is (almost constant)		[2]
3	(a)	ma	nt at which (whole) weight of body y be considered to act ow definition based on gravitational force)	M1 A1	[2]
		(ii)	380 N position nearer A than B clear indication about which point moments are taken e.g. $950 \times x = 380 \times 1.7$ $x = 68 \text{ cm}$	B1 B1 B1 C1	(4)
			distance = 108 cm or 1.08 m (accept 2 sig fig)	Αl	[6]

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4	(a)	$v^2 = 2gh$		
	` '	$v^2 = 2 \times 9.8 \times 1.6$	Cl	
			Al	[2]
	(b)	(i) working leading to idea that $h = 0.90 \times 1.6$	Ci Al	
			C1 A1	[4]
	(c)	$\Delta p = m(v - u) \text{ OR } p = mv $ $m = 0.073 \text{ kg}$	Cl	
		$\Delta p = 0.073 \times (5.6 + 5.3)$ = 0.80 N s	C1 A 1	[3]
	(d)	steel plate (and Earth) must gain momentum of 0.80 N s in downward direction (idea of Earth/plate and ball as the system scores 1/3)	Ml	[3]
5	(a)	increase the height of the cylinder	В1	[1]
	(b)	take heat out of gas OR expand gas OR cool it	Bi	[1]
	(c)	compress the gas OR increase pressure OR heat at constant volume	Bl	[1]
6	(a)	(i) top plate positive (ii) $E = V/d$	C1	
		= 360 V	A1	[3]
	(b)	$F = ma$ $3.0 \times 10^{4} \times 1.6 \times 10^{-19} = 9.1 \times 10^{-31} a$	C1	
		$a = 5.3 \times 10^{15} \mathrm{m s^{-2}}$	A 1	[3]

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7	` `		6.1(b):	approximately circular wavefronts centred on gap constant wavelength (allow this in (a) or (b) wavefronts plane at centre curved at edges	Al Bl Ml	[5]
		d si d si (Us	$n\theta = n\lambda$ $n13 = 2$ $d = 5.0$ $e \text{ of } \theta = 1$	× 630 × 10 ⁻⁹	CI Cl	[4]
	(c)	e.g.	more si	lits for light to pass through so more diffracted light and 'off-axis' fringes clearer	B 1	[1]
8		(ii) (iii) (i)	two resi any corr (1/2 only $P = I^2 I$ 0.81 = I = current	100 F	B1 B2 C1 A1 C1	[4]
9	, ,) (i)	rapid de for sma OR mo very slo	not able to penetrate air between source and window rop in count rate all thicknesses (up to 2 mm) ost \(\beta \) s stopped by few mm of aluminium ow drop-off in count rate	B1	[1]
		٠.	OR y	knesses greater than 2 mm much higher penetration than β	Bi	[4]