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UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the November 2005 question paper

0625 PHYSICS

0625/03

Paper 3 (Extended)

maximum raw 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*.

The minimum marks in these components needed for various grades were previously published with these mark schemes, but are now instead included in the *Report on the Examination* for this session.

- CIE will not enter into discussion or correspondence in connection with these mark schemes.

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1	(a)	force of gravity on a mass or mg mass/volume	B1 B1	[2]
	(b) (i)	hang object from spring balance, reading in N taken divide reading in N by 10 or g	B1 B1	
	(iii)	volume of water in cylinder or fill overflow can to top add object find increase in volume or measure overflow volume {no credit for mass unless not scored in (i) and no credit for density = mass/ volume unless not scored in a) }	B1 B1	[4]
	(c) (i)	2N left	B1 B1	
	(ii)	$F = ma$ or $2 = 0.5 a$ $a = 4.0 \text{ m/s}^2$	C1 A1	[4] Total [10]
2	(a)	upwards force = downwards force or no resultant force opposing moments equal or A.C.M. = C. M.	B1 B1	[2]
	(b)	30 x spring balance reading = 40 x 6.0 or equivalent spring balance reading = 8.0 N	C1 A1	[2]
	(c)	0.5 N downwards	B1 B1	[2] Total [6]
3	(a)	$P = hdg$ or $2 \times 1000 \times 10$ $= 20\,000 \text{ N/m}^2$ or Pa	C1 A1	[2]
	(b)	$p = f/a$ or $20\,000 = 50/a$ $a = 0.0025 \text{ m}^2$	C1 A1	[2]
	(c)	potential energy of the water converted to kinetic energy of water through outlet (and heat)	B1 B1	[2] Total [6]
4	(a)	turn on heater and wait until water starts dripping in beaker empty beaker & replace, start watch stop watch & remove beaker at same time record time find and record mass of water in beaker	B1 B1 B1 B1 B1	[M4]
	(b)	$60 \times t = 120 \times 340$ $t = 680 \text{ s}$	C1 A1	[2]
	(c) (i)	ice gains heat from surroundings/ice falls through funnel	B1	
	(ii)	lag or fit lid to funnel/place gauze in funnel bottom	B1	[2] Total [8]

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5	(a) (i)	random	B1	[2]
	(ii)	hit and rebound	B1	
	(b) (i)	increase or further apart	B1	[2]
	(ii)	increase or move faster	B1	
	(c) (i)	random, fast in gas to vibration in solid	B1	[2]
	(ii)	long way apart in gas to very close or touching	B1	
				Total [6]
6	(a)	Sound reflects off wall	B1	[1]
	(b)	400 Hz	B1	[1]
	(c)	$\lambda = v/f$ or $= 330/400$ $= 0.83$ m	C1 A1	[2]
	(d)	vibration/oscillation along line of/direction of wave	B1	[1]
				Total [5]
7	(a) (i)	two approximately correct reflections evidence of projecting back to image or use of equal distance from the mirror, object and image	B1 B1	[4]
	(ii)	virtual any one of upright, same size, same distance from mirror	B1 B1	
	(b) (i)	ray 1 correct ray 2 correct image correctly located	B1 B1 B1	
	(ii)	eye symbol to right of lens	B1	
				[4]
				Total [8]
8	(a)	force is produced on any charge placed in the field	B1 B1	[2]
	(b)	at least 3 parallel, straight lines plate to plate, ignore end effect at least one correct arrow, none wrong	B1 B1	[2]
	(c)	$q = It$ or $0.06 = I \times 30$ $I = 0.002$ A or 2 mA	C1 A1	[2]
	(d)	$E = VIt$ $= 1500 \times 0.008 \times 10$ $= 120$ J	C1 C1 A1	[3]
				Total [9]

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9	(a)	correct symbol correct labels	B1 B1	[2]
	(b) (i)	low, OFF or 0		
	(ii)	low, OFF or 0 need both correct	B1	[1]
	(c) (i)	need 4 boxes correct for 2 marks, -1 for e.e.o.e.	B2	
	(ii)	no change	B1	[3] Total [6]
10	(a) (i)	a.c. input causes constantly changing current through coil magnetic field formed in or around coil constantly changing magnetic field	B1 B1 B1	[M2]
	(ii)	(changing) magnetic field transferred to secondary coil	B1	
	(iii)	(changing) magnetic field cuts secondary coil induces e.m.f.	B1 B1	[3]
	(b)	more turns on secondary (than on primary)	B1	[1]
	(c)	no transfer of magnetic field from primary to secondary	B1	[1]
	(d)	$V_p I_p = V_s I_s$ or $100 \times 0.4 = 200 \times I_s$ $I_s = 0.2 \text{ A}$	C1 A1	[2] Total [9]
11	(a)	β -source and detector suitably arranged deflecting plates suitably arranged additional detail e.g. slit or collimator, vacuum chamber, circuit connected to deflecting plates	B1 B1 B1	[3]
	(b)	at least 3 readings at right angles beyond & perp. to the plates one near +ve, one near -ve and one in centre	M1 A1	[2]
	(c)	highest reading near +ve plate	B1	[1]
	(d)	electrons negatively charged, attracted to +ve	B1	[1]
				Total [7]