

MARK SCHEME for the October/November 2006 question paper

0625 PHYSICS

0625/03

Paper 3 (Extended Theory), 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 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.

The grade thresholds for various grades are published in the report on the examination for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level syllabuses.

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Page 2	Mark Scheme	Syllabus	Paper
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1	(a) (i)	$t = v/g$ or $32/10$ $= 3.2$ s	C1 A1		
		(ii)	straight line starting at zero, inclined line joining 0,0 and 3.2, 32, accept c.f. from time (i)	C1 A1	
		(iii)	2.4 kg	A1	[5]
	(b)	(i)	take volume of water before use (totally) immerse stone and take new volume (Not clearly measured before and after C1)	B1 B1	
		(ii)	hang rock from balance and take reading	B1	
		(iii)	density = mass/volume	B1	
		(iv)	need to tie "sinker" or cork or press cork down need volume with sinker then volume with sinker and cork or just completely submerge cork	B1 B1	[6]
				[Total: 11]	
	2	(a)	limit of proportionality (allow elastic limit)	B1	[1]
		(b)	force is proportional to extension or in terms of doubling	B1	[1]
(c)		(up to Q extension proportional to force applied) Q to R extension/unit force more however expressed	B1	[1]	
(d)		$k = \text{force/extension}$ or $8/2$ or other correct ratio $= 4.0$ N/mm	C1 A1	[2]	
			[Total: 5]		
3	(a)	p.e. lost = mgh or $1 \times 10 \times 7$ $= 70$ J	C1 A1	[2]	
	(b)	$70 = 0.5 \times m \times v^2$ or ecf $v^2 = 140$ or $2 \times \text{p.e.}$ $v = 12$ m/s	C1 C1 A1	[3]	
	(c)	some p.e. changed to heat/sound/either one/work done against air resistance air/resistance acts against the motion	B1	[1]	
			[Total: 6]		
4	(a) (i)	1 is 20°C 2 is $15 \pm 1^\circ\text{C}$, need both correct for a mark	A1		
		(ii)	more heat lost at higher temperature	B1	[2]
	(b)	heat in = 60×210 or Wt or $12\,600$ (J) heat in water = $m \times s \times \Delta\theta$ or $75 \times s \times 40$ $s = 12600/75 \times 40$ $= 4.2$ J/g $^\circ\text{C}$	C1 C1 C1 A1	[4]	
		(c)	outline correct, two wires with <u>clear</u> junction and a meter/datalogger/computer labels, hot and cold junctions or clear, two different metals	M1 A1	[2]
			[Total: 8]		

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5	(a) (i)	conduction	B1	
	(ii)	particles/atoms/ions vibrate or electrons move and carry energy pass on energy from one particle to the next	B1 B1	[3]
	(b)	four surfaces facing <u>one</u> heat source suitable detector e.g. thermometer behind surface-read all 4 precaution e.g. equal distance/time (Can not score last two marks if experiment is totally wrong)	B1 B1 B1	[3]
				[Total: 6]
6	(a)	completed path	B1	[1]
	(b)	any two correct, -1 each incorrect virtual, inverted, same size as object	B2	[2]
	(c)	angle of incidence zero/at right angles/along normal	B1	[1]
	(d)	$1.5 = V_a/V_g = 3 \times 10^8/V_g$ $V_g = 2 \times 10^8 \text{ m/s}$	C1 A1	[2]
	(e)	angle of incidence = 45° , so angle of reflection = 45° , so ray turns through 90° OR angle $i >$ angle c so totally internally reflects	B1 B1	[2]
			[Total: 8]	
7	(a)	straight not circular or WTTE waves not same wavelength/same distance apart waves should extend into shadow area (more) any 2	B2	[2]
	(b)	diagram showing large flat piece with circular edges (ignore any wavelength changes) but straight part must be (very) nearly equal to slit width	M1 A1	[2]
	(c)	speed = 1.2×8 = 9.6 cm/s	C1 A1	[2]
			[Total: 6]	
8	(a)	switch in correct position	B1	[1]
	(b) (i)	rheostat/variable resistance symbol drawn	B1	
	(ii)	dot and R in line to 12 W lamp	B1	[2]
	(c)	Question deleted		
	(d)	$R = V/I$ or $12/.3$ = 4Ω	C1 A1	[2]
	(e) (i)	parallel circuit/all lamps connected separately across the 12V	B1	
	(ii)	4 A	A1	[2]
			[Total: 7]	

Page 4	Mark Scheme	Syllabus	Paper
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9	(a) (i)	connections one to each plate	M1	[2]	
		top one to +ve , bottom one to -ve (New PSU drawn C1)	A1		
	(b)	(ii)	electrons negatively charged	B1	[3]
			one plate positively charged, one negatively charged	B1	
		electrons attracted to +/repelled by –	B1		
	(b) (i)	time base applied to X plates stated or described	B1	[2]	
(ii) a.c. or varying voltage applied to Y plates		B1			
(c)	2 full waves, (equal about centre line)	B1	[1]		
			[Total: 8]		
10	(a)	A – resistor B – LDR C – transistor D – lamp (–1 each incorrect)	B2	[2]	
	(b)	C	B1	[1]	
	(c)	resistance of LDR low in light, high in dark	B1	[3]	
		increase of resistance/potential in circuit cause transistor to conduct ($V_{be} > 0.6 \text{ V}$) switches lamp on	B1 B1		
			[Total: 6]		
11	(a) (i)	atoms interact with by particle/photon not radiation	B1	[3]	
		electron(s) removed to form ions	B1		
	(b)	(ii) much greater mass or size/slower speed/more ion pairs/cm/larger charge	B1	[3]	
		(i) any 2 correct	B2	[4]	
		(ii) e.g. foil thickness described/outline diagram foil too thick less reading/notes on diagram to show method other examples will occur, must have two clear points: e.g. 1. gamma rays aimed at cancer (not just radiation) focused on tumour e.g. 2. fission of heavy nucleus (accept named nuclide) leads to more fissions/chain reaction	B1 B1		
			[Total: 7]		