June 2004

INTERNATIONAL GCSE

MARK SCHEME

MAXIMUM MARK: 80

SYLLABUS/COMPONENT: 0625/03

PHYSICS
Paper 3 (Extended)

UNIVERSITY of CAMBRIDGE
International Examinations

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1	(a)	(i)	Acceleration / increase in speed	M1	
			Uniform / constant or in a straight line	A1	
		(ii)	Uniform speed	B1	
			Velocity changes / motion in a circle / accelerates	B1	4
	(b)		Similarity: same value / 6m/s or velocity changing	B1	
			Difference: opposite directions / up at E, down at C	B1	2
	(c)	(i)	Average speed x time / area under graph / 3 x 20	C1	
			60 m	A1	
		(ii)	6 x 52	C1	
			312m	A1	4
					[10]
2	(a)		750 N	A1	1
	(b)		p.e. lost / converted = mgh or weight x height	C1	
			750 x 15 or 75 x10 x15 = 11250 (J)	C1	
			p.e. lost = k.e. gained = 11250 (J)	A1	3
	(c)		Any 3 of: heat in water / rock (kinetic) energy of (moved) water / to make water move/ make waves some k.e. still in (sinking) rock sound energy on impact / of splash	B3	3
			(just heat and sound **C1**)		
					[7]
3	(a)	(i)	Extension proportional to load however expressed	B1	
		(ii)	Any relevant arithmetic to show direct proportion (or straight line graph with values)	B1	2
	(b)	(i)	Work done = force x distance / 400 x 0.210	C1	
			84.0 J	A1	
		(ii)	(total) work/time or (24 x) 84/60 (apply e.c.f from **(i)**)	C1	
			33.6 W	A1	4
					[6]
4	(a)		Water molecules at higher temps. have higher (av) k.e. / energy	B1	
			Higher energy molecules (have greater chance to) escape the surface	B1	
			Higher energy molecules have energy to break liquid “bonds” or separate liquid molecules or more evaporation at 85°C (lowers level)	B1	3
	(b)		Heat for evaporation = 34 500 – 600 = (33 900)	C1	
			Sp. latent heat of evaporation = heat/mass evap. or 33 900 / 15	C1	
			2260 J/g (method and working correct, but no heat loss used, 2/3)	A1	
			(600 added or 34 500 used can score **2 max**)		3

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5	(a)	(i)	Thermopile / thermocouple / (blackened) thermometer / infra red detector or use ammeter / voltmeter in supply circuit	B1	
		(ii)	One of: same distance of plate to detector or use two identical detectors or same time (after switching on)	B1	
		(iii)	Dull black better radiator / radiates more than silver / or emits more heat / radiation	B1	
		(iv)	Infra red (i.r.)	A1	4
	(b)		any correct example e.g. heating water or chimney	M1	
			current clear and complete	A1	
			direction shown correctly by arrows	A1	3
					[7]
6	(a)	(i)	Refraction at Q approx. correct, ray emerge from AB parallel PQ	B1	
		(ii)	Angle of incidence correctly marked	B1	
			Angle of refraction correctly marked	B1	
			(can score even if incorrect / no refraction shown)		3
	(b)	(i)	Refractive index = speed in air / speed in glass	B1	
		(ii)	Refractive index = $(3 \times 10^8 / 2 \times 10^8) = 1.5$	B1	2
	(c)	(i)	Wavelength = v/f or $3 \times 10^8 / 6 \times 10^{14}$	C1	
			Wavelength = 5×10^{-7} m	A1	2
					[7]
7	(a)		C,R,C,R,C,R marked (or v.v.) along XY	B1	1
	(b)	(i)	Above normal / high air pressure or particles close together	B1	
		(ii)	Below normal / low pressure or particles further apart	B1	2
	(c)		Oscillation / vibration of particles / molecules (or particles / molecules move to and fro)	B1	
			Oscillation is along XY	B1	2
	(d)		Time = distance / speed or (2x) 50/340	C1	
			Time = 0.29 s	A1	2

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8	(a)		1.52 kW	A1	1
	(b)	(i)	Each appliance is connected across 240 V supply or equivalent	B1	
		(ii)	Any 2: all work on same voltage or on 240 V or mains OR all have full/stated power OR each can be on or off OR one goes off/breaks others stay on	B2	3
	(c)	(i)	Current = power/voltage or 200/240	C1	
			Current = 0.83 A	A1	
		(ii)	Energy = power x time or 1.2 x 3	C1	
			Energy = 3.6 kWh or 1.3 x 10^7 J	A1	
		(iii)	Current = 60/240	C1	
			R= V/I or 240/0.25	C1	
			R =960Ω	A1	7
					[11]
9	(a)		Solenoid ends connected to meter, both labelled	B1	
			One magnet in correct position to enter / leave solenoid, labelled	B1	2
	(b)		Push magnet into coil / pull out / move near end of coil	B1	1
	(c)		(magnet has / produces) magnetic lines of force / magnetic field	B1	
			lines cut (coils of) solenoid / coils / wires	B1	2
	(d)	(i)	Pull magnet out of coil / reverse effect to answer **(b)**	B1	
		(ii)	Move magnet faster or effect in **(a)** faster	B1	2
					[7]
10	(a)		Analogue, continuously increasing / decreasing readings	B1	
			Digital, readings increase / decrease by one unit	B1	2
	(b)	(i)	Transistors + other components such as resistors	B1	
		(ii)	Standard symbol, must have labeled inputs and output	B1	
		(iii)	Both inputs 0 (off), or either one input 0 (off), output 0 (off)	B1	
			Both inputs 1 (on), output 1 (on) OR correct truth table drawn (**C1**) Some explanation of what truth table shows (**A1**)	B1	4
					[6]
11	(a)		Particle 1 carries straight on	B1	
			Particle 2 (slightly) deflected (less than 90°)	B1	
			Particle 3 “turns back” / (deflected more than 90°)	B1	3
	(b)		Nucleus is heavy /dense / all or most of mass in atom in nucleus	B1	
			Most of atom is space or nucleus is (very) small cf. atom	B1	2
	(c)		(mass) 4	B1	1
					[6]

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PAPER TOTAL = [80]