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Cambridge International General Certificate of Secondary Education

PHYSICS

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Paper 3 Core Theory

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MARK SCHEME

Maximum Mark: 80

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This document consists of **12** printed pages.

Question	Answer	Marks
1(a)	flexible rule/tape measure/measuring tape	B1
1(b)(i)	58.75 (s)	B1
1(b)(ii)	speed = distance ÷ time in any form	C1
	0.85 (m/s)	A1
1(b)(iii)	7.12 (s)	B1
	Total:	5

Question	Answer	Marks
2(a)(i)	6500 (g)	B1
2(a)(ii)	density = mass ÷ volume in any form	B1
	1.3	A1
	g/cm ³	B1
2(b)	density (of brush) is less (than) density of paint	B1
	Total:	5

Question	Answer	Marks
3(a)	weight = mass $\times$ gravitational field strength in any form	C1
	20.0×10.0	C1
	200 (N)	A1
3(b)(i)	moment = force $\times$ (perpendicular) distance (from pivot) in any form	C1
	180.0×2.5	C1
	450 (Nm)	A1
3(b)(ii)	2nd box down ticked decrease the length of the arm holding the sun-shade	B1
	Total:	7

Question	Answer	Marks
4(a)	radiation	B1
4(a)(ii)	thermometer near door or B is at higher temperature	B1
	any 2 from: darker colours are better absorbers (of thermal energy) darker colours are better emitters (of thermal energy) white/lighter colours are better reflectors (of thermal energy) white/lighter colours are poorer absorbers (of thermal energy) white/lighter colours are poorer emitters (of thermal energy)	B2
4(b)	any 3 from: cold air is denser (than warm air) cold air will fall the cold air is warmed and expands less dense/warm air rises or replaces the cold air (forming a) convection (current)	B3
	Total:	7

Question	Answer	Marks
5(a)	any two from: more collide with walls more often so pressure is greater (inside bag)	B2
5(b)	density (of sea water) depth (of sea water) (in either order)	B2
5(c)(i)	barometer	B1
5(c)(ii)	3.4 or 1.3 seen	C1
	2.1	C1
	1035.7	A1
	Total:	8

Question	Answer	Marks
6(a)(i)	normal line drawn at 90° to mirror by eye	B1
6(a)(ii)	reflected ray drawn with $i = r$ by eye	B1
6(a)(iii)	angle of incidence = angle of reflection	B1
6(a)(iv)	Mark is for the explanation linked to candidate's diagram. e.g. if answer is YES they should state that the reflected ray hits/reaches the (other)driver/car or can be seen	B1
6(b)(i)	ray refracted toward the normal	B1
6(b)(ii)	angle of incidence labelled	B1
	angle of refraction labelled	B1
	Total:	7

Question	Answer	Marks
7(a)(i)	visible light	B1
	gamma rays	B1
7(a)(ii)	wavelength	B1
	frequency	B1
7(b)	(sound) is a longitudinal wave (radio waves are transverse) (sound) needs a medium to be transmitted (but radio waves do not)	B1
7(c)	any four from: only award 4 marks if valid procedure (use tape measure) to measure distance of at least 100 m blocks banged together stopwatch started when blocks are SEEN to hit stopwatch stopped when sound heard time taken recorded/calculated speed = distance ÷ time	B4
	Total:	9

Question	Answer	Marks
8(a)	At least 2 curves drawn from one end of magnet to the other	B1
	pattern is symmetrical by eye above and below middle of magnet	B1
	Arrow from N to S	B1
8(b)	any 2 from: magnet/block/metal placed in coil coil connected to d.c. supply (d.c.) current in coil (for short time)	B2
8(c)	tick in 4th box steel	B1
	Total:	6

Question	Answer	Marks
9(a)	arrow drawn pointing from C to D	B1
	arrow on /near side CD pointing upwards	B1
9(b)	any 2 from: increase (size of) current increase strength of magnet increase number of turns in coil	B2
9(c)(i)	electrons	B1
9(c)(ii)	current is smaller	B1
	(as) resistance of coil/wire is greater	B1
	Total:	7

Question	Answer	Marks
10(a)	in any order: cells/battery (connected) incorrectly voltmeter used instead of ammeter thermistor symbol used instead of LDR symbol	B3
10(b)(i)	resistance decreases as brightness increases	B1
10(b)(ii)	(resistance at 60% full brightness) = 2000 (ohms)	B1
	resistance = voltage ÷ current in any form e.g. $I = \frac{V}{R}$	C1
	8.0 ÷ 2000	C1
	4×10^{-3} (A)	A1
	Total:	8

Question	Answer	Marks
11(a)	protects circuit if current too large	B2
11(b)(i)	copper	B1
11(b)(ii)	$\frac{N_s}{N_p} = \frac{V_s}{V_p}$ in any form	C1
	$\frac{16}{224} = \frac{N_s}{308}$ or $\frac{224}{16} = \frac{308}{N_s}$	C1
	22 (turns)	A1
	Total:	6

Question	Answer	Marks
12(a)	proton	B1
	positive or +1	B1
12(a)(ii)	tick in third box	B1
12(b)	idea of mass being halved, e.g. 0.5	C1
	0.25 (mg)	A1
	Total:	5