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**PHYSICS**

**0625/32**

Paper 3 Core Theory

**May/June 2017**

MARK SCHEME

Maximum Mark: 80

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**Published**

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

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

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

Question	Answer	Marks
3(a)	weight = mass · gravitational field strength in any form	C1
	20.0 · 10.0	C1
	200 (N)	A1
3(b)(i)	moment = force · (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
	<b>Total:</b>	<b>7</b>

Question	Answer	Marks
4(a)	radiation	<b>B1</b>
4(a)(ii)	thermometer near door or B is at higher temperature	<b>B1</b>
	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)	<b>B2</b>
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)	<b>B3</b>
	<b>Total:</b>	<b>7</b>

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

Question	Answer	Marks
6(a)(i)	normal line drawn at $90^\circ$ to mirror by eye	<b>B1</b>
6(a)(ii)	reflected ray drawn with $i = r$ by eye	<b>B1</b>
6(a)(iii)	angle of incidence = angle of reflection	<b>B1</b>
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	<b>B1</b>
6(b)(i)	ray refracted toward the normal	<b>B1</b>
6(b)(ii)	angle of incidence labelled	<b>B1</b>
	angle of refraction labelled	<b>B1</b>
	<b>Total:</b>	<b>7</b>

Question	Answer	Marks
7(a)(i)	visible light	<b>B1</b>
	gamma rays	<b>B1</b>
7(a)(ii)	wavelength	<b>B1</b>
	frequency	<b>B1</b>
7(b)	(sound) is a longitudinal wave (radio waves are transverse) (sound) needs a medium to be transmitted (but radio waves do not)	<b>B1</b>
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	<b>B4</b>
	<b>Total:</b>	<b>9</b>

Question	Answer	Marks
8(a)	At least 2 curves drawn from one end of magnet to the other	<b>B1</b>
	pattern is symmetrical by eye above and below middle of magnet	<b>B1</b>
	Arrow from N to S	<b>B1</b>
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)	<b>B2</b>
8(c)	tick in 4th box steel	<b>B1</b>
	<b>Total:</b>	<b>6</b>



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

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

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

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