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**PHYSICS****0625/33**

Paper 3 Core Theory

**October/November 2017**

MARK SCHEME

Maximum Mark: 80

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**Published**

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This document consists of **8** printed pages.

Question	Answer	Marks
1(a)(i)	A <b>AND</b> B cars identified	<b>B1</b>
	A = fastest AND B = slowest	<b>B1</b>
1(a)(ii)	speed = distance $\div$ time in any recognised form	<b>C1</b>
	50 $\div$ 4	<b>C1</b>
1(b)(i)	12.5 (m / s)	<b>A1</b>
	100 $\times$ 3.6 <b>OR</b> 360 (s) indicated	<b>C1</b>
	answers in the range 5–7 minutes	<b>A1</b>
1(b)(ii)	any one from:	
	car will move faster / slower at times / speed not constant	<b>B1</b>
	road will have bends / hills etc.	
	slower moving traffic or other sensible road conditions	

Question	Answer	Marks
2(a)	measuring cylinder (partially filled) with water / displacement can filled with water	<b>B4</b>
	object (submerged) into water owtte	
	new volume noted / displaced water collected in measuring cylinder	
	(volume of object = ) difference in volumes / volume of water collected	
2(b)	density = mass $\div$ volume written in any recognised form	<b>C1</b>
	347 $\div$ 18	<b>C1</b>
	19.28 <b>OR</b> 19.3 (g / cm <sup>3</sup> )	<b>A1</b>

Question	Answer	Marks
3(a)	$w = m \times g$ in any recognised form	<b>C1</b>
	2250 / 10	<b>C1</b>
	225 (kg)	<b>A1</b>
3(b)(i)	moment = force $\times$ distance from pivot in any recognised form	<b>C1</b>
	400 $\times$ 0.4 <b>OR</b> 400 $\times$ 40	<b>C1</b>
	160 <b>OR</b> 16 000	<b>A1</b>
	Nm <b>OR</b> Ncm	<b>B1</b>
3(b)(ii)	apply force further from pivot owtte	<b>B1</b>

Question	Answer	Marks
4(a)(i)	elastic	<b>B1</b>
4(a)(ii)	elastic	<b>B1</b>
	kinetic	<b>B1</b>
4(a)(iii)	kinetic	<b>B1</b>
	thermal	<b>B1</b>
4(b)	pull band further back / exert greater force on band / increase elastic potential energy	<b>B1</b>

Question	Answer	Marks
5(a)	<u>Tyre B</u>	<b>B1</b>
	<u>larger / bigger surface area</u>	<b>B1</b>
	less pressure (on ground) / weight distributed	<b>B1</b>
5(b)	molecules gain kinetic energy / move faster	<b>B1</b>
	more (frequent) / harder collisions (with tyre)	<b>B1</b>
	Increased / greater pressure (on tyre)	<b>B1</b>

Question	Answer	Marks
6(a)(i)	mercury	<b>B1</b>
6(a)(ii)	arrow between 0 °C and start of capillary tube	<b>B1</b>
6(a)(iii)	0 (°C) <b>AND</b> 100 (°C)	<b>B1</b>
6(b)	<u>emitter</u>	<b>B1</b>
	<u>conductor</u>	<b>B1</b>
	<u>convection</u>	<b>B1</b>
	<u>radiation</u>	<b>B1</b>

Question	Answer	Marks
7(a)	wavelength correctly indicated	<b>B1</b>
7(b)	<u>12</u> (cm)	<b>B1</b>
7(c)	40 / 60	<b>C1</b>
	0.67 (Hz)	<b>A1</b>
7(d)	direction of travel perpendicular to direction of vibration owtte	<b>B1</b>
7(e)	any component of the electromagnetic spectrum	<b>B1</b>

Question	Answer	Marks
8(a)(i)	top ray passes through $f_2$	<b>B1</b>
	bottom ray passes through $f_2$	<b>B1</b>
	refraction correctly shown either at centre of lens <b>OR</b> at both edges of lens	<b>B1</b>
8(a)(ii)	C to $f_2$	<b>B1</b>
8(b)(i)	critical angle	<b>B1</b>
8(b)(ii)	ray internally reflected	<b>B1</b>
	reflecting angle = incident angle	<b>B1</b>

Question	Answer	Marks
9(a)	light travels faster than sound <b>OR</b> reverse argument	<b>B1</b>
9(b)	reflection (from building) / bouncing back (from building)	<b>B1</b>
9(c)	time taken for first sound = 0.5 s	<b>C1</b>
	Time taken for echo = 2.5 s <b>OR</b> time for sound to travel from hammer and return = 2.0 s	<b>C1</b>
	2.0 s	<b>A1</b>
9(d)	quieter / less amplitude / less energy	<b>B1</b>

Question	Answer	Marks
10(a)(i)	two curved field lines drawn above and below the magnet	<b>B1</b>
	lines start and finish at the poles of the magnet	<b>B1</b>
10(a)(ii)	both arrows point left	<b>B1</b>
10(a)(iii)	(plotting) compass	<b>B1</b>
10(b)	place end on end / see if attraction / repulsion occurs	<b>B1</b>
	repulsion at one end	<b>B1</b>

Question	Answer	Marks
11(a)	ammeter in series	<b>B3</b>
	voltmeter across wire	
	two cells correctly linked positive to negative	
11(b)	$V = IR$ in any recognised form	<b>C1</b>
	$R = 2.7 \div 0.3$	<b>C1</b>
	9 ( $\Omega$ )	<b>A1</b>
11(c)	1 higher / more	<b>B1</b>
	2. lower / less	<b>B1</b>

<b>Question</b>	<b>Answer</b>	<b>Marks</b>
12(a)	Gamma	<b>B1</b>
12(b)	1 helium nuclei <b>OR</b> nuclide notation <b>OR</b> 2p, 2n	<b>B1</b>
	2 low / few cm of air / stopped by paper	<b>B1</b>
12(c)	2 half-life indicated	<b>B1</b>
	<u>25</u> (%)	<b>B1</b>