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PHYSICS

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Paper 3 Core Theory

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MARK SCHEME

Maximum Mark: 80

Published

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Question	Answer	Marks
1(a)	rule(r)	B1
	(stop) watch/clock	B1
1(b)(i)	x-axis labelled time/t with minutes	B1
	y-axis clearly labelled depth/distance/height with mm/cm/m	B1
1(b)(ii)	line drawn from the origin	B1
	single straight diagonal line	B1
1(c)	1000 mm = 1 m OR $2.5 \div 1000$	C1
	0.0025 (m) OR $2.5 \cdot 10^{-3}$	A1
	Total:	8

Question	Answer	Marks
2(a)	<u>35 m/s</u>	B1
2(b)	area under line/graph	C1
	$0.5 \cdot 15 \cdot 25$	C1
	187.5 (m)	A1
2(c)	single straight line with steeper gradient than car A	B1
	horizontal line below 25 m/s	B1
	Total:	6

Question	Answer	Marks
3(a)	$W = m \cdot g$ OR $15 \cdot 10$	C1
	150 (N)	A1
3(b)(i)	turning effect (of a force)	B1
3(b)(ii)	moment = force $\cdot$ distance	C1
	$425 \cdot 2.5$	C1
	1062.5 OR 1063	A1
	N m	B1
3(b)(iii)	(move rope/tyre) closer to trunk owtte	B1
	Total:	8

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Question	Answer	Marks
4(a)	(gravitational) potential (energy)/(G)PE	B1
4(b)	any 3 from: water flows down OR water flows at constant speed water drives turbine OR turbine rotates owtte turbine turns generator (at constant speed) electricity generated/produced owtte	B3
4(c)	transferred to thermal OR sound	B1
	dissipated to the surroundings owtte	B1
4(d)	shorter (travelling) distance/water in B higher than A/water from A has to be pumped (up to C) owtte	B1
	Total:	7

Question	Answer	Marks
5(a)	<u>friction</u>	B1
5(b)(i)	total area = $3 \cdot 4 = 12 \text{ (cm}^2\text{)}$	C1
	total weight = $525 + 75 \text{ N} = 600\text{(N)}$	C1
	$P = F \div A$ in any form	C1
	$600 \div 12$	C1
	$50 \text{ (N/cm}^2\text{)}$	A1
5(b)(ii)	less (surface) area (in contact with the ground) owtte	B1
	more pressure (results in more damage to the surface)	B1
	Total:	8

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Question	Answer	Marks
6(a)	more regular/uniform arrangement/fixed position owtte	B1
	separation between atoms decreases/move closer/tightly packed	B1
	slower moving atoms/atoms vibrate (more slowly)	B1
6(b)	(water) molecules gain energy (from surroundings)	B1
	molecules escape from a liquid (surface)	B1
	<u>evaporation</u>	B1
	Total:	6

Question	Answer	Marks
7(a)	<u>ultra violet/UV</u>	B1
	<u>X-rays</u>	B1
7(b)	remote controller/burglar detection systems/grills/incubators/cable TV systems/thermal imaging/ <u>optical fibre communication</u>	B1
7(c)	heats cells/tissue (inside the body)	B1
	Total:	4

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Question	Answer	Marks
8(a)	<u>78</u>	B1
8(b)	(radiations that) remove electrons OR break molecules	B1
8(c)	pair of count-rate values used	C1
	clear indication of use of graph, expect two vertical lines or two clear indications on axes using their values	C1
	8 days ($\pm$ 1 day)	A1
8(d)	2 half-lives	C1
	240 hours	A1
	Total:	7

Question	Answer	Marks
9(a)	light travels faster than sound or converse argument	B1
9(b)(i)	<u>echo</u>	B1
9(b)(ii)	amplitude – smaller	B1
	speed – the same	B1
9(c)	speed = distance ÷ time	C1
	170 + 170 OR 340 ÷ 1	C1
	340 (m/s)	A1
	Total:	7

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Question	Answer	Marks
10(a)(i)	attraction/strong magnet pulling small magnet	B1
	the two magnets have opposite poles facing each other	B1
10(a)(ii)	drops/falls due to repulsion owtte	B1
10(b)(i)	magnet stroked along pin/stroked in same direction by magnet/pin stroked using same pole of magnet	B1
	procedure repeated/several times	B1
10(b)(ii)	use a known magnet	B1
	opposite poles attract OR like poles repel	B1
	Total:	7

Question	Answer	Marks
11(a)	thermal	B1
	lost to surroundings/air owtte	B1
11(b)(i)	<u>ammeter</u>	B1
11(b)(ii)	correct symbol for voltmeter	B1
	connected in parallel with the resistance wire	B1
11(b)(iii)	variable resistor	B1
	varies/changes current/resistance/voltage (in resistance wire)	B1
	Total:	7

Question	Answer	Marks
12(a)	coil of wire connected in series with (sensitive) ammeter	B1
	magnet moves relative to coil	B1
	meter indicates/measures (induced) current	B1
12(b)	Any two from:	B2
	speed of movement of wire	
	strength of magnet	
	number of coils/turns per metre	
	Total:	5