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Cambridge International General Certificate of Secondary Education

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Paper 3 Core Theory	October/November 2018
MARK SCHEME	
Maximum Mark: 80	

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This document consists of **13** printed pages.



Question	Answer	Marks
1(a)(i)	constant speed OR speed of 4 m / s (for 80 s)	B1
	(constant) deceleration OR speed decreases OR slows (down after 80 s) OR stops after 100 s	B1
1(a)(ii)	distance = area under graph	C1
	$20 \times 4 \times 0.5$ or area = $\frac{1}{2} \times \text{base} \times \text{height}$	C1
	40 (m)	A1
1(b)	(average speed =) total distance $\div$ total time	C1
	$(630 + 254) \div (130 + 40)$ OR $884 \div 170$	C1
	5.2 (m / s)	A1

Question	Answer	Marks
2(a)(i)	<u>weight</u>	B1
2(a)(ii)	$W = m \times g$	C1
	$m = 20\,000 \div 10$	C1
	2000 (kg)	A1
2(b)	400 (N)	B1
	forwards / to the right	B1

Question	Answer	Marks
3(a)	Force $\times$ distance (from pivot) OR $80\,000 \times 5.0$	C1
	400 000	A1
	Nm	B1
3(b)	c.w. moment = a.c.w moment OR moment of load = moment of counterweight OR $5.0 \times 80\,000 = \text{load} \times 8.0$	C1
	$400\,000 \div 8.0 = \text{load}$	C1
	50 000 (N)	A1

Question	Answer	Marks
4(a)(i)	regular arrangement of atoms in LH box regular arrangement of atoms in LH box	B1
4(a)(ii)	few atoms with no pattern in RH box	B1
4(b)	melting below arrow on left	B1
	condensing / condensation below arrow on right	B1
4(c)	evaporate / evaporation seen anywhere in explanation	B1
	Any two from: atoms (at the surface) gain KE fastest molecules / molecules with most energy (are able to) escape from surface	B2

Question	Answer	Marks
5(a)	(gravitational) potential energy	B1
5(b)	Any 3 from: water flows through tunnel / has kinetic energy when tide coming in / going out (moving) water causes turbines / (component) X to rotate / turn (the turbine) turns a generator	B3

Question	Answer	Marks
6(a)	<u>insulator(s)</u>	B1
6(b)	aluminium AND copper	B1
6(c)	(one end of both rods) placed in same (type of) heat source means of detecting raised temperature e.g. wax covered rods OR pins attached to rods with wax outcome explained e.g. wax melted further / first on better conductor	B3

Question	Answer	Marks
7(a)(i)	ultraviolet (waves / radiation)	B1
7(a)(ii)	wavelength	B1
7(a)(iii)	(visible light and radio waves) / (they have) the same (speed)	B1
7(b)(i)	Any 2 from: Checking bags or people or packages For hidden objects shadow / image on screen / monitor	B2
7(b)(ii)	Transmission (of X-rays) through less dense materials OR absorption (of X-rays) by dense materials	B2

Question	Answer	Marks
8(a)(i)	vibrates	B1
8(a)(ii)	Yes	B1
	(as within audible range of) 20 Hz to 20 000 Hz	B1
8(b)	line drawn with smaller amplitude	B1
	lower frequency i.e. fewer waves on screen	B1

Question	Answer	Marks
9(a)	electrons	B1
	move / transfer from the rod OR move / transfer to the cloth	B1
9(b)	Any 3 from: (idea of bringing) rod near balloon if balloon repels it is positively charged as like charges repel	B3

Question	Answer	Marks
10(a)(i)	correct symbols for:	
	ammeter	B1
	voltmeter	B1
	ammeter in series OR voltmeter in parallel	B1
10(a)(ii)	Any five from: close switch adjust / change variable resistor to give current in resistor / reading on ammeter measure / record (pair of) readings on ammeter and voltmeter description of any check for reliability idea of adjusting variable resistor to give range of readings plot a graph suitable spacing of readings e.g. every 0.05A or 0.1 A use of $V = IR$ or $R = V / I$ repeat AND calculate average (value for R)	B4
10(b)	(circuit) resistance increases	B1
	BUT (circuit) resistance doubles / becomes $40\ \Omega$ (award two marks as assumes previous (1 st) marking point)	B1
	(current) decreases	B1
	BUT(current) halves / becomes 0.2 A (award two marks as assumes previous (3 rd) marking point)	B1

Question	Answer	Marks
11(a)	$(V_p / V_s) = (N_p / N_s)$ in any form	C1
	$230 / V_s = 1710 / 90$ or $V_s = (230 \times 90) / 1710$ OR $V_s = 230 / 19$	C1
	12 (V)	A1
11(b)	In a step-down transformer there are fewer turns <u>on secondary / output coil</u> (than on primary / input coil)	B2
	In a step-up transformer there are more turns <u>on secondary / output coil</u> (than on primary / input coil)	
11(c)	less energy / power wasted (in cables) / more efficient (transmission)	B1
	And any one from: (because) smaller current (in transmission cables) (and so) smaller heating effect (in transmission cables) (and so) thinner cables can be used (which are cheaper)	B1

Question	Answer	Marks
12(a)	1. 6	B1
	2. 6	B1
	3. 8	B1
12(b)	Any three from: (nucleus has) same number protons or same atomic / proton number same charge different mass different nucleon number different number of neutrons	B3
12(c)	idea of 3 half-lives Or $8.0 \rightarrow 4.0 \rightarrow 2.0 \rightarrow 1.0$	C1
	5700×3	C1
	17 100 (years)	A1