Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

PHYSICS **0625/31**

Paper 3 Core Theory **October/November 2017**

MARK SCHEME

Maximum Mark: 80

Published

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Question	Answer	Marks
1(a)	stopwatch or stopclock	**B1**
1(b)	improved accuracy	**B1**
1(c)(i)	circle around 3rd OR 3.55	**B1**
1(c)(ii)	3.93 + 4.07 + 3.99 = 11.99	**C1**
	(11.99 ÷ 3 =) 4.0 (s)	**A1**
1(c)(iii)	0.40 (s) OR **(c)(ii)** ÷ 10	**B1**

Question	Answer	Marks
2(a)	Any four from: Measure the distance between the two bridges Start stopwatch when stick hits water / starts moving (with river) stop stopwatch when stick reaches bridge Y Use speed = distance ÷ time repeat procedure and find average	**B4**
2(b)	2nd box ticked The forward force and the backward force are equal	**B1**

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Question	Answer	Marks
3(a)	subtraction of forces to obtain resultant or 30 (N)	**B1**
	up(wards)	**B1**
3(b)	any five from: measure mass (on top pan balance) part fill measuring cylinder with water (and note volume) submerge link in measuring cylinder determine increase in volume increase in volume = volume of link use density = mass ÷ volume Only award full marks for a viable method	**B5**

Question	Answer	Marks
4(a)	1 solar / Sun	**B1**
	2 wind	**B1**
4(b)(i)	any two from: (renewable sources) are replaceable in a short time no (atmospheric) pollution conserves fossil fuels do not contribute to global warming no fuel costs	**B2**
4(b)(ii)	any one from: dilute source of energy owtte dependent on weather / intermittent supply	**B1**

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Question	Answer	Marks
5(a)	solid	**B1**
5(b)	gas	**B1**
5(c)	liquid	**B1**
5(d)	gas	**B1**

Question	Answer	Marks
6(a)	ray leaves glass at top surface	**B1**
	ray refracted away from normal	**B1**
6(b)(i)	ray reflected into glass	**B1**
	angle *i* = angle *r* by eye	**B1**
6(b)(ii)	total internal reflection	**B1**
6(c)	waves with arcs centred on gap	**B1**
	same wavelength	**B1**

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Question	Answer	Marks
7(a)(i)	arrows horizontal / on line from radio to man	**B1**
	arrows in opposite direction	**B1**
7(a)(ii)	middle box ticked longitudinal	**B1**
7(a)(iii)	number in range 20–20 000	**B1**
	hertz	**B1**
7(a)(iv)	(frequency of ultrasound) is above human (hearing) range	**B1**
7(b)(i)	speed = dist ÷ time or any two corresponding values of distance ÷ time e.g. 600 ÷ 0.4	**C1**
	1500 (m / s)	**A1**
7(b)(ii)	900 (m) read from graph	**C1**
	depth = 450 (m)	**A1**

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Question	Answer	Marks
8(a)	Any 3 from: compass placed near magnet direction of compass needle marked change position of compass repeat (above procedure) join points(to show field lines) owtte	**B3**
8(b)	complete curved lines drawn in correct pattern	**B1**
	No lines crossing / symmetrical pattern	**B1**
	Correct direction indicated by arrow	**B1**

Question	Answer	Marks
9(a)(i)	Thermistor correctly identified	**B1**
9(a)(ii)	correct symbol for voltmeter	**B1**
	Voltmeter in parallel with thermistor	**B1**
9(b)(i)	V= IR	**C1**
	(R) = 6.0 ÷ 0.010	**C1**
	600 (ohms or Ω)	**A1**
9(b)(ii)	Resistance is decreasing	**B1**
	So current will increase	**B1**
9(b)(iii)	Current greater than 0.04 (A)	**B1**
9(c)	700 (ohms or Ω)	**B1**

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Question	Answer	Marks
10(a)(i)	Pointer(s) not on zero	**B1**
	Pointers in opposite directions	**B1**
10(a)(ii)	Any 2 from:	
	Increase speed of wire	**B2**
	wrap wire into a coil	
	Increase strength of magnet	
10(b)	$N_s/N_p = V_s/V_p$ OR 660 ÷ 60 = V_s ÷ 25 000	**C1**
	V_s or output voltage = (660 / 60) × 25 000 = 11 × 25 000	**C1**
	275 000 (V)	**A1**
10(c)	Any 2 from:	
	Reduced energy / power losses	**B2**
	Smaller conductors needed	
	Reduced voltage drop (across cable)	

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Question	Answer	Marks
11(a)(i)	84	**B1**
11(a)(ii)	126	**B1**
11(a)(iii)	84	**B1**
11(b)	beta and gamma OR gamma and beta	**B1**
11(c)	0.4 ÷ 2 = 0.2	**C1**
	AND 0.2 ÷ 2 = 0.1 or 2 × 138	**C1**
	276 (days)	**A1**

Question	Answer	Marks
12(a)(i)	(They) emit ionising radiation	**B1**
	(which) damage DNA/cells/cause tumours/cancers	**B1**
12(a)(ii)	Any 2 from:	
	reduce exposure time	**B2**
	keep source at distance	
	use of suitable shielding	
	monitor exposure to radiation	

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