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Cambridge International General Certificate of Secondary Education

PHYSICS

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Paper 3 Core Theory

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MARK SCHEME

Maximum Mark: 80

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Question	Answer	Marks
1(a)	$5.0 \div 500$ or 0.01 (cm)	B1
1(b)	$30 \times 20 \times 5$ or length $\times$ width $\times$ height or cross-sectional area $\times$ length	B1
1(c)	balance	B1
1(d)	$D = M / V$ in any acceptable form	C1
	$2400 \div 3000$	C1
	0.80 (g / cm ³) or 0.8 (g / cm ³)	A1

Question	Answer	Marks
2(a)(i)	2nd box ticked section B	B1
2(a)(ii)	distance = area under graph or line or $0.5 \times \text{base} \times \text{height}$	C1
	$20 \times 5 \times 0.5$	C1
	50 (m)	A1
2(b)(i)	(average speed =) (total) dist $\div$ (total) time	C1
	(250×4)	C1
	$1000 \div 80$	C1
	12.5 (m / s)	A1
2(b)(ii)	43.88 – 20.16 or 23.72	B1

Question	Answer	Marks
3(a)	12.5 (mm)	B1
3(b)	(spring) B	M1
	same load gives greater extension (than spring A) owtte	A1
3(c)(i)	43.9 – 19.7 or 24.2 (cm)	B1
3(c)(ii)	Any two from: measure the extension for different (number of 1.0 N) loads repeat each reading (as each (1.0 N) load is removed) AND calculate average (extension for each load) (take reading from ruler with) eye level with pin	B2

Question	Answer	Marks
4(a)	any three from: water flows down (from reservoir) idea of gravitational / potential energy (transferred to kinetic (energy)) water turns turbine turbine turns generator	B3
4(b)	Any three from: • does not contribute to atmospheric pollution / acid rain • does not contribute to greenhouse gases / global warming • renewable energy source (so will not run out) • short start-up time / can meet surges in demand owtte • conserve non-renewable reserves / fossil fuels • reduces dependence on fossil fuels (from other countries)	B3
4(c)(i)	kinetic	B1
4(c)(ii)	efficient	B1

Question	Answer	Marks
5(a)(i)	(pressure) increases	B1
5(a)(ii)	any four from: (air) molecules / particles have more (kinetic) energy / move faster more frequent collisions harder collisions (with walls) collisions with walls idea of collisions causing force	B4
5(b)	$P = F / A$ in any form words or numbers	C1
	0.59	A1
	N / cm^2	B1
5(c)(i)	(Area = $\pi \times r^2$ =) 50.2654 (cm^2)	B1
5(c)(ii)	smaller <u>area</u> (in contact with the table)	B1

Question	Answer	Marks
6(a)	expansion / voltage / potential difference / emf length / colour / pressure / volume / resistance / density	B1
6(b)(i)	8:30 pm	B1
6(b)(ii)	9:00 pm	B1
	(explanation) Slope / gradient of graph is less or temperature drops / falls (more) slowly / slower	B1
6(c)	insulator conduction convection	B3

Question	Answer	Marks
7(a)(i)	(angle) Z	B1
7(a)(ii)	any other part of em spectrum or (seismic) S-waves	B1
7(b)(i)	3 curved waves after gap	M1
	waves evenly spaced and centred on gap (by eye)	A1
7(b)(ii)	diffraction	B1

Question	Answer	Marks
8(a)(i)	ammeter in series with power supply	B1
8(a)(ii)	variable resistor symbol in series with lamp B	B1
8(a)(iii)	voltmeter symbol seen	B1
	voltmeter symbol in parallel with lamp B	B1
8(b)	$V = I R$ in any form	C1
	$6.0 \div 0.2$ accept $6 \div 0.2$	C1
	30 (Ω)	A1

Question	Answer	Marks
9(a)(i)	X-rays / X-radiation	B1
9(a)(ii)	Radio waves	B1
9(b)	ultrasound	B1
9(c)	For full marks the method described must work. any four from: Means of producing sharp sound use of suitable reflecting surface measure distance travelled by sound Method for measurement of time for sound to travel measured distance. use of speed = distance / time	B4

Question	Answer	Marks
10(a)	any four from: needle moves (one way) as N pole / magnet moves downward / into coil as coil cuts across magnetic field (of magnet) needle moves in opposite direction as N pole / magnet moves upward / out of coil field is cut in opposite direction needle at zero when spring at max extension magnet is stationary so no cutting of field lines	B4
10(b)	(device) X is a step-up transformer	B1
	(device) Y is a step-down transformer	B1

Question	Answer	Marks
11(a)	friction (between cloth and rod)	B1
	(causes) electrons to move	B1
	from cloth / to rod	B1
11(b)	rod {moves or rotates} away	B1
	like charges repel	B1

Question	Answer	Marks
12	For full marks the method described must work. any four from: take background reading / reading without source use piece of paper between source and detector beta particles can pass through paper or alpha particles stopped / absorbed by paper?) reading on detector similar / unchanged so no alpha particles emitted use few mm of aluminium between source and detector reading on detector now similar to background reading (because) beta particles stopped by a few mm of aluminium	B4