Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

PHYSICS **0625/43**

Paper 4 Extended Theory **October/November 2018**

MARK SCHEME

Maximum Mark: 80

Published

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Question	Answer	Marks
1(a)	P marked on line between t = 0 s and t = 30 s	**B1**
1(b)(i)	(v =) gradient **or** 150 / 30 **or** appropriate division using other points	**C1**
	5.0 m / s	**A1**
1(b)(ii)	(v =) x / t **or** (300 – 150) / (45 – 30) **or** 150 / 15	**C1**
	10 m / s	**A1**
1(c)	gradient decreasing	**B1**
	smooth transition to horizontal **and** line not too thick	**B1**
	horizontal to (60 s, 400 m)	**B1**

Question	Answer	Marks
2(a)	1st box: force	**B1**
	2nd box: impulse	**B1**
2(b)(i)	**1** (p =) mv **or** 0.046 × 65	**C1**
	3.0 kg m / s **or** 3.0 N s	**A1**
	2 (F =) $m(v – u) / t$ **or** 3.0 / 0.00050 **or** a = $(v – u) / t$ **and** F = ma **or** 0.046 × 65 / 0.00050 **or** 0.046 × 130 000	**C1**
	6000 N **or** 6000 N	**A1**
2(b)(ii)	elastic (energy) **or** strain (energy)	**B1**

Question	Answer	Marks
3(a)(i)	(mercury) barometer	**B1**
3(a)(ii)	vacuum **or** nothing **or** (low pressure) mercury vapour	**B1**
3(a)(iii)	$(p) = h\rho g$ **or** $0.76 \times 1.4 \times 10^4 \times 10$	**C1**
	1.1×10^5 Pa	**A1**
3(b)	$(m =)\rho V$ **or** $\rho \pi r^2 l$ **or** $\rho \pi d^2 l / 4$ **or** in numbers	**C1**
	$(W =)\rho Vg$ **or** $\rho \pi r^2 lg$ **or** $\rho \pi d^2 lg / 4$ **or** in numbers	**C1**
	84 N	**A1**

Question	Answer	Marks
4(a)	$(f =) v / \lambda$ **or** 0.15 / 0.030	**C1**
	5.0 Hz	**A1**
4(b)(i)	transmission of energy (through medium) **and** no transfer of matter	**B1**
	(direction of) vibration of particles **or** (direction of) vibration of medium	**M1**
	perpendicular to direction of energy travel / wave / propagation	**A1**
4(b)(ii)	wave with constant wavelength and amplitude	**B1**
	wavelength indicated **and** labelled	**B1**
	amplitude indicated **and** labelled	**B1**

Question	Answer	Marks
5(a)	power supply **and** (top-pan) balance / scales **and** stopwatch / timer / joulemeter	**B1**
	measure mass (of block) **and** initial **and** final temperature	**B1**
	reading from joulemeter **or** measure time (of heating) **and** (E =) Pt / VIt **or** $c = Pt/m\Delta T$	**B1**
	$c = Pt/m\Delta T$ **or** $c = E/m\Delta T$	**B1**
5(b)(i)	energy required to increase the temperature per °C / per unit temperature increase	**B1**
5(b)(ii)	(C =) $m\,c$ **or** 85×460	**C1**
	3.9×10^4 J / °C	**A1**

Question	Answer	Marks
6(a)(i)	correct refractions **and** dispersion at first surface	**M1**
	correct **and** more refractions of both rays at second surface **and** (more) divergence **and** labels	**A1**
6(a)(ii)	violet	**B1**
6(b)(i)	(light of) a single <u>frequency</u>	**B1**
6(b)(ii)	total internal reflection (at side AC) **or** internal reflection **and** no refraction	**B1**
	angle of incidence greater than critical angle / 42° (and refractive index of glass greater than that of air than air)	**B1**
6(b)(iii)	light <u>refracts</u> (at Y)	**B1**
	<u>angle</u> <u>of</u> <u>incidence</u> less than critical angle / 42°	**B1**
	(some) light reflects	**B1**

Question	Answer	Marks
7(a)(i)	no delocalised / free / mobile electrons in an insulator **or** electrons fixed (in place) / tightly bound in an insulator	**B1**
7(a)(ii)	no charge flows / current in doctor **or** doctor does not receive an electric shock	**B1**
	which might prove fatal / kill / injure / harm doctor **or** so charge flows / current in patient	**B1**
7(b)	electrons move (from one contact to the other)	**B1**
	negative contact gains electrons / negative charges **and** positive contact loses electrons / negative charges	**B1**
7(c)	(I =) Q/t **or** $9.1 \times 10^{-3}/6.5 \times 10^{-4}$	**C1**
	14 A	**A1**

Question	Answer	Marks
8(a)	from chemical (energy) to thermal / heat (energy)	**C1**
	from chemical (energy) to thermal / heat (energy) **and** as a result of electrical working	**A1**
8(b)(i)	(I =) V/R **or** 2.4 / 120	**C1**
	0.020 A	**A1**
8(b)(ii)	6.6 V	**B1**
8(b)(iii)	330 Ω	**B1**
8(c)	multiplication by 5.0 **or** $R \propto l$	**C1**
	multiplication by 2.0 / 4.0 **or** division by 0.50 / 0.25 **or** $R \propto 1/A$ **or** $R \propto 1/r^2$	**C1**
	multiplication by 4.0 **or** division by 0.25 **or** 20×330	**C1**
	6600 Ω	**A1**

Question	Answer	Marks
9(a)	(a d.c. has) constant value / magnitude **or** direction does not change **or** has only one direction	**B1**
9(b)(i)	sinusoidal curve in phase with voltage **and** maximum value of 0.75 A **and** same frequency	**B1**
9(b)(ii)	(P =) VI **or** 7.2×0.75	**C1**
	5.4 W	**A1**
9(c)(i)	vertical, upward arrow labelled M on side AB	**B1**
9(c)(ii)	A to B **and** (Fleming's) right-hand rule (in some way)	**B1**
	rule explained (i.e. fingers explained or labelled 3D diagram)	**B1**
9(c)(iii)	greater (maximum) voltage	**B1**
	greater frequency **or** smaller time period **or** changes direction more often **or** alternates faster	**B1**

Question	Answer	Marks
10(a)	$^{234}_{91}(\text{Pa})$	**B1**
	$^{0}_{-1}(\beta)$	**B1**
10(b)	72 / 24 **or** 3.0 (half-lives)	**C1**
	2^3 **or** 1/8 **or** 2480/8	**C1**
	310 counts/second	**A1**
10(c)	count rate larger (than 310 counts/second)	**B1**
	protactinium is also emitting (β-)particles / (nuclear) radiation	**B1**
	count rate (approximately) double **or** product of protactinium decay also radioactive **or** amount of protactinium small **or** protactinium is highly radioactive **or** half-life of protactinium much shorter (than half-life of thorium) / very short	**B1**