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Cambridge International General Certificate of Secondary Education

PHYSICS **0625/43**

Paper 4 Extended Theory **May/June 2017**

MARK SCHEME

Maximum Mark: 80

Published

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Question	Answer	Marks
1(a)	force **and** impulse underlined	**B1**
1(b)(i)	(v =) at OR 2.2 × 3.0	**C1**
	6.6 m / s	**A1**
1(b)(ii)	3.3 m / s	**B1**
1(c)	curve/line starts at origin	**B1**
	initial gradient zero OR curve passing through (3.0, 9.9)	**B1**
	gradient increasing (with time)	**B1**
	Total:	**7**

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Question	Answer	Marks
2(a)	(momentum =)mass × velocity	**B1**
2(b)(i)	(p =)3.2 × 4.0	**C1**
	13 kg m / s	**A1**
2(b)(ii)	momentum conserved	**C1**
	12.8 – (3.2 × 1.5) OR 12.8 – 4.8 OR 8.0 OR 8.0 ÷ 1.6	**C1**
	5.0 m / s	**A1**
2(c)	(F =) $\frac{\Delta p}{\Delta t}$ **or** 8.0 ÷ 0.050	**C1**
	160 N	**A1**
2(d)	internal energy (of blocks) increase OR thermal energy/sound energy (lost/produced at collision)	**B1**
	Total:	**9**

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Question	Answer	Marks
3(a)	$(\rho =)\ \frac{m}{V}$ OR 180 ÷ 210 OR 0.18 ÷ 210	C1
	0.86 g / cm^3	A1
3(b)	floats OR words to the same effect	B1
	density of wood is less than density of liquid	B1
	Total:	**4**
Question	**Answer**	**Marks**
4	$F_1 d_1 = F_2 d_2$ OR $(F_2 =)\ \frac{F_1 d_1}{d_2}$ OR 200 × 22 ÷ 8.0	C1
	550 (N) **or** 200 × 22 ÷ 8.0	C1
	$(p =)\ \frac{F}{A}$ OR 550 ÷ 0.00050 OR 200 × 22 ÷ (8.0 × 0.00050)	C1
	1.1×10^6 Pa	A1
	Total:	**4**

Question	Answer	Marks
5(a)	white kit cooler OR black kit warmer	M1
	white poor absorber/good reflector of (IR)radiation/heat/thermal energy OR v.v. for black	A1
5(b)(i)	any **two** pairs from: more/less wind; dries quicker/slower temperature increases/decreases/sunnier/cloudier; dries quicker/slower stops/starts raining; dries quicker/slower less/more humid; dries quicker/slower	B2
5(b)(ii)	molecules with most (kinetic) energy (escape) OR water cools	B1
	escape liquid/break intermolecular bonds / molecules enter air / evaporate / become vapour	B1
	Total:	**6**
Question	**Answer**	**Marks**
6(a)	molecules/they move/collide	B1
	molecules/they move/collide with walls	B1
	change of momentum OR force on area	B1
6(b)(i)	pV = constant OR $p_1V_1 = p_2V_2$	B1
6(b)(ii)1	100 (kPa) OR 1.0×10^5 (Pa)	M1
	Pa OR kPa	A1
6(b)(ii)2	(p =)50 (kPa)	C1
	3700 m < p < 3900 m	A1
	Total:	**8**

Question	Answer	Marks
7(a)(i)	(v =)$f\lambda$ **or** 6000 × 0.25	**C1**
	1500 m / s	**A1**
7(a)(ii)	300 m / s ⩽ c ⩽ 360 m / s	**B1**
7(a)(iii)	less **and** travels less far in same/periodic time	**B1**
7(b)	vibration/oscillation	**B1**
	vibration/oscillation parallel to direction of travel OR compressions and rarefactions	**B1**
7(c)(i)	inversely related OR the wider the gap, the less the diffraction OR v.v.	**B1**
7(c)(ii)	directly related OR greater wavelength, greater diffraction OR v.v.	**B1**
	Total:	**8**

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Question	Answer	Marks
8(a)	OP/it is along the normal/at 90° (to the curved surface)	**B1**
8(b)(i)	sin *i* / sin *r* = *n*	**C1**
	sin *r* / sin 30(°) = 1.5 OR sin *r* = 1.5 × sin 30(°)	**C1**
	49°	**A1**
8(b)(ii)	ray bends away from the normal **c.a.o.**	**B1**
8(c)	angle (from normal) of refraction increases	**B1**
	refracted ray travels along boundary OR reflected ray becomes brighter OR refracted ray becomes dimmer	**B1**
	light reflects back into glass (with *i* = *r*)	**B1**
	Total:	**8**

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Question	Answer	Marks
9(a)	(I =) $\frac{P}{V}$ OR 24 ÷ 6.0 OR 4.0 (A) OR (R =) $\frac{V}{I}$	C1
	6.0 ÷ 4.0	C1
	1.5 Ω	A1
9(b)(i)	6.0 V	B1
9(b)(ii)	1.5 Ω	B1
9(b)(iii)	$\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2}$ OR 1 ÷ 1.5 = $\frac{1}{R_1} + \frac{1}{R_2}$ OR 1 ÷ 1.5 = $\frac{2}{R}$	C1
	3.0 (Ω)	A1
9(c)	resistance of circuit/parallel pair increases	B1
	current (in lamp) decreases OR less p.d. across lamp	B1
	Total:	**9**

Question	Answer	Marks
10(a)(i)	magnetic field mentioned	**B1**
	changing (magnetic) field in core/Q	**B1**
	induction in Q	**B1**
10(a)(ii)	(iron is) magnetic **and** temporary magnetic	**B1**
10(b)(i)	(V_S =)$V_P \times N_S \div N_P$ OR $4.0 \times 340 \div 200$	**C1**
	6.8 V	**A1**
10(b)(ii)	(I_P =)$I_S\ V_S / V_P$ OR $3.5 \times 6.8 \div 4.0$	**C1**
	6.0 A	**A1**
10(c)	less energy wasted (in cables)	**B1**
	cheaper **and** one from: thinner cables fewer pylons fewer power stations/less fuel required	**B1**
	Total:	**10**

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Question	Answer	Marks
11(a)(i)	produces a narrow beam of γ-rays OR absorb γ-rays that are not on path shown	**B1**
11(a)(ii)	no change	**B1**
	γ-rays not deflected	**B1**
	γ-rays are electromagnetic radiation/uncharged OR not deflected by magnetic field	**B1**
11(b)	**(ionising effect of) α-particles greater than β-particles** and **β-particles greater than γ-rays**	**B1**
	any **two** from: mass α > mass β > mass γ charge α > charge β > charge γ speed γ > speed β > speed α	**B2**
	Total:	**7**

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