PHYSICS	**0625/43**
Paper 4 Extended Theory	**May/June 2017**
MARK SCHEME	
Maximum Mark: 80	

Published

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This document consists of **10** printed pages.

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**
7	Total:	7

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)	$(F =)\dfrac{\Delta p}{\Delta t}$ **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**
2		Total: **9**

Question	Answer	Marks
3(a)	$(\rho =)\dfrac{m}{V}$ OR $180 \div 210$ OR $0.18 \div 210$	C1
	$0.86 \ \text{g}/\text{cm}^3$	A1
3(b)	floats OR words to the same effect	B1
	density of wood is less than density of liquid	B1
4	**Total:**	4

Question	Answer	Marks
4	$F_1 d_1 = F_2 d_2$ OR $(F_2 =)\dfrac{F_1 d_1}{d_2}$ OR $200 \times 22 \div 8.0$	C1
	550 (N) **or** $200 \times 22 \div 8.0$	C1
	$(p =)\dfrac{F}{A}$ OR $550 \div 0.00050$ OR $200 \times 22 \div (8.0 \times 0.00050)$	C1
	1.1×10^6 Pa	A1
4	**Total:**	4

Question	Answer	Marks
5(a)	white kit cooler OR black kit warmer	**M1**
	white poor absorber/good reflector of (<u>IR</u>)<u>radiation</u>/<u>heat</u>/<u>thermal</u> <u>energy</u> 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**
6		Total: **6**

Question	Answer	Marks
6(a)	<u>molecules</u>/<u>they</u> move/collide	**B1**
	molecules/they move/collide with <u>walls</u>	**B1**
	<u>change</u> 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)	$300 \, \text{m/s} \leqslant c \leqslant 360 \, \text{m/s}$	**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**
8	Total:	8

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**
8	Total:	8

Question	Answer	Marks
9(a)	$(I =) \dfrac{P}{V}$ OR 24 ÷ 6.0 OR 4.0 (A) OR $(R =) \dfrac{V}{I}$	**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)	$\dfrac{1}{R} = \dfrac{1}{R_1} + \dfrac{1}{R_2}$ OR $1 ÷ 1.5 = \dfrac{1}{R_1} + \dfrac{1}{R_2}$ OR $1 ÷ 1.5 = \dfrac{2}{R}$	**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**
9		Total: 9

Question	Answer	Marks
10(a)(i)	<u>magnetic</u> 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

10	Total:	10

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
7	Total:	7