Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

PHYSICS **0625/43**

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

MARK SCHEME

Maximum Mark: 80

Published

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the May/June 2017 series for most Cambridge IGCSE®, Cambridge International A and AS Level and Cambridge Pre-U components, and some Cambridge O Level components.

This syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

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**

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**

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 $\leqslant c \leqslant$ 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**

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**

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**

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**