



Cambridge IGCSE™

PHYSICS

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Paper 3 Core Theory

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MARK SCHEME

Maximum Mark: 80

Published

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This document consists of **13** printed pages.

Question	Answer	Marks
1(a)(i)	0.3(0) (cm ³)	A3
	(average volume of one drop) = $60 \div 200$	(C2)
	total volume = number of drops $\times$ (average) volume of one drop	(C1)
1(a)(ii)	226.5 (s)	A2
	180 (+ 46.5 =)	(C1)
1(a)(iii)	1.1 (s)	A2
	time for one drop = total time $\div$ no of intervals	(C1)
1(b)	84 (cm ³)	B1

Question	Answer	Marks
2(a)(i)	9.3 (m/s)	A2
	any indication on graph or in working of vertical line from 10.0 s	(C1)
2(a)(ii)	(car) A (has greater acceleration)	M1
	(speed-time graph/line) has greater gradient OR is steeper	A1
2(b)(i)	<u>speed</u> (of car) is steady OR <u>speed</u> is constant	B1
	(at) 16 <u>m/s</u>	B1
2(b)(ii)	240 (m)	A3
	(distance =) $\frac{1}{2} \times 16 \times 30$	(C2)
	distance travelled = area under graph OR (d =)speed $\times$ time OR $\frac{1}{2} \times b \times h$	(C1)

Question	Answer	Marks
3(a)(i)	24 (cm ²)	A2
	(area in contact with ground) = length $\times$ width OR $12 \times 2(.0)$	(C1)
3(a)(ii)	(weight =) 8.4 (N)	A2
	(weight =) mass $\times$ g OR 0.84×10	(C1)
3(b)	(pressure =) 6(.0) (N/cm ²)	A3
	(pressure =) $24 \div 4(.0)$	(C2)
	(pressure =) force $\div$ area	(C1)

Question	Answer	Marks
4(a)	(useful energy transfers:) kinetic (energy)	B1
	in either order gravitational potential (energy)	B1
	(wasted energy transfer:) thermal (energy)	B1
4(b)	50 (Ncm)	A3
	2.5×20	(C2)
	(moment of force =) force $\times$ (perpendicular) distance (of force from pivot)	(C1)

Question	Answer	Marks
5(a)	any three from: (moving) air has kinetic energy OR wind has kinetic energy (moving) air / wind turns turbine/blades turbine turns generator (rotating) <u>generator</u> produces/generates electricity	B3
5(b)	any two from: (wind is) renewable (energy source) no greenhouse gases / CO ₂ produced (during operation) no SO ₂ OR acidic gases produced (during operation) OR no nitrous oxides produced	B2
5(c)	any two from: large(r) area of land needed OR dilute energy source intermittent/inconsistent/unreliable supply OR cannot work if wind too strong/weak (possible) harm to (migrating) birds difficult to maintain (particularly if off-shore)	B2

Question	Answer	Marks
6(a)(i)	conduction	B1
6(a)(ii)	1 80 (°C)	B1
	2 170 (°C)	B1
	3 26 (minutes)	B1

Question	Answer	Marks
6(b)	(solid:) particles/molecules any three from: (are) fixed in place/position/arrangement regular spacing / pattern / arrangement vibrating close together	B3
	(gas:) particles/molecules any three from: (are) moving randomly at high speed colliding (with each other/walls) randomly arranged/no pattern (relatively) far apart	B3

Question	Answer	Marks
7(a)(i)	8.0 (cm)	B1
7(a)(ii)	1.5 (cm)	B1
7(b)(i)	wavefronts at different angle to boundary	B1
	wavefronts towards left AND all with smaller wavelength	B1
7(b)(ii)	refraction	B1

Question	Answer	Marks
7(c)(i)	ultraviolet OR X-rays OR gamma rays	B1
7(c)(ii)	correct use for wave in (c)(i)	B1

Question	Answer	Marks
8(a)	first method (use of plotting) compass(es)	B1
	idea of mark arrow position OR move compass in direction of arrow	B1
	start from different position(s) OR join up marks/draw lines (to show pattern)	B1
	OR alternative method (use of plotting) compass(es)	(B1)
	place number of compasses around magnet	(B1)
	idea that arrows line up to show pattern	(B1)
8(b)	(metal bar XY/it is soft) iron OR magnetic material/bar/metal	B1
	(so XY) must be unmagnetised	B1
	(because end X of XY or bar) attracts to (both) N pole and S pole	B1

Question	Answer	Marks
9(a)	(current/reading/it) increases	B1
	(because circuit) resistance decreases	B1
9(b)	0.75 (A)	A3
	$6(.0) \div 8(.0)$	(C2)
	$V = IR$ or $(I =) V/R$	(C1)
9(c)	28 (Ω)	A2
	(total resistance =) $R_1 + R_2$ OR $20 + 8(.0)$	(C1)
9(d)	tick in 2nd box (magnetic)	B1
	tick in 3rd box (heating)	B1

Question	Answer	Marks
10(a)	any four from: Earth wire keeps case at zero volts/earth (potential) (so) user not electrocuted (live wire touching metal case produces) large current (in fuse/earth wire) (causes) fuse to melt isolating appliance from supply OR (so) no current in appliance OR disconnects/breaks the circuit prevent(s/ing electrical) fire/overheating (in cables/appliance)	B4

Question	Answer	Marks
10(b)	1920 (V)	A3
	$V_s / 240 = 560/70$ OR $V_s = (560/70) \times 240$ OR $V_s = 240 \times 8$ OR $560/70 = ? / 240$	(C2)
	$V_s/V_p = N_s/N_p$ in any form	(C1)

Question	Answer	Marks
11(a)	alpha (particles) not emitted	M1
	any one from idea that count rate for paper is similar to count rate for air OR if alpha emitted count rate for paper would decrease/be less (than 480)	A1
11(b)	gamma (rays) emitted	M1
	any one from idea that count rate for (10 mm) lead is less (than count rate for (2 mm) aluminium/air/paper owtte) OR (most/some of) gamma (rays) are absorbed by lead	A1