

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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Question	Answer	Marks
1(a)	(distance travelled =) 400 (m)	A3
	(distance travelled =) $\frac{1}{2} \times 8 \times 100$	(C2)
	(distance travelled =) area under graph OR $\frac{1}{2} \times b \times h$	(C1)
1(b)	(section Q) accelerating	B1
	(section R) constant speed OR steady speed	B1
	(section S) decelerating	B1
1(c)	(velocity =) 12 m / s	B1
	north	B1

Question	Answer	Marks
2(a)	(pressure =) $0.8(0) \text{ (N / cm}^2\text{)}$	A4
	(pressure =) $1540 \div 1920$ OR $1540 \div (160 \times 12)$	(C3)
	(pressure =) force $\div$ area	(C1)
	(area in contact with ground =) $12 \times 160 = 1920 \text{ (cm}^2\text{)}$	(C1)
2(b)	(moment =) $120\,000 \text{ (N cm)}$ OR $1.2 \times 10^5 \text{ (N cm)}$	A3
	(moment =) 1030×120	(C2)
	(moment =) force $\times$ (perpendicular) distance from pivot	(C1)
2(c)	move (lifting) force further from pivot owtte	B1
2(d)	centre of gravity / mass is high(er) OR idea that area of base is small(er)	B1

Question	Answer	Marks
3(a)	C (energy from the Sun heats the atmosphere unevenly) D A F (moving air turns the turbine blades) B (the turbine blades turn a generator) E (the generator produces electrical energy) 4 correct – 3 marks 3 or 2 correct – 2 marks 1 correct – 1 mark	B3
3(b)	any two from: • idea of large(r) area of land needed • intermittent supply OR cannot work if wind too strong / weak • idea that energy output is small / not very large • (possible) harm to (migrating) birds • difficult to maintain (particularly if off-shore) • <u>noise</u> OR <u>visual</u> pollution	B2

Question	Answer	Marks
4(a)(i)	50 (J)	A3
	(work done =) 25×2.0	(C2)
	(work done =) force $\times$ distance (moved in the direction of the force)	(C1)
4(a)(ii)	same as answer to (a)(i) OR 50 (J)	B1
4(a)(iii)	(some input energy is transferred as) thermal energy	B1
	to surroundings / motor	B1
4(b)	(power output =) 16 (W)	A3
	(power output =) $80 \div 5(.0)$	(C2)
	(power output =) energy output $\div$ time	(C1)

Question	Answer	Marks
5(a)	any three from: - idea of (continuous) random movement (of gas particles) - collisions / impacts (of particles) (collisions) with wall(s) of box - idea that force is produced (by colliding particles) - idea that pressure is force on an area	B3
5(b)	pressure increases	M1
	(as) <u>more</u> (frequent) collisions (with walls of box)	A1

Question	Answer	Marks
6(a)	idea of measure more than one wavelength	B1
	idea of dividing measurement by number of wavelengths (measured)	B1
6(b)	(speed =) 24 (cm / s)	A3
	(speed =) $6(.0) \times 4(.0)$	(C2)
	$(v =) f \times \lambda$	(C1)
6(c)	(name of effect) refraction	B1
	change of speed	B1

Question	Answer	Marks
7(a)	both rays refracted toward principal axis	B1
	both rays meet at F_1	B1
7(b)	infrared (rays / waves) OR microwaves OR radio (waves)	B1
7(c)(i)	any one from: - sterilising food / water - sterilising (medical) equipment - detection of cancer - treatment of cancer - space telescopes	B1
7(c)(ii)	mutation (of cells / DNA) OR damage to cells / DNA	B1

Question	Answer	Marks
8(a)	two N/north poles on either side of gap	B1
8(b)	use of (plotting) compass or iron filings	B1
	use of (plotting) compass to show direction (of magnetic field line)	B1
	further details to method any two from: • idea of sprinkle / scatter iron filings (around magnets) • tap card • to arrange filings along field lines / to show (magnetic field) pattern • place compass near magnet • mark point at end of arrow • move compass OR multiple compasses in different positions • idea of plotting more than one line	B2

Question	Answer	Marks
9(a)	any two from: • switch • ammeter • <u>variable</u> resistor	B2
9(b)	(power =) 2.4 (W)	A3
	(power =) $0.4(0) \times 6(.0)$	(C2)
	(power =) $I \times V$	(C1)
9(c)	lamp symbol drawn in parallel <u>with lamp</u> in circuit	B1

Question	Answer	Marks
10(a)(i)	any two from: • magnetic field • cuts / links with coil / conductor / wire • e.m.f. / voltage / p.d. induced (in coil)	B2
10(a)(ii)	any two from: • increase strength of the magnet(ic field) • increase speed of the magnet • increase (the number of) turns on coil	B2
10(b)	$(V_s =) 7.5 \text{ (V)}$	A3
	$V_s / 180 = 200 / 4800$ OR $(V_s =) (200 \times 180) \div 4800$	(C2)
	$V_s / V_p = N_s / N_p$	(C1)

Question	Answer				Marks
11(a)	name of particle	number of particles	position of particle	relative charge of particle	B4
	electron	6	orbiting / outside (nucleus)	–1 OR minus one	
	neutron	8	in the nucleus	0 OR zero OR none OR neutral	
	proton	6	(in the) nucleus	+1 (plus one)	
	1 mark for each correct column				
11(b)	(2 × 5700 =) 11 400 (years)				A3
	(change in mass takes place over / decay takes) 2 <u>half-lives</u>				(C2)
	8(.00) → 4(.00) → 2(.00) OR 8(.00) × ½ × ½ = 2(.00)				(C1)

Question	Answer	Marks
12(a)	Earth rotates / spins (on its axis)	M1
	(once) every 24 hours / day OR daily	A1
12(b)	Mercury Venus Earth Mars	
	3 correct planets	M1
	in correct order	A1
12(c)	hydrogen	B1
	helium	B1
12(d)	Milky Way	B1