Cambridge IGCSE™

PHYSICS **0625/43**

Paper 4 Extended Theory **October/November 2025**

MARK SCHEME

Maximum Mark: 80

Published

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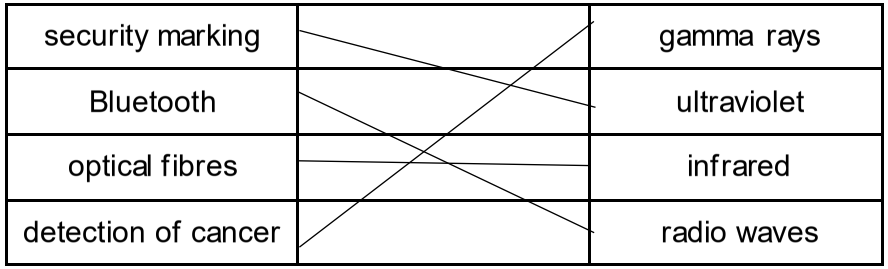
Question	Answer	Marks
1(a)(i)	constant acceleration	**B1**
1(a)(ii)	area under the graph **OR** ½ *bh* **OR** <u>average</u> speed × time	**B1**
	0.5 × 5.9 × 0.6 **OR** 1.77 (to ⩾ 3 sf)	**B1**
1(a)(iii)	9.5 J	**A2**
	(Δ*E*p =) *mg*(Δ)*h* **OR** 0.54 × 9.8 × 1.8	C1
1(a)(iv)	candidate's **1(a)(iii)** value × 0.5 (2sf)	**A1**
1(b)	any **three** from: • (initially there is acceleration due to) an unbalanced force **OR** resultant force **OR** downward force **OR** weight **OR** gravitational force acting on the ball • as speed increases the <u>air</u> resistance increases • (as air resistance increases) resultant force downwards decreases **OR** acceleration decreases • (eventually) ball falls with constant speed when air resistance = weight **OR** ball falls with terminal velocity when air resistance = weight	**B3**
1(c)	(some of the) energy is: transferred to the thermal energy (store) of the ground (when ball hits ground) **OR** converted / transferred to thermal energy (store) of the air **OR** used to deform ball / transferred to the elastic energy (store) of the ball (as it contacts the ground)	**B1**
	gravitational potential energy (in the store at C) will be less (than at A) **OR** (ball has) less kinetic energy (in its store just after B)	**B1**

Question	Answer	Marks
2(a)	(–) 3.5 kgm / s	**A2**
	(Δp =) $m(\Delta)u$ **OR** $m\{v - u\}$ **OR** 0.14 × {25 (– 0)}	C1
2(b)	360 N	**A3**
	0.0097 (s) **OR** 9.7×10^{-3} (s) **OR** 3.6×10^{n}	C1
	(F =) $(\Delta)p / t$ **OR** 3.5 / 0.0097	C1

Question	Answer	Marks
3(a)(i)	(wasted power =) 2200 + 40 + 25 **OR** 2265 **OR** (useful power output =) power input – wasted power	**B1**
	1140 (MW) (⩾ 3 sf)	**B1**
3(a)(ii)	0.32 **OR** 32%	**A2**
	(efficiency =) {useful power output / total power input} (× 100%) **OR** 1100 / 3400	C1
3(b)	water is pumped into the ground and heated by hot rocks **OR** heat from hot rocks underground is used to turn water into steam	**B1**
	steam used to heat buildings **OR** steam used to turn generator / turbine / produce electricity	**B1**

Question	Answer	Marks
4(a)(i)	930 kg / m^3	**A1**
4(a)(ii)	1400 N	**A4**
	(Δ)p = ρg(Δ)h **OR** 930 × 9.8 × 1.1 **OR** 10 000 (N / m^2)	C1
	area = length × width **OR** 0.45 × 0.30 **OR** 0.14 (m^2)	C1
	(F=) p × A **OR** 10 000 × 0.14	C1
	Alternative method:	
	1400 N	**A4**
	volume (of liquid above block) = length × width × height **OR** 0.45 × 0.30 × 1.1 **OR** 0.15 (m^3)	C1
	mass (of liquid above block) = $\rho \times v$ **OR** 930 × 0.15 **OR** 140 (kg)	C1
	(F =) mg **OR** 140 × 9.8	C1
4(b)	thermal expansion **OR** to prevent buckling / bending when heated	**B1**
	any **one** from: • particles vibrate faster • particles have greater speed / kinetic energy / momentum • vibrations (of particles) take up more space • (average) space / separation between particles increases	**B1**
4(c)	(plastic is a good) insulator / poor conductor	**B1**
	(handle) will not get too hot to touch **OR** reduces heat flow to hand	**B1**

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>5(a)(i)</td><td>all four correct = 2 marks; any two correct = 1 mark

 
</td><td>B2</td></tr>
<tr><td>5(a)(ii)</td><td>any one from:

• only require a short aerial / antenna
• can pass through the atmosphere / ionosphere to satellites
• can transmit large amounts of data at high speeds / high rate of data transmission</td><td>B1</td></tr>
<tr><td>5(b)</td><td>any two from:

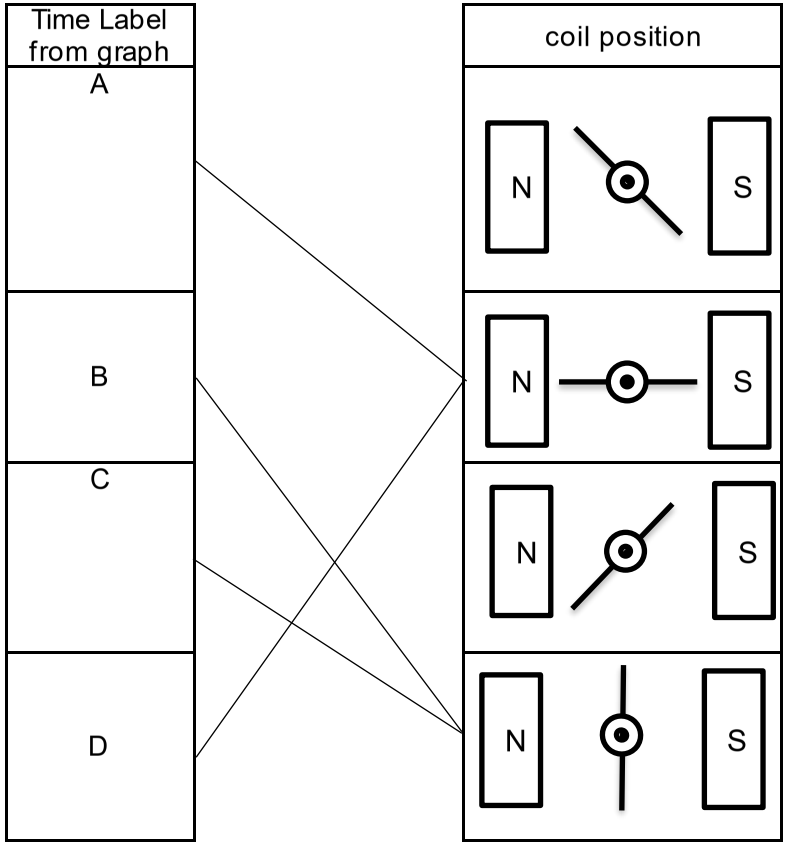
transverse:
• oscillations / vibrations are at right angles to direction of propagation
• medium not required / can travel through a vacuum (for e-m wave)
• have crests / peaks and troughs

longitudinal:
• oscillations / vibrations are parallel to direction of propagation
• medium is required
• have rarefactions and compressions</td><td>B2</td></tr>
<tr><td>5(c)(i)</td><td>longitudinal</td><td>B1</td></tr>
<tr><td rowspan="2">5(c)(ii)</td><td>refraction</td><td>B1</td></tr>
<tr><td>any one from:
• change in speed of the wave
• change in density of the medium</td><td>B1</td></tr>
</table>

Question	Answer	Marks
5(d)	<u>increase</u> in carbon dioxide / greenhouse gases (in the atmosphere) **OR** <u>increase</u> in methane / water vapour (in the atmosphere)	**B1**
	any **one** from: prevents / reduces (re-emitted) radiation escaping (into space) **OR** radiation re-emitted / reflected back to surface (by atmosphere / greenhouse gases) **OR** (amount of) radiation absorbed is greater than (the amount of) radiation leaving the atmosphere	**B1**

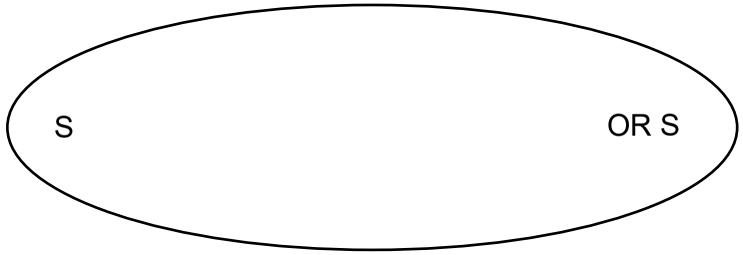
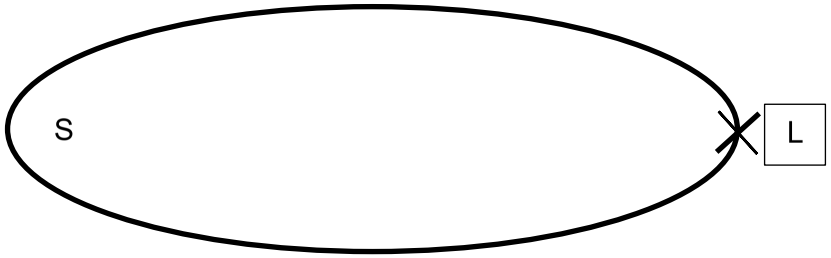
Question	Answer	Marks
6(a)(i)	0.008(0) A **OR** 8(.0) mA **OR** 8(.0) $\times 10^{-3}$ A	**A3**
	(p.d. across 400 Ω resistor =) 5 – 1.8 **OR** 3.2 (V)	C1
	(I =) V / R **OR** 3.2 / 400	C1
6(a)(ii)	increases	**B1**
	resistance of <u>LDR</u> increases	**B1**
	ratio of potential differences (across each component) equals ratio of the two resistances **OR** $R_1 / R_2 = V_1 / V_2$ **OR** LDR has greater share of the total / supply voltage **OR** potential difference of the source is divided between the resistor (R) and LDR	**B1**
6(b)(i)	56 mA **OR** 5.6 $\times 10^{-2}$ A	**A2**
	44 (mA) **OR** 12 (mA)	C1
6(b)(ii)	0 (A)	**B1**

Question	Answer	Marks
7(a)(i)	provide a continuous connection (between the coil and the lamp) **OR** prevent the contacts reversing every half turn / 180° **OR** prevent the wires (to the lamp) twisting / tangling	**B1**
7(a)(ii)	any **three** from: • coil is rotated / moved in magnetic field • coil cuts (magnetic) field **OR** changing (magnetic) field through coil • e.m.f. / voltage induced • coil forms part of a complete circuit (through the lamp) so there is a current • as one side of the coil starts to move in the opposite direction, current is induced in the opposite direction **OR** direction of current in coil is reversed every half turn / 180°	**B3**
7(a)(iii)	any **two** from: • increase strength of magnetic field • increase speed of rotation (of the coil) • increase number of turns (of coil)	**B2**
7(b)(i)	2.5 (revolutions)	**B1**

Question	Answer	Marks
7(b)(ii)	any 1 correct = 1 mark any 2 or 3 correct = 2 marks all 4 correct = 3 marks 	B3

Question	Answer	Marks
8(a)(i)	most of the atom is empty space **OR** nucleus is (very) much smaller than the atom	**B1**
8(a)(ii)	nucleus must have a positive charge **OR** (the positive) charge is concentrated at the centre of the atom **OR** most of the mass (of the atom) is concentrated in the nucleus	**B1**
8(b)(i)	P	**B1**
	alpha particles have greater mass so are deflected less (than the beta particles)	**B1**
8(b)(ii)	upwards **AND** alpha particles are positively charged so attracted towards negatively charged plate **OR** direction of field is direction of force on positive charge	**B1**
8(c)	1.9×10^{-2} g **OR** 1.9×10^{-5} kg	**A2**
	3 half-lives **OR** $2.4 \times 10^{-3} \times 2^3$ **OR** 1 / 8	C1

Question	Answer	Marks
9(a)(i)	(shortly after) Big Bang **OR** when Universe was formed	**B1**
9(a)(ii)	Increased	**B1**
	Universe has expanded **OR** Universe accelerated outwards	**B1**
9(b)(i)	120 000 (km / h) **OR** 1.2×10^5 (km / h)	**A3**
	(v =) $2\pi r / T$ **OR** $\{2 \times \pi \times 108 (\times 10^6)\} / \{0.62 \times 365 \times 24\}$	C1
	(T =) $0.62 \times 365 \times 24$ **OR** (T =) 5431 **OR** (T =) 226.3×24 **OR** 1.2×10^n	C1
9(b)(ii)	decreases	**B1**

Question	Answer	Marks
10(a)		
	elliptical shape drawn	**B1**
	S at a focus of the ellipse by eye	**B1**
10(b)		
	L furthest away from their S / Sun	**B1**
10(c)	total energy = gravitational (potential) energy + kinetic energy	**B1**
	(energy stored as) GPE decreases and (energy stored as) KE increases closer to the Sun	**B1**
	when the comet has more kinetic energy it has a greater speed	**B1**