A-Level Physics: **w24 12**

Multiple Choice Answers

Q2: A

Q3: D

A-Level Physics: **s24 11**

Multiple Choice Answers

Q1: A

Q3: C

A-Level Physics: **s22 22**

1(a)	only ampere and kilogram underlined
1(b)(i)	percentage uncertainty = 2.1 + 0.6 + (1.5 × 2)
	= 5.7%
1(b)(ii)	absolute uncertainty = (5.7 / 100) × 8.245 × 10^9
	(= 4.7 × 10^8 Pa or 0.47 × 10^9 Pa)
	E = (8.2 ± 0.5) × 10^9 Pa

A-Level Physics: **w22 23**

1(a)	(SI base unit of α =) $m^3 s^{-1} \times m / m^4 = s^{-1}$
1(b)	(percentage uncertainty =) 3 + 4 + 2 × 4 = 15 (%)
1(c)	$\alpha = QL / r^4$
	= 2.72 × 10^{-8} × 2.5 × 10^{-2} / (7.1 × 10^{-5})^4
	= 2.7 × 10^7
	absolute uncertainty = 0.15 × [2.7 × 10^7]
	= 0.4 × 10^7
	α = (2.7 ± 0.4) × 10^7 s^{-1}

A-Level Physics: **w21 23**

2(a)	force × displacement in the direction of the force
2(b)	units: kg m s^{-2} × m = kg m^2 s^{-2}
2(c)	T_1: K and T_2: K
	A: m^2 and t: s and L: m
	c = (kg m^2 s^{-2} m) / (m^2 K s)
	= kg m s^{-3} K^{-1}

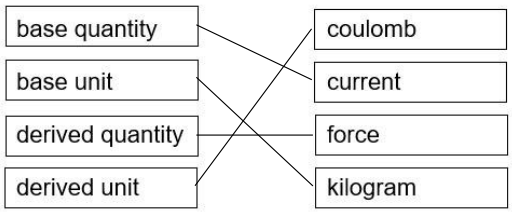
A-Level Physics: **w21 22**

1(a)	10^{12}
	pico (p)
1(b)	ampere and metre both underlined (and no other units underlined)
1(c)(i)	percentage uncertainty = 3.5 + (3.0 × 2) + 2.5 + 2.0
	= 14%
1(c)(ii)	absolute uncertainty = $4.1 \times 10^{-7} \times 14 / 100$ = $6 \times 10^{-8}\ \Omega\,m$

A-Level Physics: **m23 22**

1(a)	only ampere and kelvin underlined
1(b)	initial speed / velocity is zero
	(non-zero magnitude of) acceleration is constant / uniform (and in a straight line)
1(c)(i)	$a = 2.75^2 / (2 \times 3.89)$ = $0.97\ m\,s^{-2}$
1(c)(ii)	percentage uncertainty = (2 × 0.8) + 0.5
	= 2.1%
1(c)(iii)	absolute uncertainty = (2.1 / 100) × 0.97 = $0.02\ m\,s^{-2}$

A-Level Physics: **w22 21**

1(a)	 any two joined correctly
	all four joined correctly
1(b)(i)	the measurements have a small range
1(b)(ii)	(average of the) measurements not close to the true value
1(c)(i)	percentage uncertainty = (3 + 5 + 4) / 2
	= 6%
1(c)(ii)	absolute uncertainty = (6 / 100) × 15.0 = $0.9\ m\,s^{-1}$