Question Number	Answer		Mark
18a	Use of speed = distance / time	(1)	
	Calculates distance travelled by sound in 3s = 1020 (m) **Or** calculates time taken for sound to travel 1 km = 2.94 (s) **Or** calculates speed to travel 1000m in 3 seconds = 333 (ms^{-1})	(1)	
	Time taken by light to reach 1 km is almost instantaneous / 3.3×10^{-6} s so teacher is (approximately) correct.	(1)	
	Example of calculation For light, $t = d/v$ = 1000 m / 3.00×10^{8} ms^{-1} = 3.33×10^{-6} s For sound, $t = d/v$ = 1000 m / 340 ms^{-1} = 2.94 s Difference in arrival time = 2.94 s ≈ 3 s		**(3)**
18bi	Use of $Q = It$	(1)	
	Q = 0.75 C	(1)	
	Example of calculation $Q = It$ = 25,000 A × (30×10^{-6} s) = 0.75C		**(2)**
18bii	Use of $P = VI$	(1)	
	$P = 3.0 \times 10^{13}$ W	(1)	
	Example of calculation $P = VI$ = (1.2×10^{9} V) × 25,000 A = 3.0×10^{13} W		**(2)**
18biii	Use of $A = \pi r^2$	(1)	
	Use of $R = \rho l/A$	(1)	
	ρ = 0.24 (Ω m)	(1)	
	Example of calculation Cross sectional area of wire = $\pi r^2 = \pi (2.5 \times 10^{-2})^2 = 1.96 \times 10^{-3}$ m^2 $R = V/I$ = (1.2×10^{9} V) / 25,000 A = 48,000 Ω ρ = RA/l = (48,000 Ω) (1.96×10^{-3} m^2) / 400 m = 0.235 Ωm		**(3)**
18biv	Air in the lightning channel has been ionised **Or** Lightning channel unlikely to have a uniform diameter / CSA	(1)	**(1)**