Question Number	Answer		Mark
17a	**Either**		
	Uses resistors in parallel formula correctly	(1)	
	Adds series resistance	(1)	
	Use of $V = IR$ to find whole circuit current	(1)	
	Current in the 6.0 Ω resistor = 0.67(A)	(1)	
	Use of $Q = It$	(1)	
	4.2×10^{18} (electrons)	(1)	
	Or		
	Uses resistors in parallel formula correctly	(1)	
	Uses potential divider to calculate V across parallel section	(1)	
	Use of $V = IR$ to find current in 6.0 Ω resistor	(1)	
	Current in the 6.0 Ω resistor = 0.67(A)	(1)	
	Use of $Q = It$	(1)	
	4.2×10^{18} (electrons)	(1)	6
	<u>Example of calculation</u>		
	$\dfrac{1}{Rp} = \dfrac{1}{3.0\Omega} + \dfrac{1}{6.0\Omega}$, so $R_{parallel} = 2.0$ Ω		
	Total circuit resistance = 4.0 Ω + 2.0 Ω = 6.0 Ω		
	$I = V / R = 12$ V $/ 6.0$ Ω $= 2.0$ A		
	Current in 6.0 Ω resistor is 1/3 of 2.0A = 0.67 A		
	No. of electrons per second $= \dfrac{\text{current}}{\text{charge per electron}} = \dfrac{0.67 \text{ A}}{1.60 \times 10^{-19} \text{C}}$		
	$= 4.2 \times 10^{18}$ electrons per second		
17b	(Student is correct that) resistance in circuit/parallel is greater	(1)	
	V is the same	(1)	
	So if student uses $P = V^2/R$	(1)	
	Power in whole circuit would be less, so student incorrect	(1)	
	Or		
	(Student is correct that) resistance in circuit/parallel is greater	(1)	
	This leads to current being lower	(1)	
	So if student used $P = VI$ with same V	(1)	
	Power in whole circuit would be less, so student incorrect	(1)	
	Or		
	(Student is correct that) resistance in circuit/parallel is greater	(1)	
	This leads to current being lower	(1)	
	Effect of decreasing current > the effect of increasing resistance	(1)	
	Power in whole circuit would be less, so student incorrect	(1)	4
	(MP4 via any method is dependent on awarding MP2 & MP3)		
	Total for question 17		**10**