



## 2022 Sec 4 Physics Assignment 14 Current of Electricity - Answers

### Reminders:

1. Use subscripts for similar quantities belonging to different components, e.g.  $R_1$ ,  $R_2$ .
2. Write down the **basic formulae** before substitution.
3. Show all key mathematical steps clearly.
4. Evaluate your final answer!

### AS 14

- 1  $I = Q / t$   
Current in lightning =  $120 \text{ C} / 0.20 \text{ s} = 600 \text{ A}$
- 2 (a) Current through Resistor A =  $2 \times 0.5 \text{ A} = 1.0 \text{ A}$   
Resistor A is connected in parallel to the path where point X lies. Point X lies along a path with 2 resistors. Therefore, the current through Resistor A will be twice that at X.  
(b) Current through Resistor B =  $0.5 \text{ A} + 1.0 \text{ A} = 1.5 \text{ A}$   
Resistor B is in series with the battery, where the two paths (one with Resistor A and one with point X) converges.
- 3  $R = \rho L / A = \rho L / \pi r^2 = (7.0 \times 10^{-7} \times 600) / \pi (5.0 \times 10^{-4})^2$   
 $= 534.76 \Omega$   
 $= 530 \Omega$  (2 sf)
- 4  $R_y = 5.0 \Omega$
- 5  $R_x : R_y = 16 : 1$   
 $= R_x / R_y = 16$
- 6 (a) Rheostat or variable resistor  
(b) (i)  $0.053 \text{ A}$   
(ii)  $R = V / I = 2.5 / 0.053 = 47 \Omega$  (2 sf)  
(iii)  $I = V / R = 2.5 / 200 = 0.013 \text{ A}$  (2 sf)  
(iv)  $I = 0.053 + 0.0125 = 0.066 \text{ A}$  (3d.p)