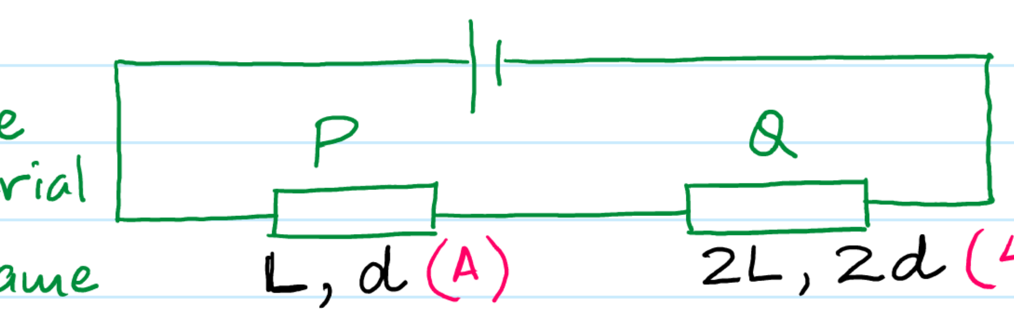
Slide (3)

23 February 2021 19:09

Ex. 2 How to compare drift velocity in a Series Circuit

Same material
ρ = Same
n = Same

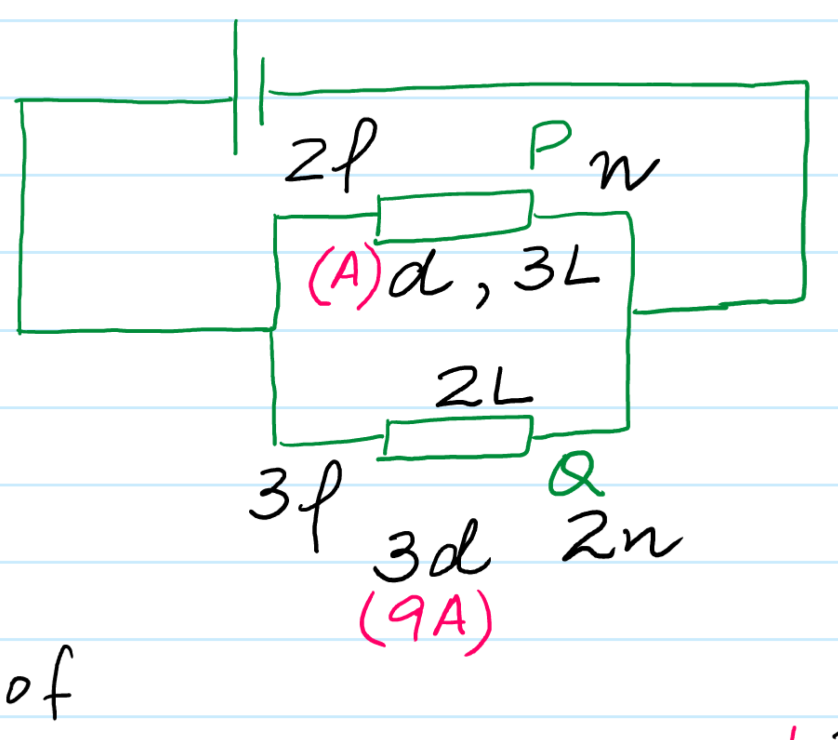


Cal ratio of

$$\frac{V_P}{V_Q} = \frac{\frac{I}{nAe}}{\frac{I}{n\,4A\,e}} = \frac{4}{1} \text{ Ans.}$$

Ex. 3 Compare drift Velocity in a Parallel Combination

different materials



(i) Ratio of

(a) $\frac{R_P}{R_Q} = \frac{\frac{2\rho . 3L}{A}}{\frac{3\rho . 2L}{9A}}$

$\frac{R_P}{R_Q} = \frac{6}{1} \times \frac{9}{6} = \frac{9}{1}$ Ans

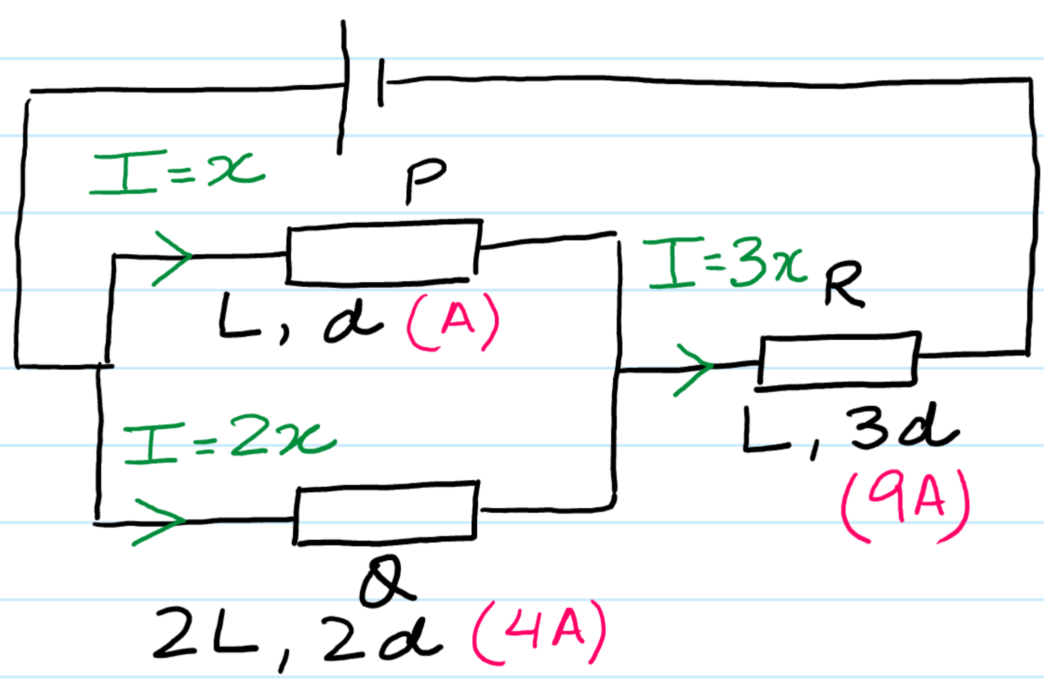
(c) $\frac{V_P}{V_Q} = \frac{\frac{1\,I}{n\,A\,e}}{\frac{9\,I}{2n\,9A\,e}}$

$\frac{V_P}{V_Q} = \frac{2}{1}$ Ans

(b) $\frac{I_P}{I_Q} = \frac{1}{9}$

Ex. 4 Compare drift velocity in Series & parallel circuits

Same material



(i) $\frac{R_P}{R_Q} = \frac{\frac{\rho . L}{A}}{\frac{\rho . 2L}{4A}} = \frac{2}{1}$ Ans.

(ii) $\frac{I_P}{I_Q} = \frac{1}{2}$

(iii) $\frac{V_Q}{V_R} = \frac{\frac{2x I}{n\,4A\,e}}{\frac{3x I}{n\,9A\,e}}$

$\frac{V_Q}{V_P} = \frac{3}{2}$ Ans

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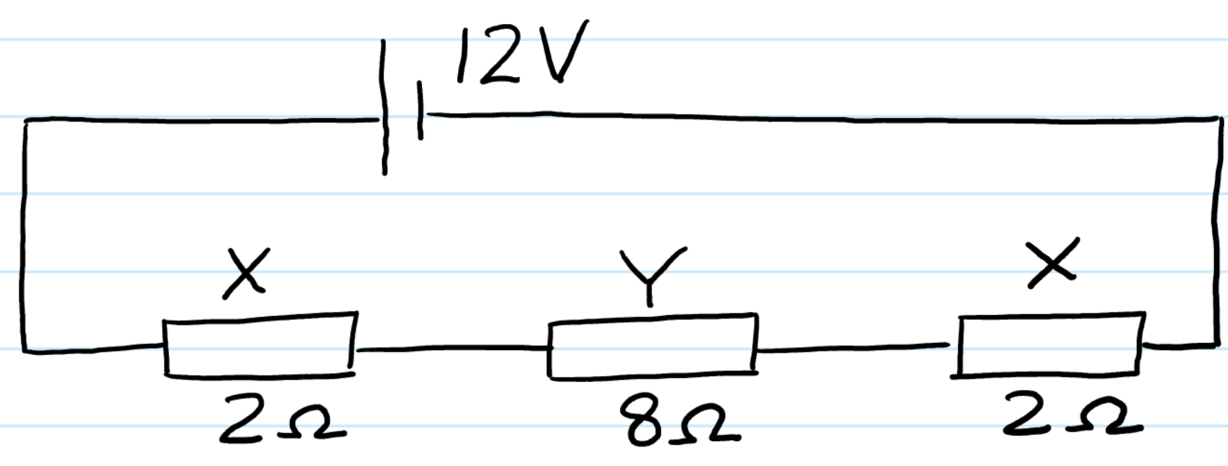
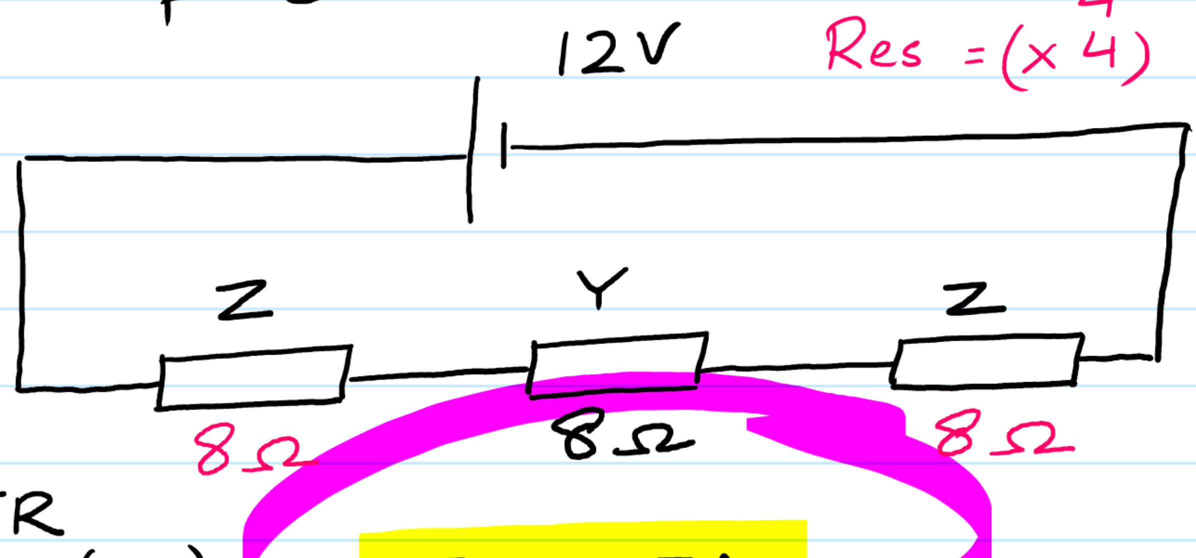
Ex. 5 How to compare drift velocity in a Series Circuit whose Resistance is changed



Cal Current in Circuit
V = IR
12 = I (12)
I = 1A

Both Resistors X are replaced with Two identical Resistors Z made of Same material as X but having **half the diameter**. Cal new value of Current

Area = $\frac{1}{4}$th
Res = (x 4)



V = IR
12 = I (24)
I = 0.5A

* Compare drift velocity in Z with drift velocity in X ?

$$\frac{V_Z}{V_X} = \frac{\frac{0.5\,I}{n\,0.25A\,e}}{\frac{1\,I}{n\,1A\,e}} = \frac{2}{1} \text{ Ans.}$$

(Important)

* Theory **Explain** how the drift velocity in Z compares with drift velocity of X

I = half, Area = Quater

Ans drift velocity in this case depends on two factors Current & Area.

Current = halved, Area = Quarter
∴ we can say that the change in Area **OUTWEIGHS** the change in Current.

$V \propto \frac{1}{A}$ ∴ as

area of Z decreases; its drift velocity **increases**.