

Answers – Week 7

7-1 Loop Rule: The Coulomb force is Conservative, the electric potential derived from it at any point must be unique and therefore the total change of potential over a closed loop must be ZERO.

$$\sum_C \Delta V \equiv 0$$

JUNCTION RULE: Current is flux of charge and charge is conserved. Therefore at a junction the total outgoing current must be equal to the total incoming current.

$$\sum I_{out} = \sum I_{in}$$

7-3 $I_1 = 1$ Amp

$I_2 = -2$ Amps. (minus sign means I_2 is opposite to direction of arrow on figure)

7-5 $R = \frac{V}{I} = \frac{VT}{Q}$ $C = \frac{Q}{V}$

$$RC = \frac{VT}{Q} \cdot \frac{Q}{V} \rightarrow T$$

7-7 (i) $I = 0.37$ mA

(ii) $I = 0.05$ mA

(iii) $i \approx 0$ Amp

7-9 Both reach 6 V at the same time

7-11 4.61 TIME CONSTANTS MUST ELAPSE TO GROW TO 0.99 OF FINAL CHARGE

7-13 $\Delta V = 5.13 \times 10^{-5}$ Volt

7-15 ZERO because $\vec{F}_B \perp \vec{v}$ at all times.