3.1 Here $\mathcal{E} = 12\,V$

$r = 0.4\,\Omega$

Current = $R = 0$

$$I_{max} = \frac{\mathcal{E}}{r} = \frac{12}{0.4}$$

$$= 30\,A$$

3.2 $$I = \frac{\mathcal{E}}{R + r}$$

$$R + r = \frac{\mathcal{E}}{I}$$

$$R = \frac{\mathcal{E}}{I} - r = \frac{10}{0.5} = 3\,\Omega$$

$$V = IR = 0.5 \times 17 = 8.5\,V$$

3.3 $R_s = R_1 + R_2 + R_3 = 6\,\Omega$

$$\text{Current} = \frac{\mathcal{E}}{R} = \frac{12}{6} = 2\,A$$

P.d across different resistors

$V_1 = IR_1$ $\quad 2 \times 1 = 2\,V$

$V_2 = IR_2$ $\quad 2 \times 2 = 4\,V$

$V_3 = IR_3$ $\quad 2 \times 3 = 6\,V$

3 4) $\frac{19}{20}$

$\frac{1}{R_P} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$

$R_P = \frac{20}{19}\,\Omega$

$\frac{1}{2} + \frac{1}{4} + \frac{1}{5}$

$= \frac{19}{20}$

$\therefore R_P = \frac{20}{19}\,\Omega$

11 Current

$I_1 = \frac{\mathcal{E}}{R_1} = \frac{20}{2}$ 10A

$I_2 = \frac{\mathcal{E}}{R_2} = \frac{20}{4}$ 5A

$I_3 = \frac{20}{5}$ 4A

Total Current = 10 + 5 + 4 = 19A

3.5 $R_1 = 100$

$R_2 = 117$

$t_1 = 27$

$\alpha = 4.70 \times 10^{-4} C^{-1}$

$$\alpha = \frac{R_2 R_1}{R_1 (t_2 - t_1)}$$

$$t_2 - t_1 = \frac{R_2 - R_1}{R \alpha} \qquad \frac{117 - 100}{100 \times 4.70 \times 10^{-4}}$$

$$t_2 = 1000 + t_1 - 100 + 27 = 1027 \cdot C$$

3.6 $l = 15 m$

$A = 6.0 \times 10^{-2} m^2$

$R = 5 = \Omega$

$$P = \frac{RA}{l} \qquad \frac{5.0 \times 6.0 \times 10^{-7}}{15}$$

$$= 2.0 \times 10^{-7} \Omega m$$

37 $R_1 = 2.15\Omega$

$R_2 = 27.5°C$

$R_2 = 2.78\Omega$

$t_2 = 100°C$

$\text{Temp} = \frac{R_2 - R_1}{R_1(t_2 - t_1)}$

$= \frac{2.7 - 2.1}{2.1(100 - 27)}$

$= \frac{0.6}{2.1 \times 72.5}$

$= 0.0039°C^{-1}$

38 $V = 230V$

$I = 3.2$

$R = \frac{2.8}{1.70 \times 10^{-4}}$

$$R_1 = \frac{V}{I_1} = \frac{230}{3.2} = 71.875\,\Omega$$

$$R = \frac{VQ}{I_2} = \frac{230}{2.8} = 82.143\,\Omega$$

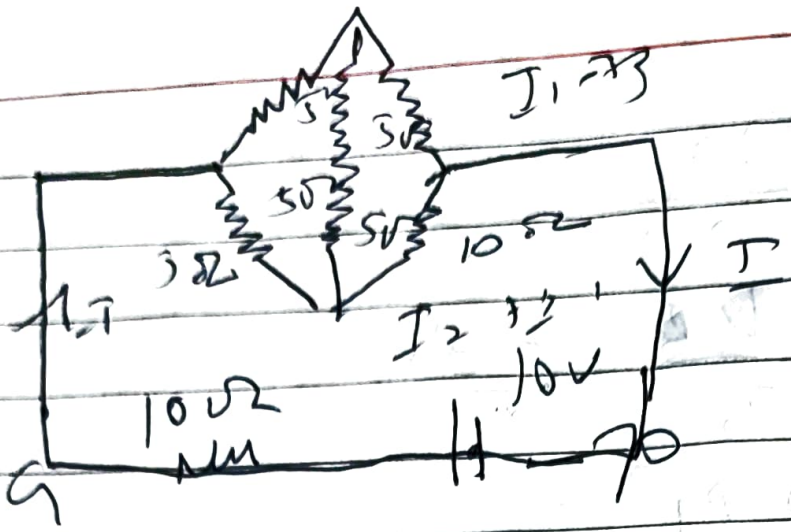
$$\alpha = \frac{R_2 - R_1}{R_1 (t_2 - t_1)}$$

$$t_2 - t_1 = \frac{R_2 - R_1}{R_1 \alpha}$$

$$\frac{82.143 - 71.875}{71.875 \times 1.70 \times 10^{-4}}$$

$$= \frac{10.268 \times 10^4}{71.875 \times 1.7} = 840.35\,^{\circ}C$$

3.9



ABDA

$$10I_2 + 5I_3 - 5I_2 = 0$$

$$5(I_2 - I_2) - 10(-I_2 + I_3) - 5I_3 = 0$$

$$5I_2 + 10(I_2 + I_3) + 10(-I_2 + I_3 = 0$$

$$10I_1 - 5I_2 + I_3 = 0$$

$$5I_1 - 10I_2 + 20I_3 = 0$$

$$10I_1 + 25I_2 + 10I_3 = 0$$

$I_{AB} = \frac{9}{17} A$

$I_{BC} = I_1 - I_3 = \frac{6}{17} A$

$I_{AR} = I_2 + I_3 = \frac{4}{17} A$

$I = AD = I_2 = \frac{6}{17}$

$I_{BD} = I_3 = \frac{2}{17} A$

total Current $= \frac{10}{17}$

3.10 $l = 35.9 m$

$R = x - 7$

$S: x = 12.50 \Omega$

$d_{15} = \frac{100 - l}{l} \times 12$

$= \frac{122 - 39.2}{39.5} \times 12$

$= \frac{12.5 \times 39.5}{60.5} = 8.100 \Omega$

3-11 $\xi_1 = 1.25 V$

$l_1 = 35.0$

$l_2 = 3.0$

$\xi_2 = ?$

$\frac{G_2}{G_1} = \frac{12}{l_1}$

$\xi_2 = \frac{\phi_2}{t_1} \quad \xi_4 = \frac{63 \times 1.2.5}{3}$

$= 2.25 \text{ V}$

3.13 $n = 8.5 \times 10^{-6} \text{ m}^2$

$\lambda = 2.0 \times 10^{-7} \Omega$

$\xi = 1.6 \times 10^{-19} \text{ C}$

$I = 3.0 \text{ A}$

$t_1 = \frac{I}{\text{~~mA~~}}$

$\frac{3}{1.6 \times 10^{-19} \times 8.5 \times 10^{28} \times 2 \times 10^{-6}}$ m/s

$\frac{3}{1.6 \times 8.5 \times 2 \times 10}$ m/s

$= 1.1 \times 10^{-4} \text{ s}$

Request Lund

$t = \frac{T}{4}$

3

1.1×10^{-4}

$= 2.73 \times 10^{45} = 7.57\ m$