① $V_S = 12\,V$

$R_T = 550\,\Omega$

Value of one Resistance

$R_T = \frac{R}{n}$

$550 \times 4 = R \Rightarrow 2200\,\Omega = R$

→ voltage across each Resistor is 12 V.

→ current through each Resistor

$V_s = I R \Rightarrow I = \frac{V_s}{R} = \frac{12}{2200} =$

$= 5.45\,mA$

current through each resistor is same.

---

②

I_1 = Current of ~~Cars~~ Running lights = $0.5 \times 4 = 2$

I_2 = " " Tail lights = $1.2 \times 2 = 2.4$

$I_T = I_1 + I_2 = 2 + 2.4 = 4.4\,A$

---

③

$1/R_T = \frac{1}{1k} + \frac{1}{4.7k} + \frac{1}{560} = .002998$

$\Rightarrow R_T = 1/.002998 = 333.56\,\Omega$

$I_T = \frac{V_s}{R_T} = \frac{25}{333.56} = 74.94\,mA$

Scanned with CamScanner

(4) $I_T = 100\,mA$

$$1/R_T = \frac{1}{R} + \frac{1}{2R} + \frac{1}{3R} + \frac{1}{4R}$$

$$= \frac{24+12+8+6}{24R} = \frac{50}{24R} = \frac{25}{12R}$$

$$\Rightarrow R_T = \frac{12R}{25}$$

$$I_1 = \left(\frac{R_T}{R}\right) I_T = \frac{12R}{25R} \cdot 100\,mA = 48\,mA$$

$$I_2 = \frac{12R/25}{2R} \cdot 100 = 24\,mA$$

$$I_3 = \frac{12R/25}{3R} \cdot 100 = 16\,mA$$

$$I_4 = \frac{12R/25}{4R} \cdot 100 = 12\,mA$$

---

(5) $I_T = 10\,\mu A$

$$R_T = \frac{(1.0\,M)(2.2\,M)}{1.0\,M + 2.2\,M} = \frac{2.2\,M^2}{3.2\,M} = .6875\,M\Omega = 687.5\,k\Omega$$

$$I_1 = \frac{.688\,M}{1.0\,M} \cdot 10\mu = 6.88\,\mu A$$

$$I_2 = \frac{.687\,M}{2.2\,M} \cdot 10\mu = 3.12\,\mu A$$

Scanned with CamScanner