Circuit 1

$V_A = 6.97V$

$V_S = 12.0V$

$I = 1.00mA$

$V_{R_1+R_2} = V_S - V_A = 12.0V - 6.97V = \boxed{5.03V}$

$R_1 + R_2 = \frac{V_{R_1+R_2}}{I} = \frac{5.03V}{1.00mA} = \boxed{5.03k\Omega} = \boxed{4.70k\Omega} + \boxed{330\Omega}$

$R_3 = \frac{V_A}{I} = \frac{6.97V}{1.00mA} = \boxed{6.97k\Omega} = 6.80k\Omega + 180\Omega$

$R_1 = \boxed{4.70k\Omega}$

$R_2 = \boxed{330\Omega}$

$P_{R3} = I^2 \cdot R_3 = (1.00mA)^2(6.97k\Omega) = \boxed{6.97mW}$

$P_{R1} = I^2 \cdot R_1 = (1.00mA)^2(4.70k\Omega) = \boxed{4.70mW}$

$P_{R2} = I^2 \cdot R_2 = (1.00mA)^2(330\Omega) = \boxed{330\mu W}$

$P_{max} = 0.5W \rightarrow P_{80\%} = \boxed{400mW}$

$V_{expected} = \boxed{6.97V}$

$V_{actual} = 6.9758V = \boxed{6.98V}$

$error\% = \frac{V_{actual}}{V_{expected}} \cdot 100 - 100 = \boxed{0.143\%}$

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Circuit 2

$V_S = 8.00V$

$I_{R1} = 17.4 mA$
$I_{R2} = 16.2 mA$
$I_{R3} = 45.0 mA$

$$R_1 = \frac{V_S}{I_{R1}} = \frac{8.00V}{17.4mA} = \boxed{459.77\Omega} = \boxed{\underset{(R_1)}{390.00\Omega} + \underset{(R_{1b})}{68.00\Omega}}$$

$$R_2 = \frac{V_S}{I_{R2}} = \frac{8.00V}{16.2mA} = \boxed{493.83\Omega} = \boxed{\underset{(R_2)}{470.00\Omega} + \underset{(R_{2b})}{22.000\Omega}}$$

$$R_3 = \frac{V_S}{I_{R3}} = \frac{8.00V}{45.0mA} = \boxed{177.78\Omega} = \boxed{\underset{(R_3)}{150.00\Omega} + \underset{(R_{3b})}{27.000}}$$

$$P_{R1} = I_{R1}^2 \cdot R_1 = (17.4mA)^2 (459.77\Omega) = \boxed{139.20mW}$$

$$P_{R2} = I_{R2} \cdot R_2 = (16.2mA)^2 (493.83\Omega) = \boxed{129.60mW}$$

$$P_{R3} = I_{R3} \cdot R_3 = (45.0mA)^2 (177.78\Omega) = 360.00mW$$

	Expected	Actual	Error%
I_{R1}	17.4 mA	17.5 mA	5.75 %
I_{R2}	16.2 mA	16.3 mA	6.17 %
I_{R3}	45.0 mA	44.4 mA	-13.3 %

$$Error = \frac{Actual}{Expected} \cdot 100 - 100$$

Made with Goodnotes