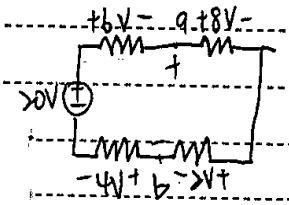
資科一甲 CBE103006 駱維得 第四章：簡單電阻電路

Date: / Page: /

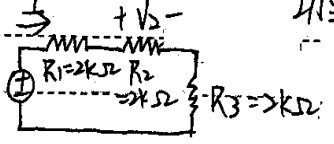
4.5 試應用克希荷夫電壓定律，利用迴路1及迴路2，求出下圖中電壓 V_5 之值？



$6+V_5+4-20=0$

$V_5=10V$ #

4.6 有一串聯電路如下圖所示，試求：(a) 等效電阻 (b) 總電量 I (c) 電壓 V_2 (d) 電源所提供的功率



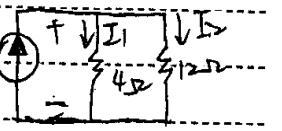
(a) $R_T=2+2+2=6(k\Omega)$ #

(b) $I=\frac{V}{R_T}=\frac{120}{6}=20(mA)$ #

(c) $V_2=IR_2=2\times20=40(V)$ #

(d) $P=IV=120\times20=2400(mW)=2.4(W)$ #

4.8 如下圖所示兩個並聯電阻器，試求其電壓 V 和電流 I_1 和 I_2 之值



$\frac{1}{R_T}=\frac{1}{4}+\frac{1}{12}\Rightarrow\frac{1}{R_T}=\frac{4}{12}\Rightarrow R_T=3$

$V=IR\Rightarrow3\times5=15(V)$ #

$I_1=\frac{V}{R_1}=\frac{15}{4}=3.75(A)$ #

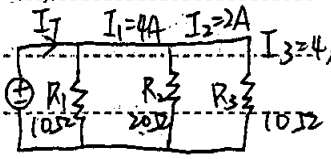
$I_2=\frac{V}{R_2}=\frac{15}{12}=1.25(A)$ #

1

69 A a s F 5 C j D d e

Date: / Page: /

4.9 如下圖所示之並聯電路，試求：(a) R_3之值 (b) 電壓 V (c) I_T (d) I_2 (e) P_2



(a) $\frac{5}{20}=\frac{2}{20}+\frac{1}{20}+\frac{1}{R_3}$

$\frac{2}{20}=\frac{1}{R_3} \Rightarrow R_3=10\Omega$ #

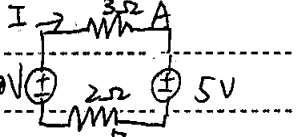
(b) $V=I_1R_1=4\times10=40V$ #

(c) $I_T=I_1+I_2+I_3=10A$ #

(d) $I_2=\frac{V}{R_2}=\frac{40}{20}=2A$ #

(e) $P_2=VI_2=40\times2=80W$ #

4.10 試求下圖中每一元件的吸收功率和供給功率，並證明功率不變



$V_T=20-5=15V$，$R_T=3+2=5\Omega$

$I=\frac{15}{5}=3A$

$V_A=3\times3=9V$

$V_B=3\times2=6V$

$P=IV$

$P_A=3\times(-9)=-27W$

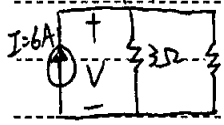
$P_B=3\times(-6)=-18W$

$P_{5V}=3\times(-5)=-15W$

$P_{20V}=3\times20=60$

$P_f=\frac{60}{P_{20V}}+(P_A+P_B+P_{5V})=0$ #

4.11 如下圖所示之並聯電路求供給所有電阻之功率 P



$\frac{1}{R_T}=\frac{1}{3}+\frac{1}{6}$

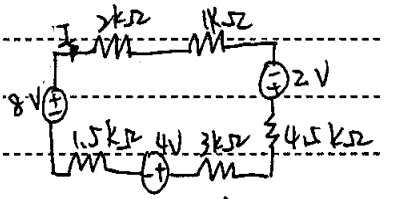
$\Rightarrow\frac{1}{R_T}=\frac{3}{6}\Rightarrow R_T=2$

$V=IR=12$

$P=IV=12\times6$

$=72W$ #

4.12 如下圖所示之電路試求 V_T，R_T 及 I



$V_T=8+2-4=6V$ #

$R_T=2+4+3+1.5$

$=12k\Omega$ #

$I=\frac{V_T}{R_T}=\frac{6}{12}=0.5mA$ #