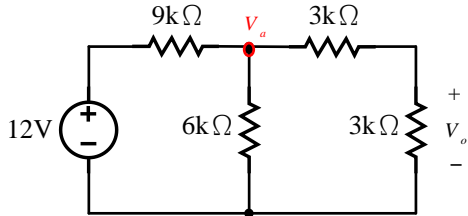


1. Find  $V_o$  in the circuit of **Fig. 1**. (15%)



**Fig. 1**

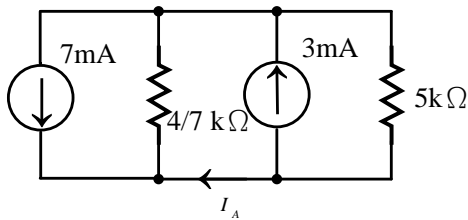
根據電壓分配定則得到  $V_a$  後再對  $3k\Omega$  與  $3k\Omega$  做分壓即可得到  $V_o$ 。

$$12 \times \frac{3}{9+3} \times \frac{3}{3+3} = 1.5$$

答案:  $V_o = 1.5 \text{ V}$

2. Find the current  $I_A$  in the circuit of **Fig. 2**. (15%)

將 **Fig. 2** 整理後可變為下圖

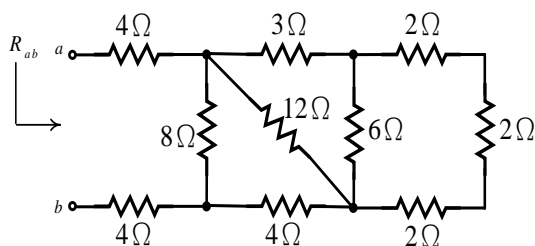


根據分流定則可以得到  $I_A$  的電流:

$$I_A = - \left( 7 \times \frac{\frac{4}{7}}{\frac{4}{7} + 5} + 3 \times \frac{5}{\frac{4}{7} + 5} \right) = -3.41$$

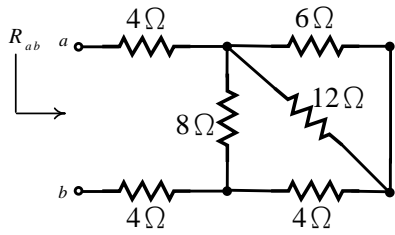
答案:  $V_o = -3.41 \text{ mA}$

3. Find the resistance  $R_{ab}$  looking into terminals  $a$  and  $b$  of the circuit shown in **Fig. 3**. (15%)

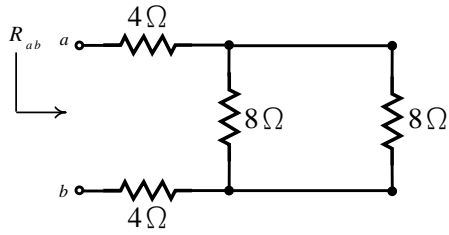


**Fig. 3**

將 Fig. 3 化簡後變為



再化簡後變為



$$R_{ab} = 4 + (8 // 8) + 4 = 12$$

答案:  $R_{ab} = 12 \Omega$

4. All the resistors in Fig. 4 are 1- $\Omega$ , find the current  $I_s$ . (15%)

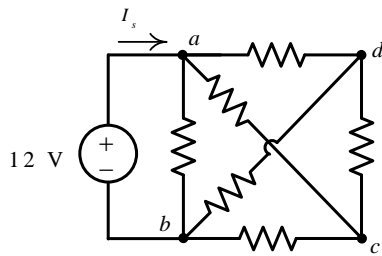
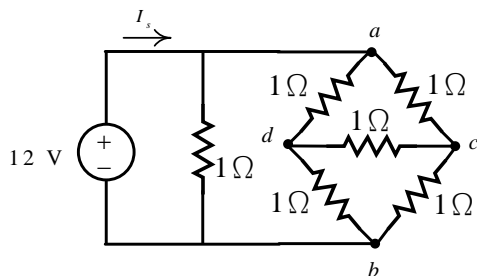
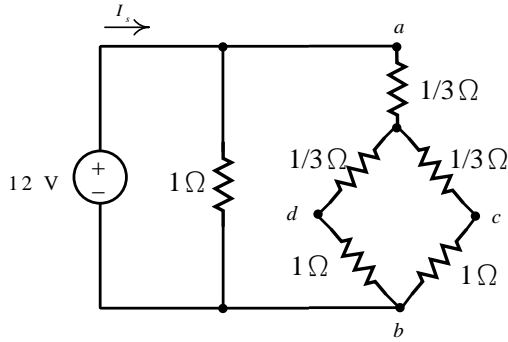


Fig. 4

將 Fig. 4 電路做整理後



對 a、d、c  $\Delta$  化 Y 後



$$I_s = \frac{12}{1 // \left[ \frac{1}{3} + \left( \frac{4}{3} // \frac{4}{3} \right) \right]} = 24$$

答案:  $I_s = 24 \text{ A}$

5. Find the node voltages  $V_1$  and  $V_2$  in the circuit of **Fig. 5**. (20%)

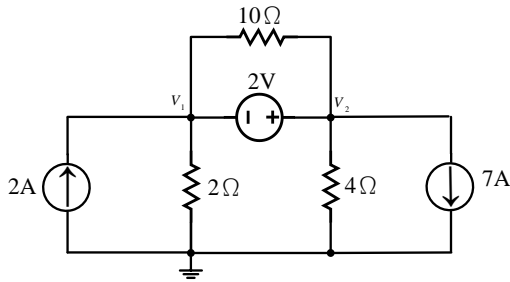


Fig. 5

由於遮蔽效應，所以並聯電壓源的電阻  $10 \Omega$  沒有電流通過。

根據克希荷夫電流定律，流進等於流出，假設  $V_1$ 、 $V_2$  點的電流往下流即可以

$$\text{得到: } 2 = \frac{V_1}{2} + \frac{V_2}{4} + 7$$

$$\text{而 } V_2 = V_1 + 2 \text{ 帶回上式後可以得到 } V_1 = -\frac{22}{3}, V_2 = -\frac{16}{3}$$

答案:  $V_1 = -\frac{22}{3} \text{ V}, V_2 = -\frac{16}{3} \text{ V}$

6. Find the branch current  $I_3$  in the circuit of **Fig. 6** using the mesh current method. (20%)

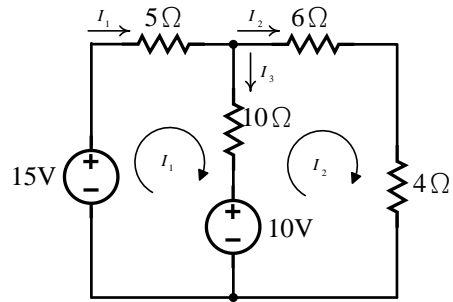


Fig. 6

在所欲求出之網路的迴路中，應用克希荷夫電壓定律寫出兩組迴路方程式以  
 求出各迴路之電流

$$-15 + 5I_1 + 10(I_1 - I_2) + 10 = 0 \quad (1)$$

$$6I_2 + 4I_2 + 10(I_2 - I_1) - 10 = 0 \quad (2)$$

將(1)、(2)式解聯立後便可得到  $I_1 = 1$ ， $I_2 = 1$

而  $I_3 = I_1 - I_2 = 0$

答案： $I_3 = 0$  A