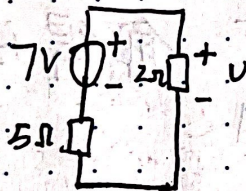
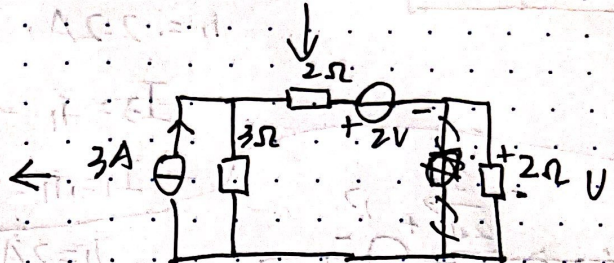
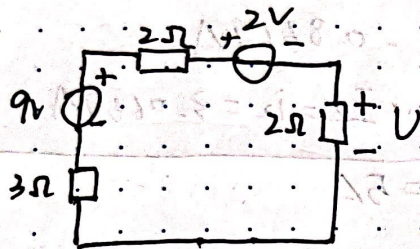
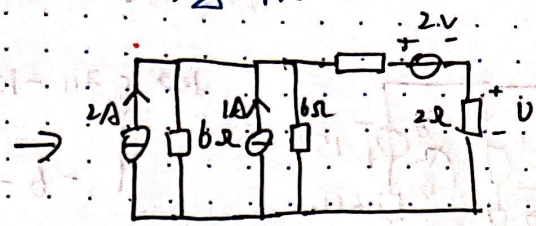
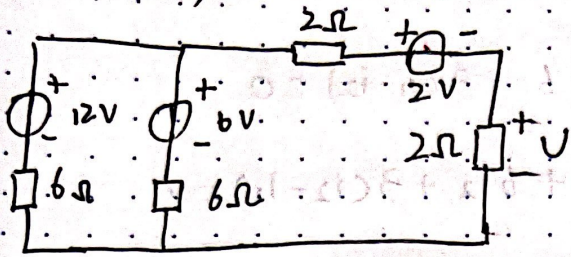


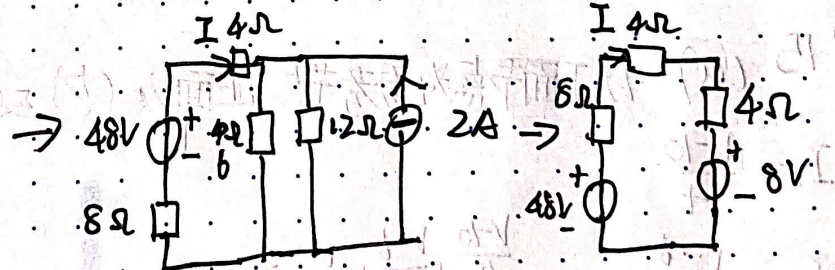
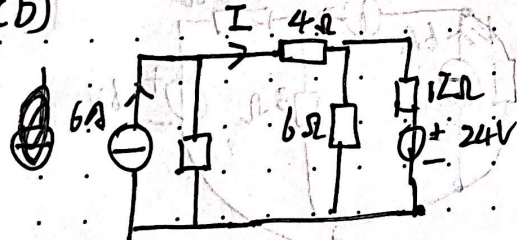
1.13 (a)

李文俊 2023/5/20



$$U = \frac{2}{5+2} \times 7 = 2V$$

(b)



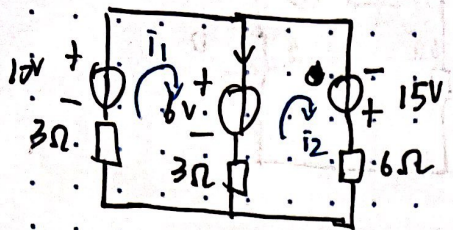
$$I = \frac{48-8}{8+4+4} = 2.5A$$

$$V_d = 5V$$

1.14

(a)

分别设网孔电流为 i_1, i_2

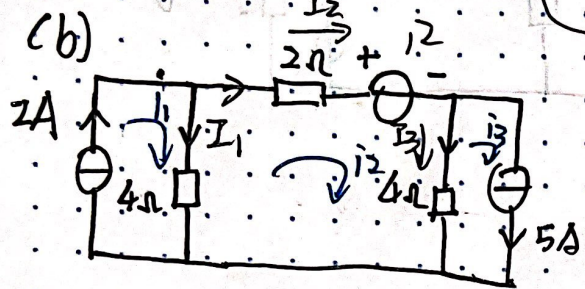


$$\begin{cases} 3i_1 - 10 + 6 + 3(i_1 - i_2) = 0 \\ -6 - 15 + 6i_2 + 3(i_2 - i_1) = 0 \end{cases}$$

$$i_1 = 2.2A, i_2 = 3.0667A$$

$$I_3 = i_1 - i_2 = -0.8667A$$

$$I_1 = i_1 = 2.2A, I_2 = i_2 = 3.0667A$$



$$i_1 = 2A, i_3 = 5A$$

$$4(i_2 - i_1) + 2i_2 + 2 + 4(i_2 - i_3) = 0$$

~~1.2A~~ 解得 $i_2 = 1.6A$

$$I_1 = i_1 - i_2 = 0.4A$$

$$I_3 = i_2 - i_3 = -3.4A$$

$$I_2 = i_2 = 1.6A$$

1.15 (a)

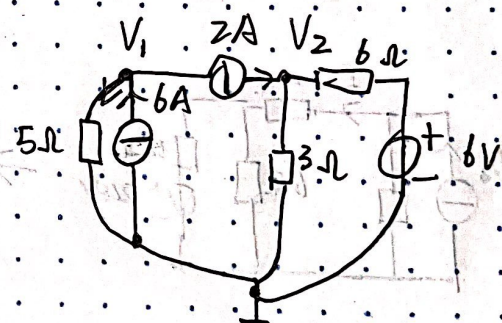
以下面节点为参考节点, 上面为 (b)

$$\begin{cases} I_1 = \frac{V-10}{4} \\ I_2 = \frac{V-6}{3} \\ I_3 = \frac{V}{6} \\ I_4 = 3A \end{cases} \Rightarrow \frac{V-10}{4} + \frac{V-6}{3} + \frac{V}{6} + 3 = 0$$

$$V = 2V$$

公式: $(\frac{1}{4} + \frac{1}{3} + \frac{1}{6})V = \frac{10}{4} + \frac{6}{3} - 3$

$$V = 2V$$



$$V_1 = 5, 6 = \frac{V_1}{5} + 2$$

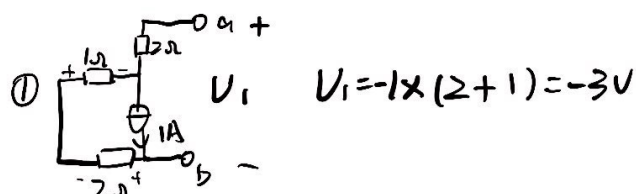
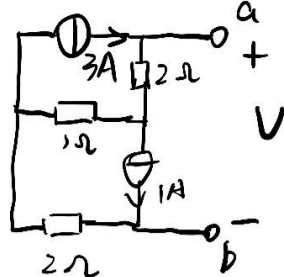
$$V_1 = 20V$$

$$V_1 = 20V$$

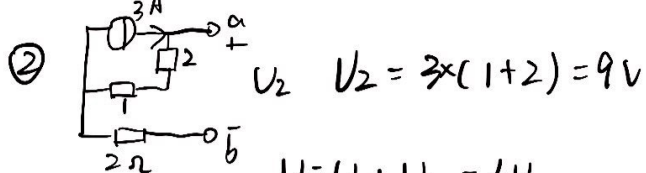
$$2 = \frac{V_2}{3} + \frac{V_2-6}{6}$$

$$V_2 = 6V$$

作业: 1-17



$$V_1 = -1 \times (2+1) = -3V$$



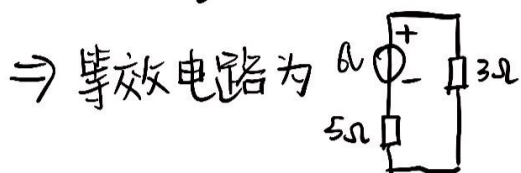
$$V_2 = 3 \times (1+2) = 9V$$

$$V = V_1 + V_2 = 6V$$



$$R_0 = 1+2+2 = 5\Omega$$

$$I_3 = \frac{V}{R+R_0} = \frac{6}{5+3} = \frac{3}{4} = 0.75A$$



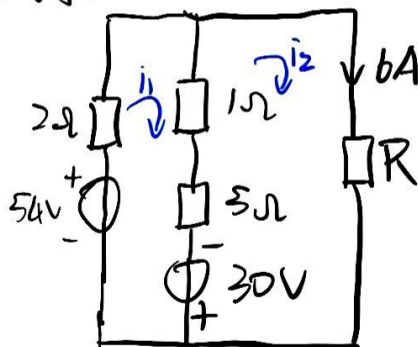
⇒ 等效电路为

1-20

电路可等效为:

① 网孔法

假设回路电流分别为 i_1, i_2

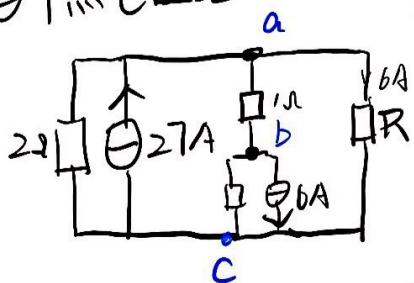


$$\begin{cases} 6(i_1 - i_2) - 30 - 54 + 2i_1 = 0 \\ 30 + 6(i_2 - i_1) + i_2 R = 0 \end{cases}$$

$$i_2 = 6A$$

解得 $R = 4\Omega$

② 节点电位法

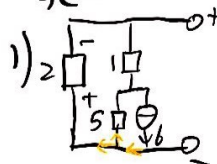


$$\begin{cases} (\frac{1}{2} + 1 + \frac{1}{R}) V_a - V_b = 27 \\ (1 + \frac{1}{5}) V_b - V_a = -6 \end{cases}$$

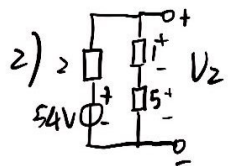
$$V_a = 6R$$

解得 $R = 4\Omega$

③ 戴维南

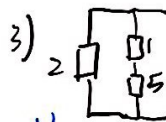


$$V_1 = 2 \times 6 \times \frac{-5}{5+3} = -7.5V$$



$$V_2 = 6 \times \frac{54}{2+1+5} = 40.5V$$

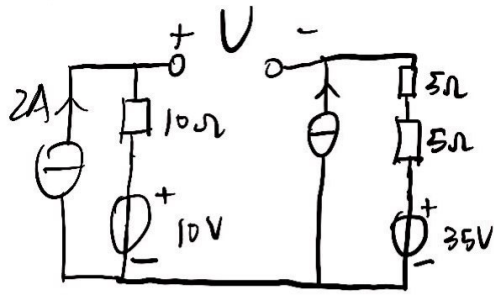
$$V = V_1 + V_2 = 33V$$



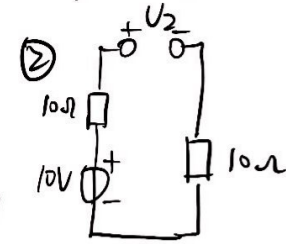
$$R_0 = \frac{2 \times 6}{2+6} = \frac{2 \times 6}{8} = 1.5\Omega$$

$$I = \frac{V}{R+R_0} = 6A \quad \therefore R = 4\Omega$$

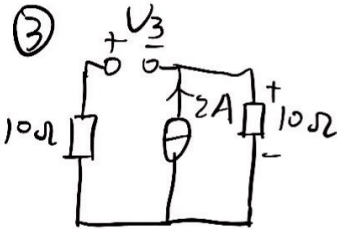
1-21



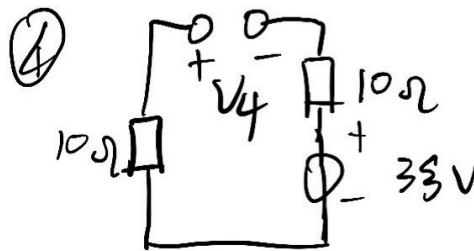
$$V_1 = 2 \times 10 = 20V$$



$$V_2 = 10V$$



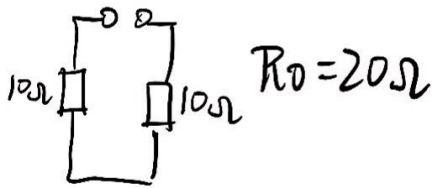
$$V_3 = -2 \times 10 = -20V$$



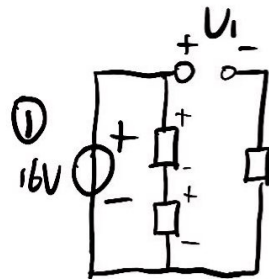
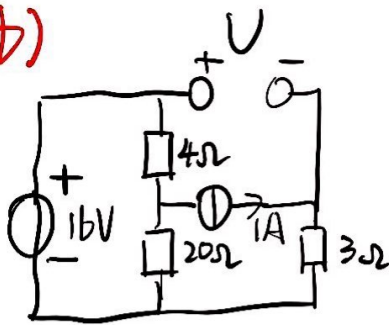
$$V_4 = -35V$$

$$I = \frac{V_1 + V_2 + V_3 + V_4}{R_0 + 5}$$

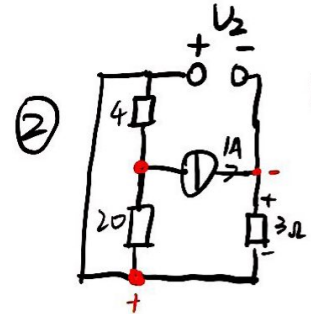
$$= \frac{-25}{25} = -1A$$



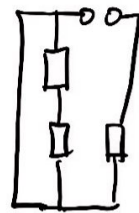
(b)



$$V_1 = 16V$$



$$V_2 = -1 \times 3 = -3V$$



$$R_0 = 3\Omega$$

$$I = \frac{V}{R_0 + 3} = \frac{13}{6}$$

$$V = V_1 + V_2 = 13V$$

$$\approx 2.167A$$