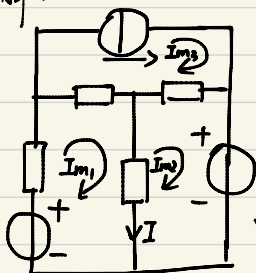2.2 解:

(a).

$$\begin{cases} I_{m_3} = 1A & ① \\ I = I_{m_1} - I_{m_2} & ② \\ 40I_{m_1} - 30I_{m_2} - 5 = 30 & ③ \\ -30I_{m_1} + 50I_{m_2} - 20 = -5 & ④ \end{cases}$$
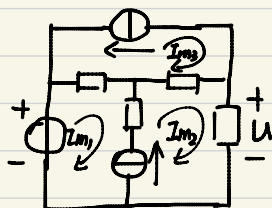
由 ③ ④ 可解得 I_{m_1} 和 I_{m_2}：

$$\begin{cases} 40I_{m_1} - 30I_{m_2} = 35 \\ -30I_{m_1} + 50I_{m_2} = 15 \end{cases}$$

$$\Rightarrow \begin{cases} 8I_{m_1} - 6I_{m_2} = 7 \\ -6I_{m_1} + 10I_{m_2} = 3 \end{cases} \Rightarrow \begin{cases} I_{m_1} = 2A \\ I_{m_2} = 1.5A \end{cases}$$
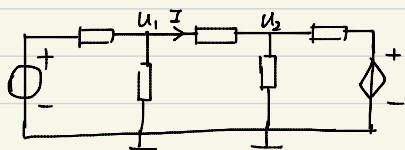
$$\therefore I = I_{m_1} - I_{m_2} = 0.5A$$

(b).

$$\begin{cases} I_{m_3} = -2A & ① \\ I_{m_3} - I_{m_1} = 8A & ② \\ (1+R)I_{m_1} - RI_{m_2} - (-2) = 24 + U_i & ③ \\ -RI_{m_1} + (R+7)I_{m_2} - (-2) \times 3 = -U_i & ④ \end{cases}$$

由 ②③④ 可解得 I_{m_1}、I_{m_2}：

$$\begin{cases} I_{m_3} - I_{m_1} = 8 \\ I_{m_1} + 7I_{m_2} + 8 = 24 \end{cases} \Rightarrow \begin{cases} I_{m_1} = -5A \\ I_{m_2} = 3A \end{cases}$$

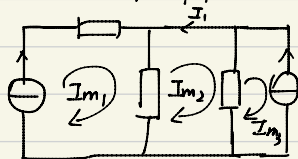$$\therefore U = I_{m_2} \times 4 = 3 \times 4 = 12V$$

2.6 解:

$$\begin{cases} (\frac{1}{2} + \frac{1}{20} + \frac{1}{5})U_1 - \frac{1}{5}U_2 = \frac{20}{2} \\ -\frac{1}{5}U_1 + (\frac{1}{5} + \frac{1}{10} + \frac{1}{2})U_2 = \frac{8I}{2} \\ I = \frac{U_1 - U_2}{5} \end{cases}$$

由此可解出 $\begin{cases} U_1 = 10V \\ U_2 = 16V \end{cases}$

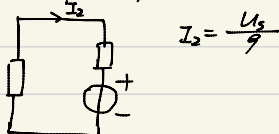$\therefore P = \frac{U^2}{R} = \frac{(U_1 - U_2)^2}{5} = 7.2\ W$

2.8 解:

(6). 电流源单独作用:

$$\begin{cases} I_{m_1} = 2A \\ I_{m_2} = -I_1 \\ I_{m_3} = -1A \\ -6 \times 2 + 9 I_{m_2} - 3 \times (-1) = 0 \end{cases}$$

$\Rightarrow -12 + 9 I_{m_2} + 3 = 0$

$\therefore I_{m_2} = 1\ A \Rightarrow I_1 = -I_{m_2} = -1A$

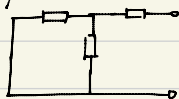**电压源单独作用:**

$$I_2 = \frac{U_s}{9}$$

$\therefore$ 对于原路: $I = I_1 + I_2 = -1 + \frac{U_s}{9} = 0 \Rightarrow U_s = 9V$

2.18 解: $\frac{U_{oc}}{R_0 + R_L} = I_L = \frac{U_{oc}}{R_0 + 4} = 2$

$\therefore$ 等效电阻 $R_0 = 1 + 2//2 = 2\ \Omega$

$\therefore U_{oc} = 2 \times (2 + 4) = 12V$

根据最大功率传输原理, $P_m = \frac{U_{oc}^2}{4R_0} = \frac{12^2}{4 \times 2} = 18\ W$