

1. For the given circuit

(a)

$$V_{oc} = \frac{130}{11}V, \quad I_{sc} = \frac{13}{12}A$$

(b)

$$R_{eq} = \frac{120}{11}\Omega$$

(c)

$$P_{1\Omega} = \left(\frac{130}{131}\right)^2 \approx 0.985W$$

2. For the given circuit

$$v_o = 2V, \quad i_i = 15A$$

3. For the given circuits

(a)

$$i_s = 5A, \quad i_o = 2.5A$$

(b)

$$R = 1.5\Omega$$

(c)

$$R = -2.5\Omega$$

4. For the given circuit

(a)

$$R_{eqab} = \frac{R_1 R_2}{R_1 + R_2} + \frac{R_3 R_4}{R_3 + R_4}$$

(b)

$$R_{eqDC} = \frac{(R_1 + R_2)(R_3 + R_4)}{R_1 + R_2 + R_3 + R_4}$$

5.

6. $\mathbf{G}_{uu}\mathbf{v}_u + \mathbf{G}_{uk}\mathbf{v}_k = \mathbf{i}$,

$$\mathbf{G}_{uu} = \begin{bmatrix} \frac{1}{R_1} + \frac{1}{R_8} + \frac{1}{R_3} + \frac{1}{R_2} & 0 & \frac{-1}{R_8} \\ 0 & \frac{1}{R_4} + \frac{1}{R_5} + \frac{1}{R_7} & \frac{-1}{R_7} \\ \frac{-1}{R_8} & \frac{-1}{R_7} & \frac{1}{R_6} + \frac{1}{R_8} + \frac{1}{R_7} \end{bmatrix} \quad \mathbf{v}_u = \begin{bmatrix} v_b \\ v_d \\ v_e \end{bmatrix}$$

$$\mathbf{v}_k = \begin{bmatrix} v_a \\ v_c \end{bmatrix} \quad \mathbf{G}_{uk} = \begin{bmatrix} -1/R_1 & 0 \\ 0 & -1/R_5 \\ 0 & -1/R_6 \end{bmatrix} \quad \mathbf{i} = \begin{bmatrix} -I_S \\ 0 \\ 0 \end{bmatrix}$$

7.

$$v_{ce} = -5.414V$$