1. Assign values to V and I in element B so that it is equivalent to element A (see Figure 1).

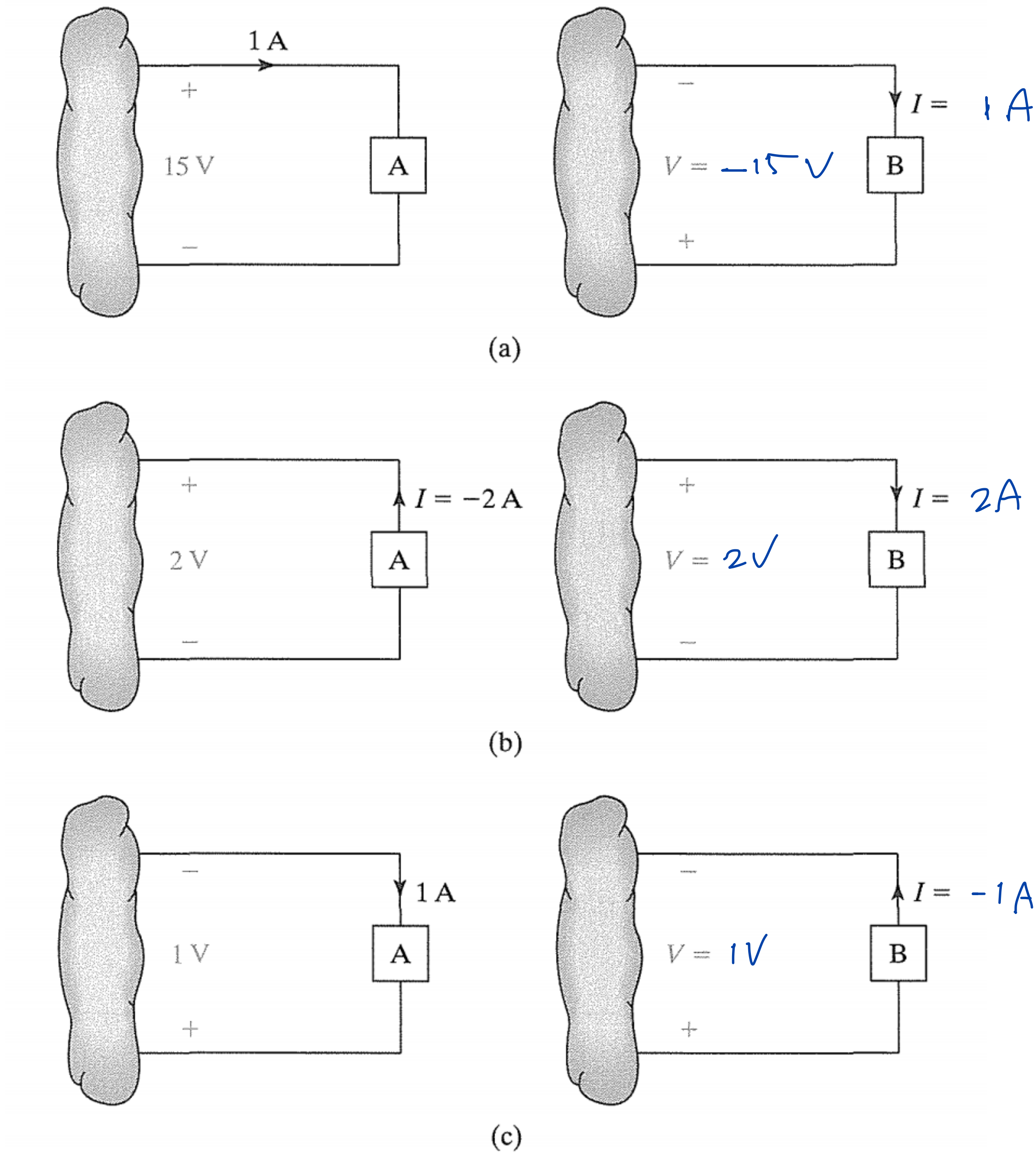


Figure 1

2. Assign directions to currents and polarities to voltages in element B so it is equivalent to element A (see Figure 2)

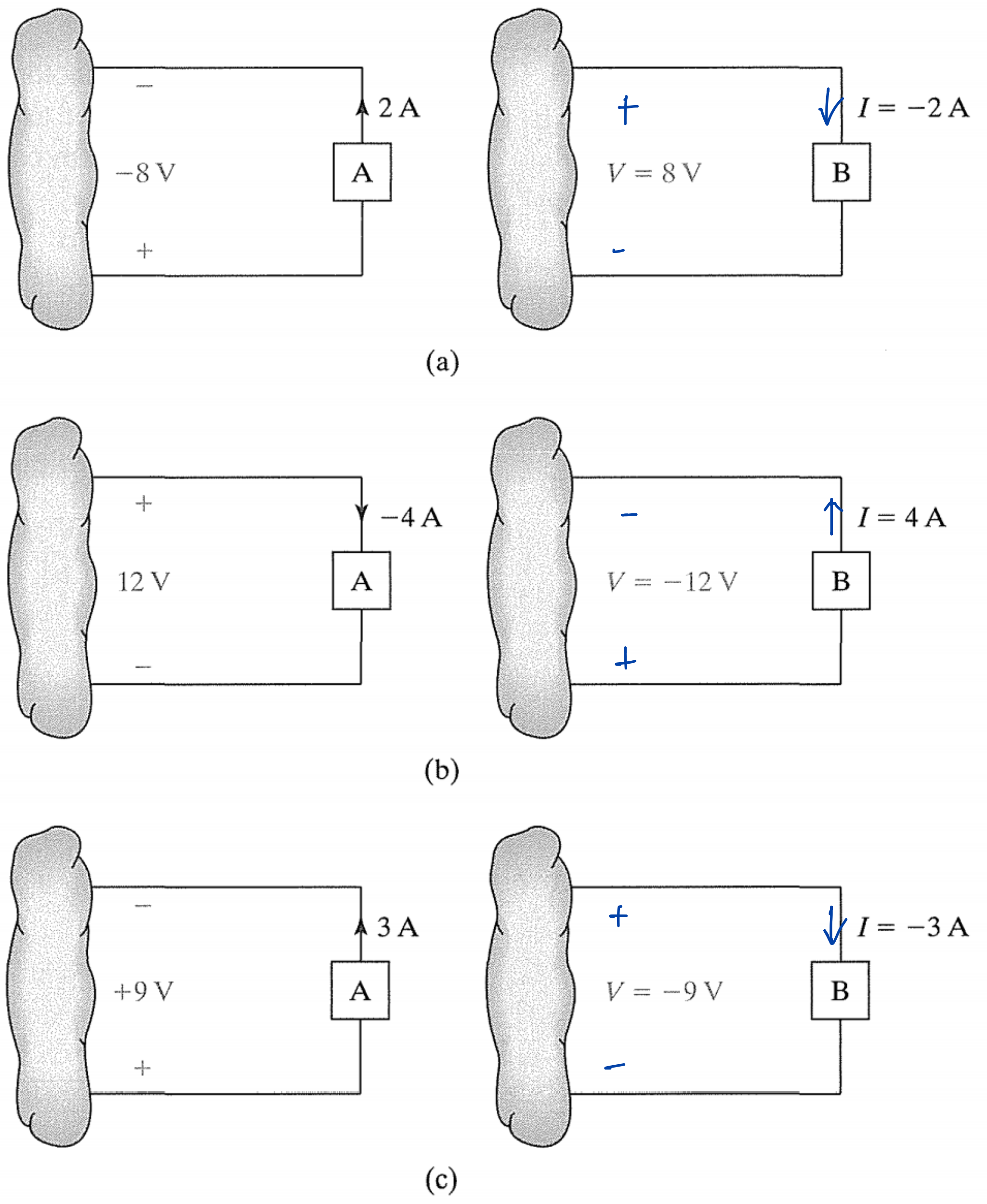


Figure 2

3. In the elements of Figure 3, determine for each if they are supplying power or absorbing power and the magnitude of the power being transferred.

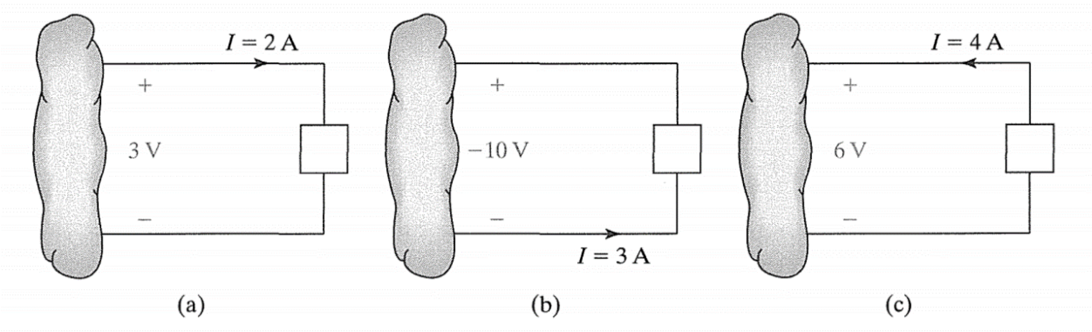


Figure 3

abcorbing absorbing supplying .

4. In Figure 4 determine for each element whether it is supplying or absorbing power. If all the energy absorbed is dissipated as heat dissipated (in joules) over a period of one hour for each of the circuits shown.

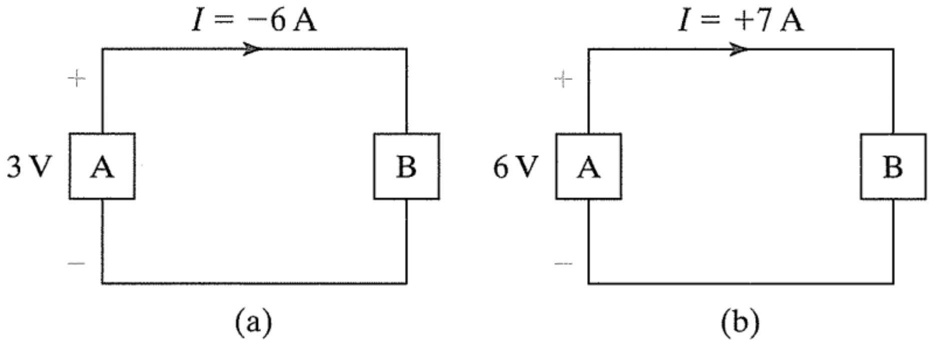


Figure 4

A: absorbing
B: supplying

A: supplying
B: absorbing

5. A heater element draws 2.0 A when connected to a 120 V source. Calculate both the resistance of the element and the power absorbed in the form of heat.

$I = 2A$.

$V = 120V$.

Resistance $= 60\Omega$

Power $= 240W$.

6. A speaker is a device that converts electrical energy into sound energy. Assume the internal resistance of a speaker is typically 8Ω. The speaker's power rating is maximum power that can be delivered to it without damage. Therefore, determine the maximum safe current that can be delivered to a stereo speaker with internal resistance of 8Ω and a power rating of 200 watts.

$I^2 R \leq 200\,W.$

$I^2 \leq 25$

$\therefore 5A$

7. Find I and V_0 in the network in Figure 5.

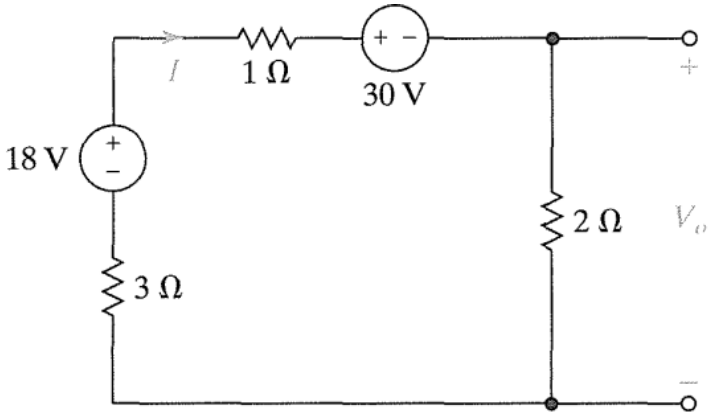


Figure 5

$$-18 + I + 30 + 2I + 3I = 0$$

$$6I = -12$$

$$\therefore I = -2A.$$

$$\therefore V_o = 2 \cdot I = -4V.$$

8. Find V, I_1, I_2, and $P_{6\Omega}$ in the network in Figure 6.

KCL.

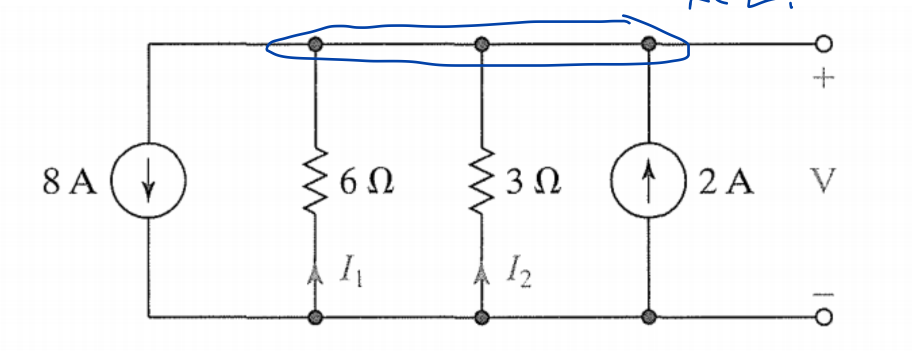


Figure 6

$$\frac{V}{6} + \frac{V}{3} + 8 - 2 = 0$$

$$\frac{V}{6} + \frac{V}{3} = -6$$

$$V + 2V = -36$$

$\therefore V = -12V$

$$I_1 = \frac{-V}{6} = 2A$$

$$I_2 = -\frac{V}{3} = 4A$$

$$P_{6\Omega} = I_1^2 6 = 24W.$$

9. Find the equivalent resistance at the terminals $A - B$ in the network in Figure 7.

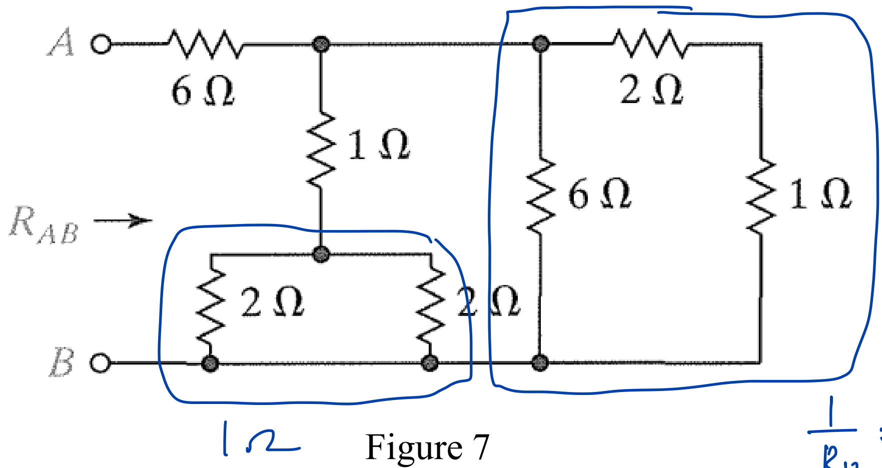
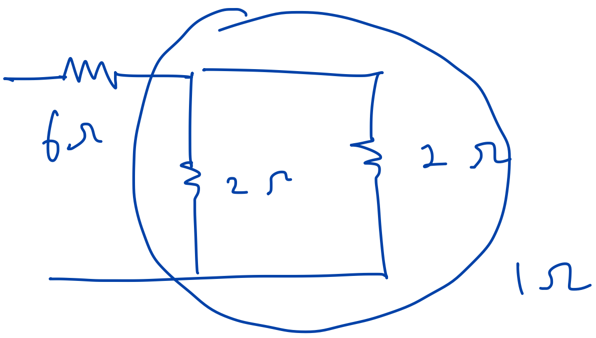


Figure 7

$\frac{1}{R_p} = \frac{1}{6} + \frac{1}{3} = \frac{1+2}{6}$

$\therefore R_p = 2\Omega$.



$\therefore R_{AB} = 7\Omega$

10.Find the resistance at terminals $A-B$ in the network in Figure8

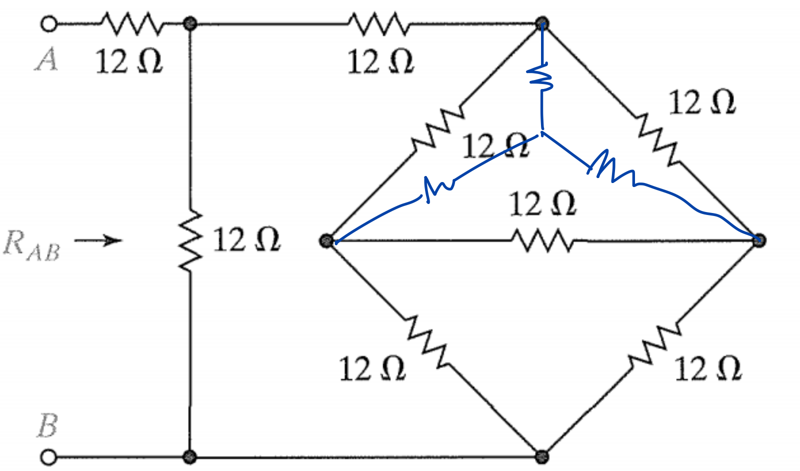
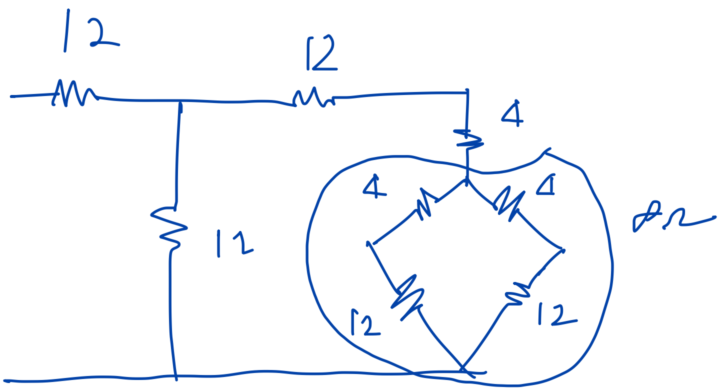
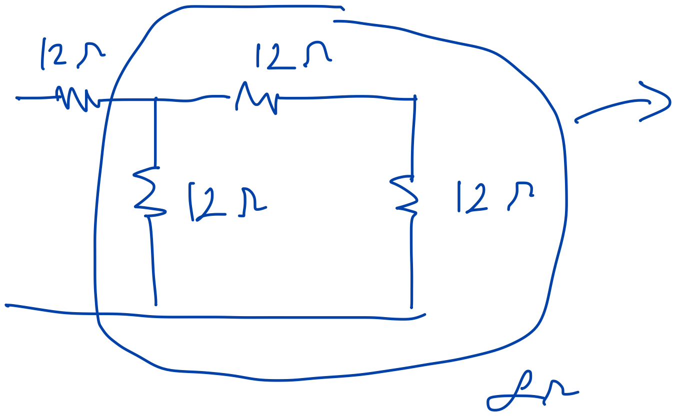


Figure 8

$$\frac{\cancel{12}\cdot 12}{36} = 4\Omega$$





$$\frac{1}{R_p} = \frac{1}{12} + \frac{1}{24}$$

$$= \frac{2+1}{24} = \frac{1}{8}$$

$\therefore \quad R_{AB} = 20\Omega.$