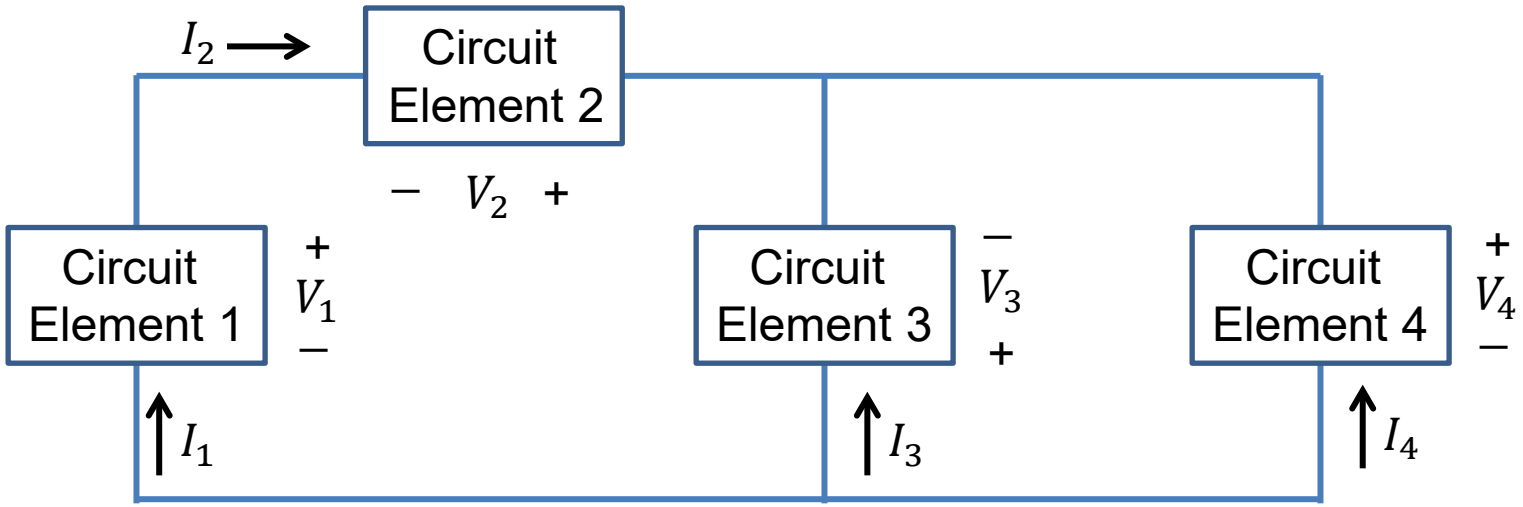
Conservation of Energy

Conservation of Energy: In a circuit that is isolated from any other devices, conservation of energy applies and the total power (energy) generated must equal the total power (energy) absorbed. That is the sum of the power of all elements that are generating power must equal the sum of the power of all elements that are absorbing power.

This principle can often be used (and should be used) to check your answers when analyzing a circuit. After you have found all the voltages and currents in a circuit, check to see that the power in all devices balances.

Conservation of Energy



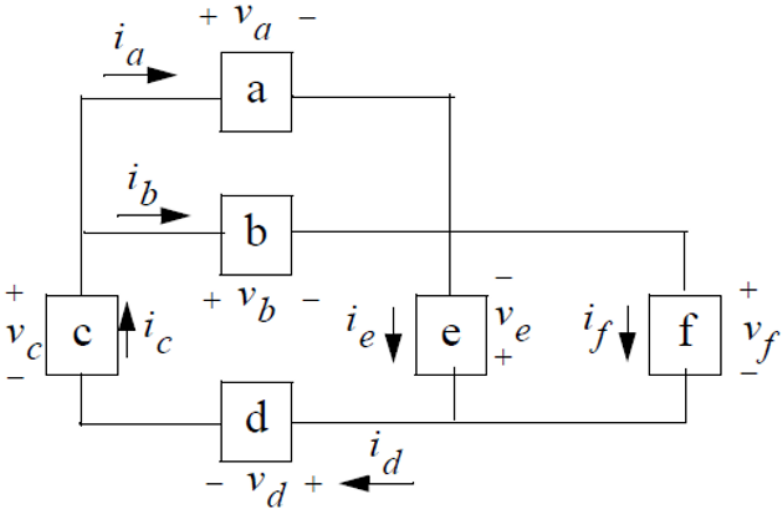
Element	Voltage	Current
1	3 volts	-1mA
2	-2 volts	-1mA
3	-1 volt	4mA
4	1 volt	-3mA

Element	Power
1	-(-1mA)(3V)=3mW
2	-(-1mA)(-2V)=-2mW
3	(4mA)(-1V)=-4mW
4	-(-3mA)(1V)=3mW

Total Power = 0

Example

The numerical values for the voltages and currents in the circuit shown are given in the table below. Find the total power developed in the circuit.



Element	Voltage (kV)	Current (mA)
a	150	0.6
b	150	-1.4
c	100	-0.8
d	250	-0.8
e	300	-2.0
f	-300	1.2