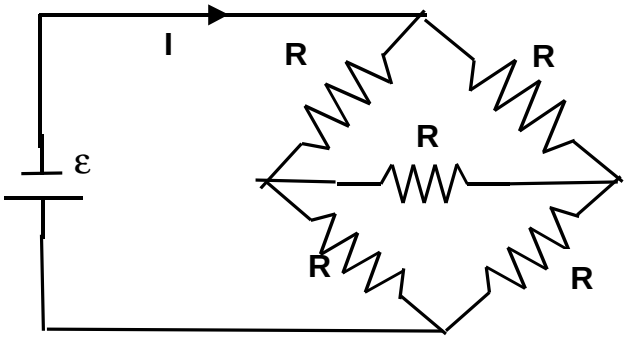
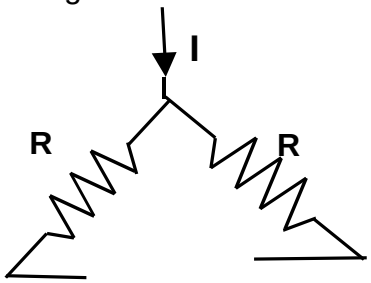
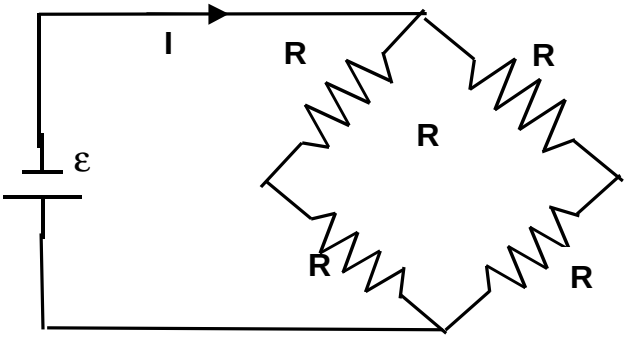
**Wheatstone Bridge**: Replace the network of resistors below by a single equivalent resistor.




**Solution:** Consider only the top part of the circuit with the current I flowing in as shown below. We have intentionally left out the diagonal resistor.




In order to complete the circuit what we have to connect to the points a and b are exactly identical in other words looking down from a and b the circuit looks the same. Therefore the potentials a and b are identical. This means that no current can flow along the diagonal connection and the resistor there need not be included at all. Thus the circuit simplifies to:




This circuit is clearly equivalent to two resistors of value 2R which are in parallel. Therefore the final equivalent resistance is R.