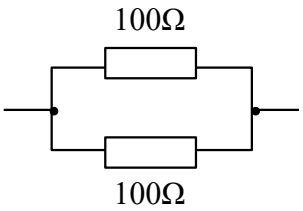
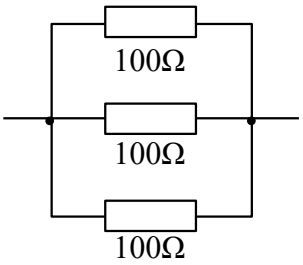
Resistors in series and parallel

1. Without detailed calculation, state the resistance of each of these combinations of resistors.

(a)

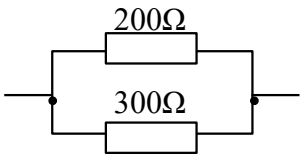


(b)

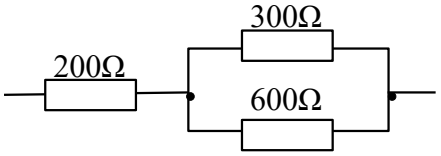


2. What is the resultant resistance of each of the following combinations of resistors? *(120Ω, 400Ω, 55Ω, 100Ω, 167Ω, 133Ω)*

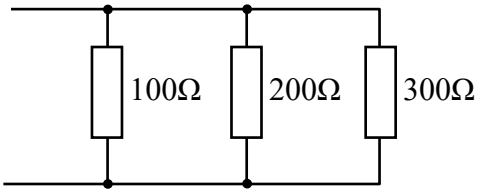
(a)



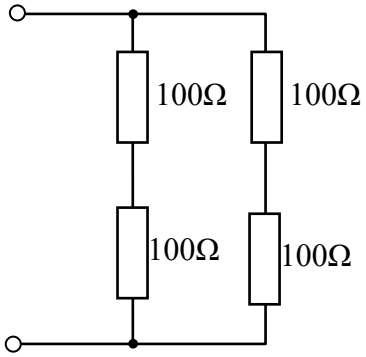
(b)



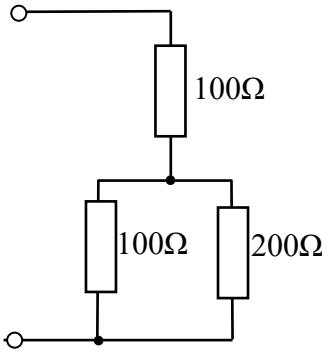
(c)



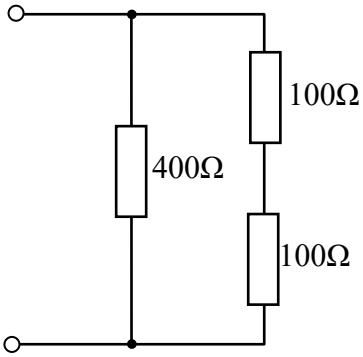
(d)



(e)



(f)

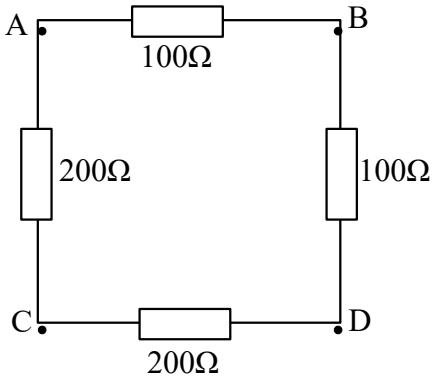


3. Resistors of 100Ω and 150Ω are joined, first in series, then in parallel.
What is the total resistance:
   (i) in series? *(250Ω)*
   (ii) in parallel? *(60Ω)*

4. A connecting lead used in a laboratory consists of 55 strands of wire, each of resistance 2.3Ω. What is the resistance of the wire? *(0.042Ω)*

5. What is the total resistance when:
   (i) two 1kΩ resistors are connected in parallel? *(500Ω)*
   (ii) ten 1kΩ resistors are connected in parallel? *(100Ω)*

6. Four resistors, two 100Ω and two 200Ω , are arranged in a square as shown.



   What resistance would be measured between the points:
   (i) AB? *(83Ω)*
   (ii) AC? *(133Ω)*
   (iii) AD? *(133Ω)*

7. You are given one 200Ω resistor and two 100Ω resistors. Draw diagrams to show how you would connect any combination of them to give a combined resistance of:
   (i) 400Ω,
   (ii) 250Ω,
   (iii) 167Ω.

8. Resistors are manufactured only in certain values. In the laboratory there are resistors with the values 1kΩ, 2.2kΩ, 3.3kΩ, 4.7kΩ, 5.6kΩ and 6.8kΩ.
   How can you combine two or more of these resistors when you need a resistance of:
   (i) 3.0kΩ,
   (ii) 9.0kΩ,
   (iii) 500Ω,
   (iv) 5.0kΩ,
   (v) 4.0kΩ?

9. (a) What is the smallest number of resistors you need to make a resistance of:
   (i) 5Ω, given a supply of 3Ω resistors? *(4)*
   (ii) 7Ω, given a supply of 4Ω resistors? *(5)*
   (b) Draw a diagram, in each case, to show how you would connect them.