202: Principles of electrical science  
**Worksheet 5: Resistors in parallel**

1. Calculate the total resistance of each branch if the following resistors are connected in parallel.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **R1** | **R2** | **R3** | **RT** |
| **a** | 12Ω | 6Ω | 4Ω |  |
| **b** | 30Ω | 90Ω | 45Ω |  |
| **c** | 120Ω | 80Ω | 48Ω |  |
| **d** | 6Ω | 20Ω | 30Ω |  |
| **e** | 1.5Ω | 4Ω | 12Ω |  |

1. Complete the following table assuming that the resistors are connected in parallel.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **R1** | **R2** | **R3** | **RT** |
| **a** | 120Ω |  | - | 48Ω |
| **b** |  | 48Ω | - | 12Ω |
| **c** |  | 50Ω | - | 40Ω |
| **d** | 40Ω |  | 20Ω | 10Ω |
| **e** | 60Ω |  | 20Ω | 10Ω |

1. Two resistors of 48Ω and 80Ω are connected together in parallel. What would the value of a third resistor have to be, when connected in parallel with the first two, in order to give a combined resistance total of 15Ω?
2. A parallel circuit containing three resistors of 1.5Ω, 4Ω and 12Ω is connected across a 10 volt supply. Calculate the current flowing in each resistor and prove Kirchhoff's current law.
3. A parallel circuit containing three resistors of 18Ω, 20Ω and 30Ω is connected across a 144 volt supply. Calculate the current flowing in each resistor and prove Kirchhoff's current law.
4. A parallel circuit containing three resistors of 30Ω, 90Ω and 45Ω is connected across a 30 volt supply. Calculate the current flowing in each resistor and prove Kirchhoff's current law.
5. Three resistors of 0.012Ω, 0.015Ω and 0.008Ω, respectively, are connected in parallel across a 2.4 volt d.c. supply. Calculate:
   1. the current flowing in each resistor
   2. the current in each section of the circuit
   3. the total current drawn from the supply.
6. Three resistors are connected in parallel across a d.c. supply. The values of two of the resistors are 12Ω and 18Ω, respectively. If the 18Ω resistor has a current of 18 amperes flowing through it and the total current drawn from the supply is 81 amperes, calculate:
   1. the supply voltage
   2. the value of current flowing through each resistor
   3. the value, in ohms, of the third resistor.