

Higher Electrical Circuits Questions

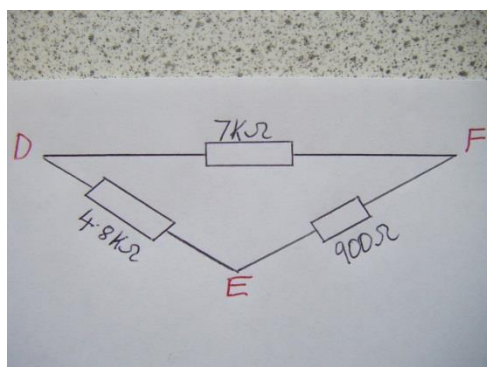
1. Four resistors are available with values 4Ω , 6Ω , 10Ω and 12Ω .

Describe which combination of any of these resistors will produce the combined resistances below:

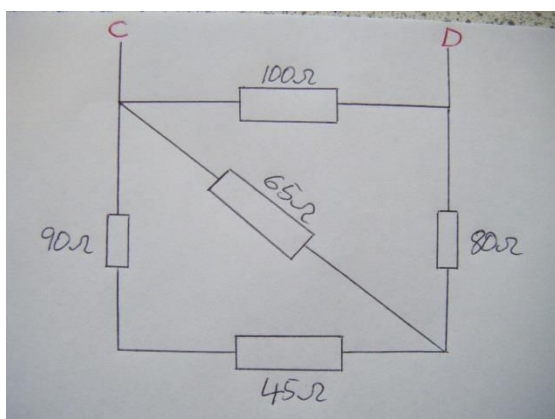
- a) 20Ω .
- b) 3Ω .
- c) 5Ω .

2. Calculate or find the resistance in the network below between:

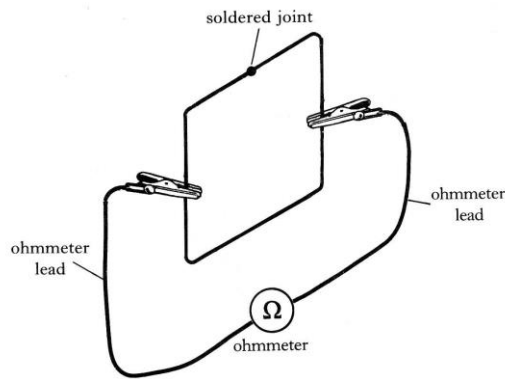
- a) DE.
- b) EF.
- c) DF.



3. Calculate or find the resistance between the points C and D in the network below.



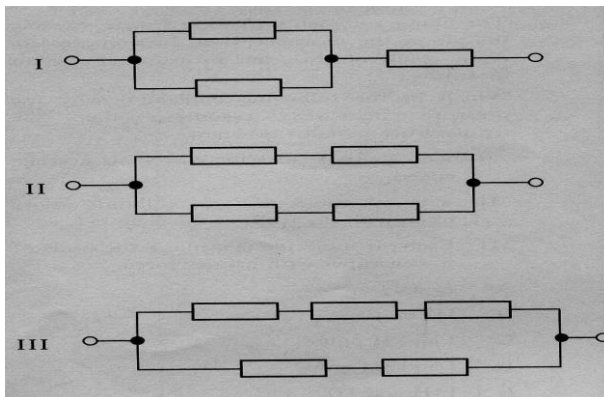
4. The length of a bare uniform resistance wire is 30Ω . The length of the wire into the shape of a square and the ends are soldered as shown below.



Calculate the resistance that the ohmmeter would display if it is connected at the mid-points on opposite sides of the square.

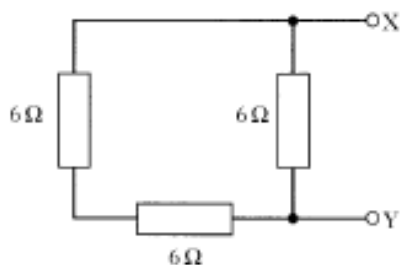
5. A student requires a resistor for an electronics project and its value must lie in the range $(11 \pm 2)\Omega$. The only resistors available are 10Ω .

Which of the following combinations of these 10Ω resistors could be used?



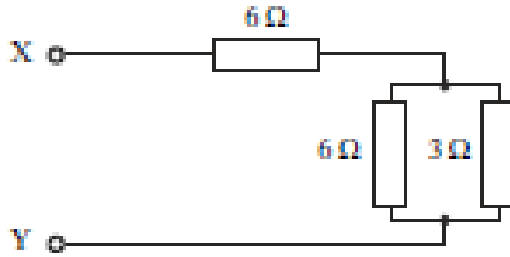
6. Three resistors are connected as shown below.

Calculate the total resistance between X and Y.



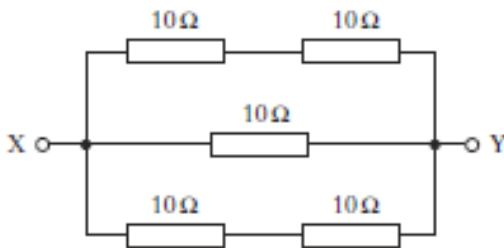
7. **Three resistors** are connected as shown below.

Calculate the **total resistance between X and Y**.



8. **Five resistors** are connected as shown below.

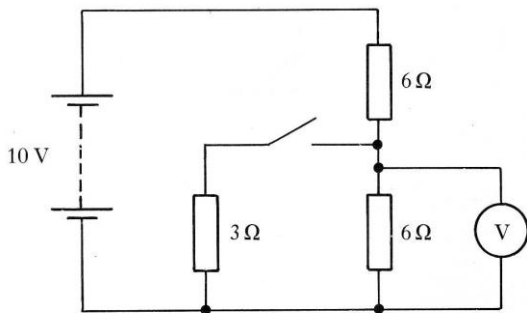
Calculate the **total resistance between X and Y**.



9. The circuit below shows resistors connected as a potential divider.

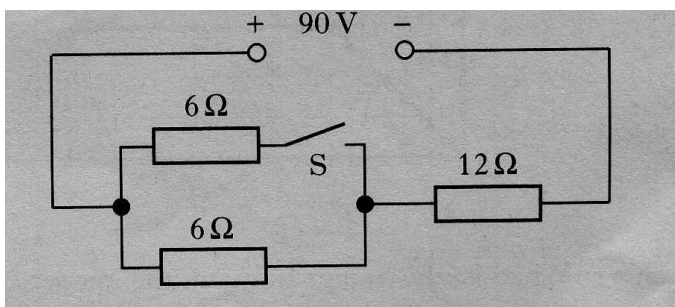
Calculate the **reading on the voltmeter**:

- When the **switch is open**.
- When the **switch is closed**.



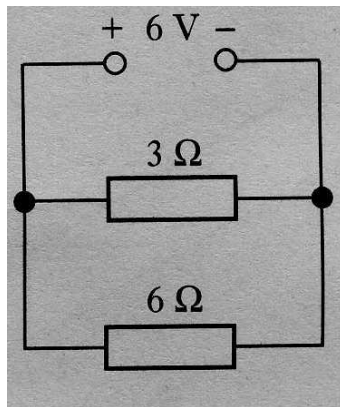
10. In the following circuit calculate the **potential difference across the 12Ω resistor** when:

- Switch is **open**.
- Switch is **closed**.



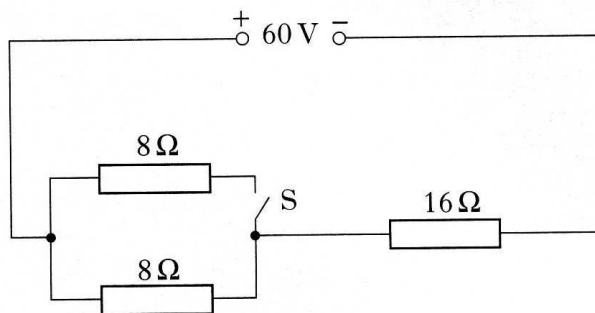
11. The circuit below shows two resistors connected to a 6V dc supply.

Calculate the **power dissipated** in the **3Ω** resistor.



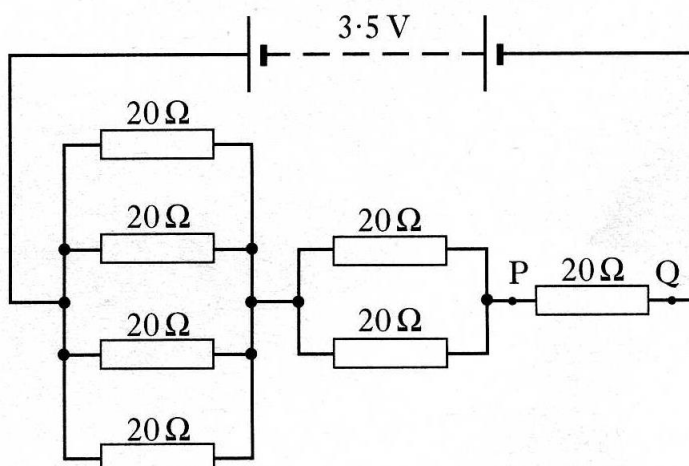
12. In the following circuit, the pd across the **16Ω** resistor is **40V** when the **switch is open**.

Calculate the **pd** across the **16Ω** resistor when the **switch is closed**.



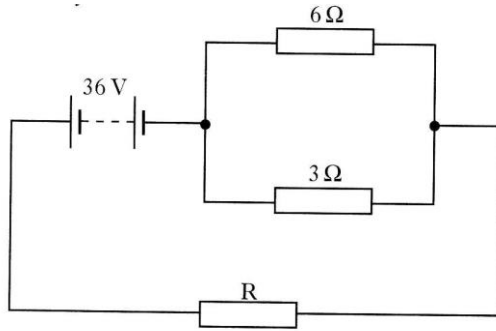
13. In the circuit below, **each resistor** has a resistance of **20Ω**.

Calculate the **voltage across PQ**.

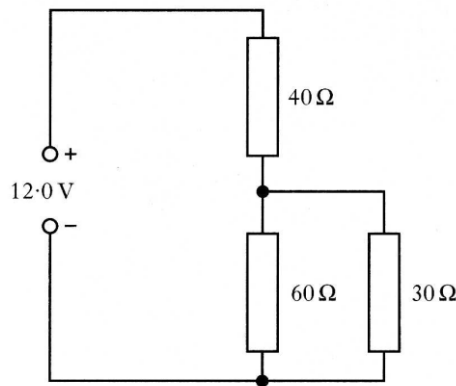


14. In the following circuit the current from the battery is **3A**.

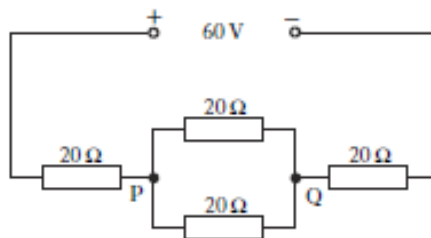
Calculate the resistance of the **unknown resistor R**.



15. Calculate the **pd** across the **30Ω resistor** in the circuit below.



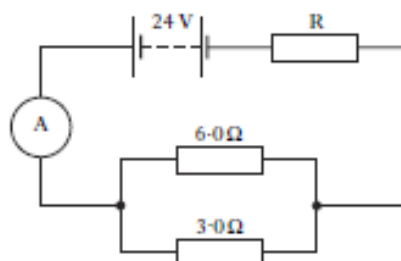
16. Calculate the **pd** across **PQ** in the circuit below.



17. A battery of **EMF 24V** and negligible internal resistance is connected as shown below.

The reading on the ammeter is **2.0 A**.

Calculate the resistance of the **unknown resistor R**.



18. Calculate or find:

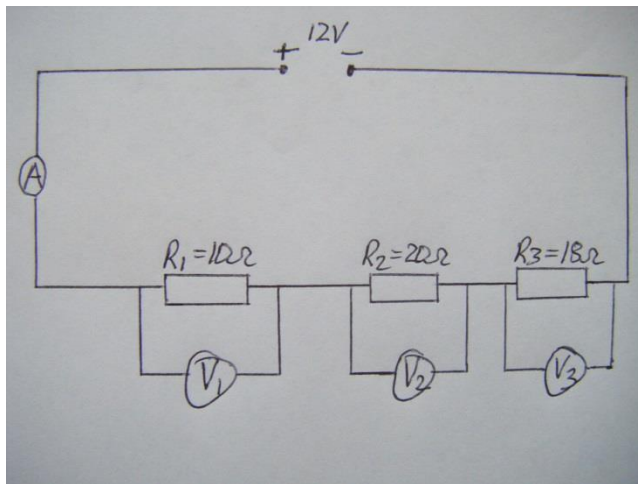
a) Total **resistance** in **series**.

b) **Current reading** on the ammeter.

c) Readings on:

Voltmeter **V₁**, Voltmeter **V₂** and Voltmeter **V₃**.

d) What do the readings on the voltmeters **V₁ + V₂ + V₃** add up to?



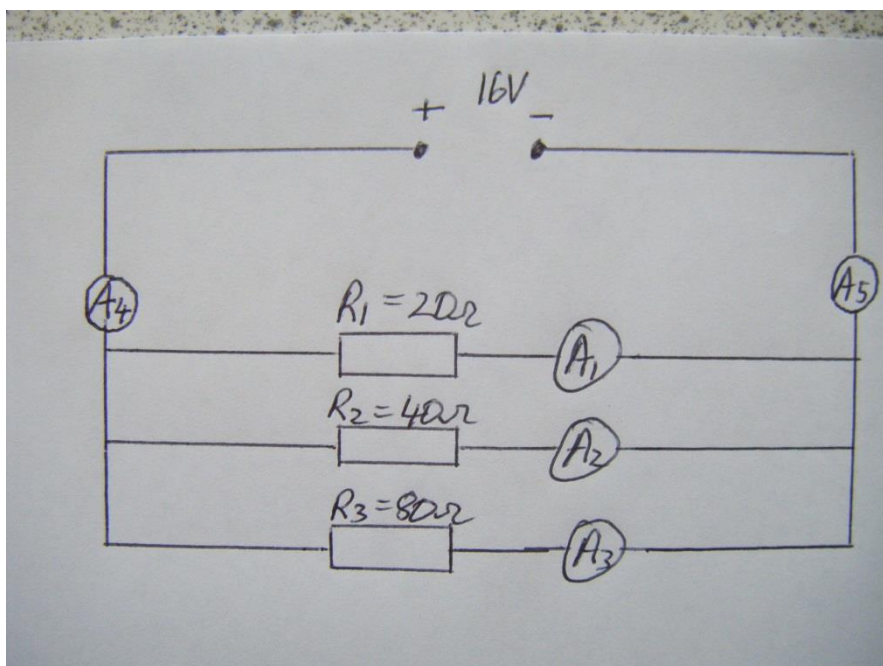
19. Calculate or find:

a) Total **resistance** in **parallel**.

b) Readings on ammeters **A₄** and **A₅**.

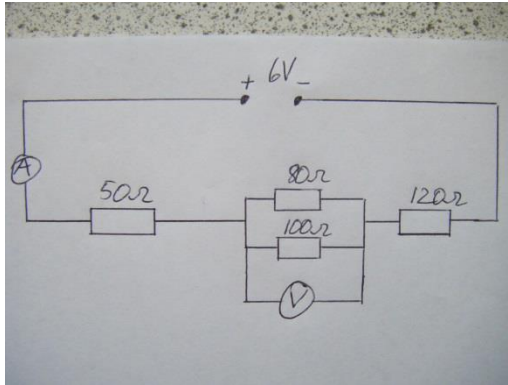
c) Readings on ammeters **A₁**, **A₂** and **A₃**.

d) **How do the readings** on ammeters **A₄** and **A₅** compare with the readings on A₁, A₂ and A₃?

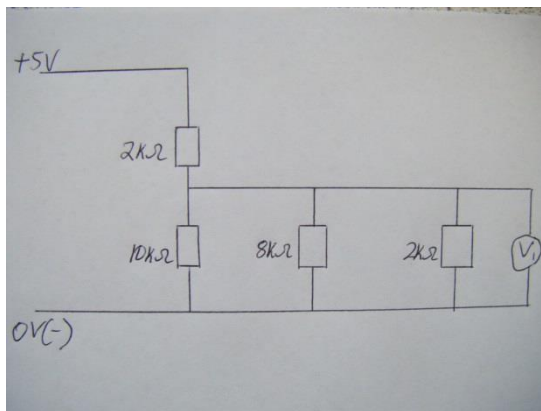


20. Calculate or find the following from the circuit below:

- a) Total resistance in series R_s .
- b) Total resistance in parallel R_p .
- c) Total resistance in the circuit R_T .
- d) **Reading** on the **ammeter**.
- e) **Reading** on the **voltmeter**.

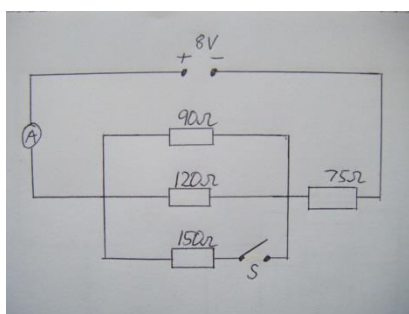


21. Calculate the reading on the voltmeter V_1 from the circuit below.



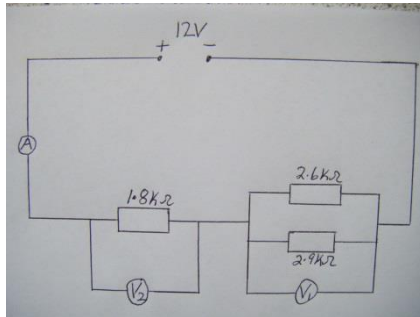
22. Calculate or find the following from the circuit below:

- a) The **power developed** in the **120Ω** resistor when the switch S is open.
- b) The **power developed** in the **90Ω** resistor when the switch S is closed.



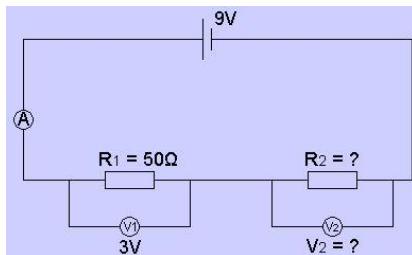
23. Calculate or find the following from the circuit below:

- Reading on the **ammeter**.
- Reading on the voltmeters **V₁** and **V₂**.
- Power dissipated** in the **1.8kΩ** resistor.



24. Calculate the following from the circuit below:

- The **current reading** on the ammeter.
- The **voltage reading** on voltmeter **V₂**.
- The resistance **R₂**.



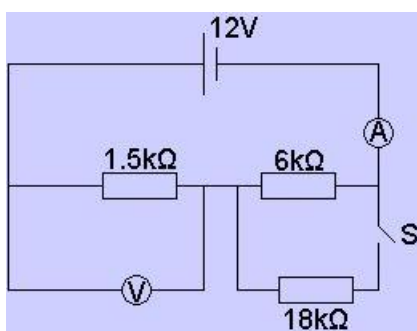
25. Calculate the following from the circuit below:

When the switch is open.

- Reading on the **ammeter**.
- Reading on the **voltmeter**.

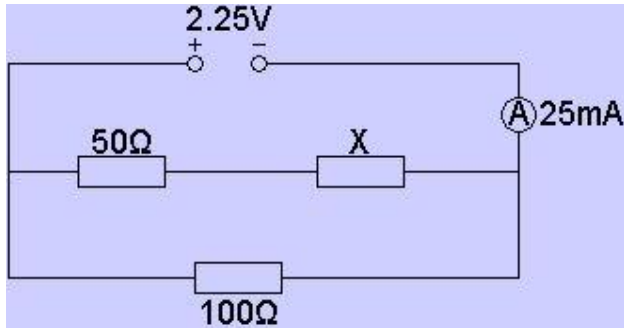
When the switch is closed.

- Reading on the **ammeter**.
- Reading on the **voltmeter**.



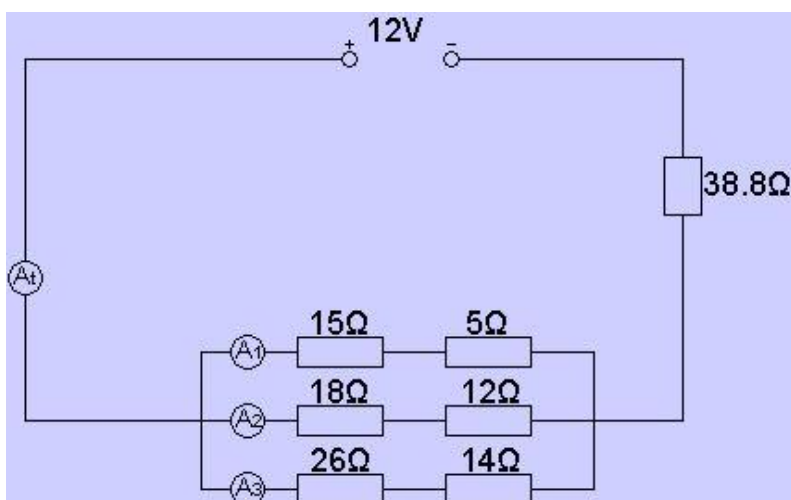
26. Calculate the following from the circuit below:

- Total resistance in the circuit.
- The unknown resistance **X**.



27. Calculate or find the following from the circuit below:

- Total resistance in the circuit.
- Reading on the ammeter **A_T**.
- The **voltage dropped** across the **38.8Ω** resistor.
- The current readings on ammeters **A₁**, **A₂** and **A₃**.

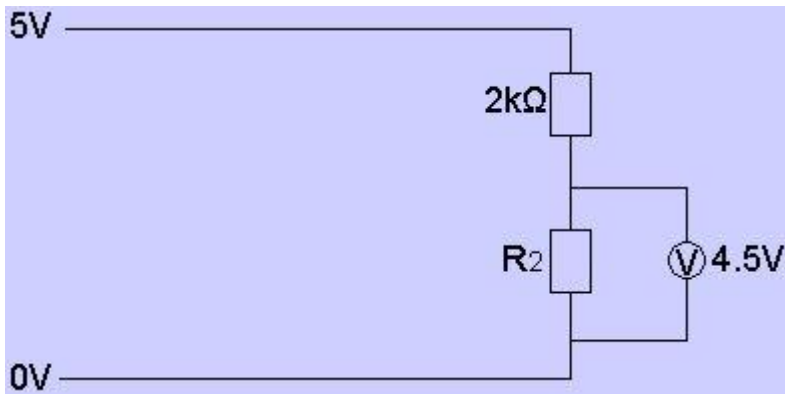


28. Calculate or find the following from the circuit below:

a) Resistance R_2 .

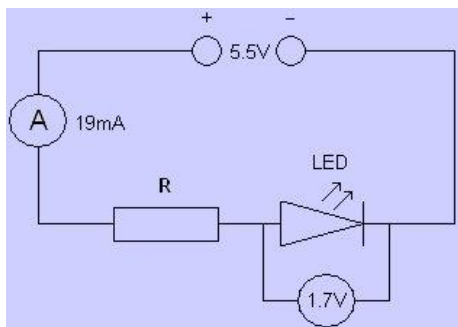
b) A resistor of $9k\Omega$ is then added in parallel to R_2 .

Calculate the **new reading** on the **voltmeter**.



29. A series circuit contains a voltage supply of 5.5V, a resistor and a LED with a voltage of 1.7V dropped across it.

Calculate the **unknown resistance R** if a current of 19mA flows in the circuit.



30. A circuit contains a 6V supply, an ammeter, a 4kΩ resistor and a thermistor at room temperature.

Calculate the **voltage dropped** across the **4kΩ resistor** if the **thermistor** has a resistance of **20kΩ** at room temperature.

