This print-out should have 11 questions. Multiple-choice questions may continue on the next column or page – find all choices before answering. The due time is Central time.

Please notice that for your homework to be considered towards your grade, it needs to be submitted one hour before the corresponding recitation starts. Work submitted after this time, but before the DUE DATE on top of this page, will be accepted but not graded.

PLEASE REMEMBER THAT YOU MUST CARRY OUT YOUR CALCULATIONS TO AT LEAST THREE SIGNIFICANT FIGURES. YOUR ANSWER MUST BE WITHIN ONE PERCENT OF THE CORRECT RESULT TO BE MARKED AS CORRECT BY THE SERVER.

Internal Resistance 04

28:01, trigonometry, multiple choice, < 1 min, normal.

001

The emf of a battery is $\mathcal{E} = 12$ V . When the battery delivers a current of 0.5 A to a load, the potential difference between the terminals of the battery is 10 V volts.

Find the internal resistance of the battery. Answer in units of Ω.

Internal Resistance 05

28:02, trigonometry, numeric, > 1 min, normal.

002

A battery has an emf of 12 V and an internal resistance of 0.05 Ω. Its terminals are connected to a load resistance of 3 Ω.

Find the current in the circuit. Answer in units of A.

003

Calculate the terminal voltage of the battery. Answer in units of V.

004

Find the power dissipated in the load resistor. Answer in units of W.

005

Find the power dissipated in the battery. Answer in units of W.

Triple the Current

28:04, trigonometry, numeric, > 1 min, normal.

006

The current in a circuit is tripled by connecting a 500 Ω resistor parallel with the resistance of the circuit.

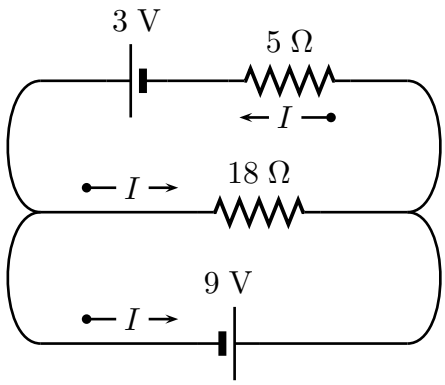
Determine the resistance of the circuit in the absence of the 500 Ω resistor. Answer in units of Ω.

Currents in a Circuit 03

28:06, trigonometry, numeric, > 1 min, normal.

007

In this problem assume
1 the batteries have zero internal resistance,
2 the currents are flowing in the direction indicated by the arrows. A negative current denotes flow opposite to the direction of the arrow.



Find the current through the 5 Ω resistor and the 3 V battery at the top of the circuit. Answer in units of A.

008

Find the current through the 18 Ω resistor in the center of the circuit. Answer in units of A.

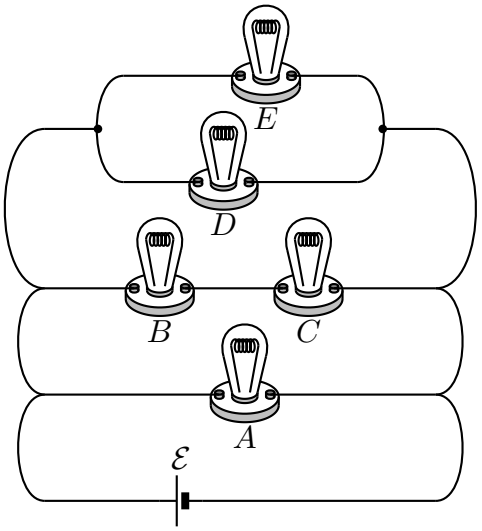
009

Find the current through the 9 V battery at the bottom of the circuit. Answer in units of A.

Five Bulbs 02

28:06, trigonometry, multiple choice, > 1 min, fixed.

010



Rank the brightness of the identical bulbs in the following circuit. *Hint:* You may find it helpful to work out the currents through the bulbs for the case $V = 1\ V$, and $R = 1\ \Omega$ for all the bulbs, then compare the currents.

1. $A = B = C = D = E$

2. $A = D = E > B > C$

3. $A = B = C > D > E$

4. $A = B = C > D = E$

5. $A = D = E > B = C$

6. $B = C > A = D = E$

7. $A = B > C > D = E$

8. $A = C > B > D = E$

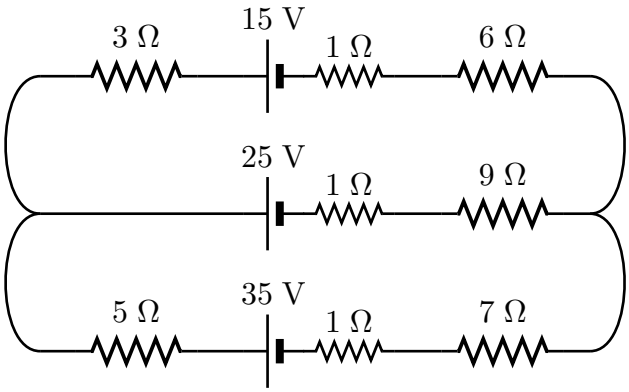
9. $C > B > A > D > E$

10. $E = D > A > B = C$

Resistance Circuit 07

28:06, trigonometry, numeric, > 1 min, normal.

011



Find the magnitude of the current in the 15 V cell. Answer in units of A.