

Electricity

Physics

Nudger

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Tutorials

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Current and Resistance

1. Define current.
2. Define resistance.
3. Define potential difference (voltage).
4. Define the volt. ['When one joule of work is done per unit charge transferred between two points'.]
5. What is a rheostat?
6. Draw the I-V graph for a non-ohmic conductor. [195]
7. Derive the resistors in series and parallel equations. [210]
8. What is the most common error when calculating ΣR in parallel networks?
9. Why is it important to remember the phrase 'origin-to-point gradient' in the context of I-V and V-I graphs particularly?
10. What does a diode do? [195]
11. Draw the I-V graph for a typical diode, clearly indicating the threshold voltage (and its typical value). [196]
12. What are the two major differences between a diode and an LED? [196]
13. What is the difference between resistance and resistivity? [197]
14. Define resistivity.
15. Did you use the expression 'cross-sectional area' in the previous answer, or do you want to burn in hell forever and ever amen?
16. Draw the R- θ (resistance-temperature [in $^{\circ}\text{C}$]) graph for a superconductor.
17. Draw the R-T (resistance-temperature [in K]) graph for a superconductor.

Circuits

18. Draw circuit symbols for: battery; fuse; thermistor; diode; LED; LDR; cell with internal resistance. [189]
19. Derive the three electrical power equations from $W = VQ$, $Q = It$ and $V = RI$.

Internal Resistance

20. What is internal resistance?
21. Lost volts = The work done per unit charge transferred through circuit components that are power sources (i.e. through the internal circuit).
22. Terminal pd = The work done per unit charge transferred through circuit components that are not power sources (i.e. through the external circuit).
23. EMF = The work done per unit charge transferred through all circuit components, including power sources (i.e. through both the internal and external circuit).
24. The Volt = When one joule of work is done per unit charge transferred between two points in a circuit.
25. What is $\Sigma \mathcal{E}$ for cells in series?
26. What is $\Sigma \mathcal{E}$ for cells in parallel?

Potential Dividers

27. What is a potential divider? [214]
28. What is a potentiometer? [215]