

Science Olympiad Circuits Lab, Division B + C

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Event Supervisor

What to Expect

Total time of Event: 50 minutes

Broken into two, 25 minute, sections:

- Written Test
- Hands On Task

General Rules

- Cell phones are prohibited
 - Teams are automatically disqualified if a student is caught checking/using their phone during the event
- Students CANNOT return to the event if they leave, for any reason
 - Partner can remain to finish

What Students Can Bring

- One three-ring binder
 - Any size
 - Containing information in any form, from any source
- Writing Utensils
- Two calculators (1 per person)

Overview of the Written Test

25 minute time period

Worth 50% of the overall grade

1 test per team

assess the team's knowledge of electricity and magnetism

answers must be in metric units with correct sig figs

Types of questions on the Written Test

Includes:

- multiple choice
- true/false
- completion
- calculations

The Written Test: Material

Historical figures - discoveries made

Properties of electric charges and electric fields

Sources and hazards of static electricity

Capacitance & Coulombs Law

Direct Current: characteristics, sources, uses, simple circuit diagrams, & hazards

Alternating Current: characteristics, sources, uses, & hazards

The Written Test: Material

Calculations using Ohms Law

Magnetic poles and fields, transformers, & the right-hand rule

Electrical control devices (including 3-way light switch circuits)

Calculations, configurations, and construction of a circuit/individual components

Simple analysis using Kirchhoff's voltage and current laws

Fundamentals of LEDs

The Written Test: Material for Division C ONLY

Basic digital logic and operations

Basic electrical characteristics of silicon PN junctions (diodes etc)

Basics and applications of operational amplifiers

Overview of the Written Test

25 minute time period

Worth 50% of the overall grade

1 test per team

10 - 25 questions

assess the team's knowledge of electricity and magnetism

Overview of the Hands on Task

25 minute time period

Worth 50% of the overall grade

3 - 4 separate stations that must be completed

Teams may split up

Must be familiar with the operation of breadboards and how to use them

The Hands on Task: Material

Some options include:

Determining the value of a mystery resistor using voltage measurements

Calculating the power supplied to a circuit

Tasks involving LEDs (equally bright LEDs, etc.)

Constructing an electromagnet

Scoring System

High score wins

- Written portion is 50% of each team's score
- Hands on portion is 50% of each team's score
- Ties: broken using pre-selected questions
 - will be noted on the written test

How are points awarded?

- Correct answers
- Correct measurements
- Correct calculations
- Correct data analysis

Event supervisors will provide a standard form for competitors to show measurements/calculations

Circuits Lab

Total time of Event: 50 minutes

Broken into two, 25 minute, sections:

- Written Test - 50%
- Hands On Task - 50%

The Written Test: NOT INCLUDED

semiconductors (beyond those listed above)

AC circuit theory and Inductance

calculations involving direct use of calculus and/or ODEs

non-linear devices

three-state logic gates, sequential logic

3 Phase Power, and oscilloscopes