TECHNICAL PROBLEM SOLVING

Read the General Rules in the manuals and on www.soinc.org as they apply to every event.

1. **DESCRIPTION**: Teams will gather and process data to solve problems.

   A TEAM OF UP TO: 2 **EYE PROTECTION**: #4 **APPROXIMATE TIME**: 50 minutes

2. **EVENT PARAMETERS:** Each **student** may bring **and use any kind of** calculator and **one 8.5" X 11" two-sided page of information in any form from any source (including a list of mathematical relationship, formulas or constants)** and must bring and use chemical/splash protection goggles where required. Where a station requires a more advanced calculator, probes or other lab equipment, the event supervisor will provide them.

3. **THE COMPETITION**: The event will consist of two lab stations and up to 10 questions **per station** (limited to the two topic areas below).

Level	Probes	2014 Topics
All	**Voltage, amps and Temperature**	Topic 1 will focus on electrochemistry under standard and non-standard conditions. This topic can include basics of oxidation/reduction reactions, half-cells, electroplating, and Galvanic Cells. The event supervisor will supply appropriate half-cell reduction potentials.
All	**Temperature**	Topic 2 will focus on heat and thermodynamics in an open or closed system. The topic can include the basics of heat transfer, specific heat capacity, latent Heat, and Newton's Law of Cooling. The event supervisor will supply either specific heat values of appropriate material, or the materials necessary for the student to determine the required values.

- **Note: At the national level, Vernier probes and TI handhelds will be used at the two stations.**

a. Students will apply scientific theories and principles related to the current topics in the solution of the problems. Students will be asked to collect data, make measurements and determine specific values to solve a problem using probeware that has been provided, set up, and demonstrated by the supervisor. Intermediate measurements and calculations may be required.

b. At state and national tournaments, supervisors will use calculators and **probes for the topics above.** Regionals are encouraged to use probes but may provide students with data sets collected by such sensors/probes following a data collection demonstration.

4. **SCORING**: Teams will be ranked based on the highest total points as determined by the sum of the scores of each individual station. **Each of the two stations will be worth 100 points for a total of 200 points for the event.** In case of ties, a tiebreaker will be announced prior to the competition. **At each of the two stations the students will complete a required task (supported with data they have collected) and answer up to 10 questions. The 100 points will be awarded as follows:**

   1) **50 points on the correctness of the required answer.**
   2) **30 points based on procedure and supporting data.**
   3) **20 points on content questions relating to the given topic.**

Recommended Resources: All reference and training resources including the **Problem Solving and Technology CD** are available on the Official Science Olympiad Store or Website at www.soinc.org

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