TECHNICAL PROBLEM SOLVING

1. **DESCRIPTION**: Teams will be required to gather and process data to solve a given problem. Intermediate measurements and calculations may be required.

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

2. **EVENT PARAMETERS:** Students may bring only non-programmable and non-graphing calculators. Where a station requires a more advanced calculator, probes or other lab equipment, the event supervisor will provide them. The event supervisor will provide a list of mathematical relationship, formulas or constants. No other resources are allowed. Students **must** bring and use chemical/splash protection goggles where required.

3. **THE COMPETITION**:

   a. The event will consist of up to five lab stations and use materials commonly found in a high school laboratory.

   b. The students are required to apply scientific theories and principles in the solution of the problems presented. Students will make measurements and determine specific values. The solution to some of the problems may be arrived at by using an indirect method of obtaining the necessary data.

   c. All data collected and equations used must be shown in an organized manner on the answer sheet.

   d. The students are expected to use mathematical expressions that are required for the values and the correct equation for basic relationships. Students will be expected to apply the proper statistical analysis. Students will be required to use correct metric units throughout calculations and to work with significant figures.

   e. Supervisors are encouraged to use calculators and probes wherever possible or provide students with data sets collected by such sensors/probes following a data collection demonstration. At the State level, teams will be required to utilize probes at one or more stations. Students may be asked to collect data to solve a problem using probeware that has been provided, set up, and demonstrated by the Supervisor. Probes will be limited to the measurement of temperature, voltage, light, gas pressure, pH, photo-gate, or motion detector at the state level. Various probes will be utilized at two or more stations at the National Tournament.

4. **SCORING**: Problems may have different point values depending upon the difficulty of the problem. Points will be awarded for the correct answers and/or the use of proper mathematical relationships. Points will be deducted for failure to express values in the proper units and the incorrect use of significant figures. No points will be awarded for answers that are not supported by data and calculations. Tiebreakers will be problems selected in advance of the competition by the event supervisor. If the event is held over a series of time periods, the tiebreakers will be the same for all groups.

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