

ELECTROGAMES

OBJECTIVES:

- To introduce ROCAME students to the wonders and excitement of the fields of electricity and electronics.
- To provide hands on experience in reading and understanding symbols, schematic diagrams and wiring circuits of various descriptions.
- To expose students to systematic note taking, drawing schematic diagrams, utilizing scientific and mathematical based problem solving and team work.

DESCRIPTION OF JAMBOREE: (GENERAL)

This event will test the team's knowledge of basic electrical and electronic principles. Each team member shall prepare a notebook and bring it to the competition (see more specifics on the notebook). A written test on basic electricity/ electronics will be given to each student during the competition. Afterwards, the team will be given a schematic with the wiring sequence numbers included. Judging for this wiring will include team work and successfully functioning of the circuit. A second schematic will be provided without the wiring sequence numbers. Judging for this wiring will include team work and successfully functioning of the circuit. Prior to the Jamboree, each (LEA) should have an Electrogames competition to determine which team will represent the LEA. If a competition is not held it is advised that the LEA figure out how to ensure their high school and middle school has good representation. Each LEA is allowed to have a maximum of two – two man teams for both high school and middle school (total of 8 people max per LEA) competing in the Jamboree. Note the two teams that are representing a high school and middle school for the LEA do not have to come from the same school. Each LEA team will bring a 75 in 1 kit in good working order.

NUMBER OF PARTICIPANTS: 2 per team

APPROXIMATE TIME: 50 min

NOTEBOOK: (Maximum of 20 Pts.)

Each member of the team must keep a comprehensive notebook which will include definitions, symbols, schematic of circuits built along with a description of each. All notebooks must include dates and time spent on each project. Students should build a minimum of 10 of the 75 circuits found in the kit. We strongly encourage the students to build as many circuits as time allows. The notebooks will be reviewed during the contest. Neatness and comprehensiveness will enhance the score given to the notebook. Each notebook's score will be added together and divided by 2 to obtain the team's final score for the notebook.

WRITTEN TEST: (Maximum of 40 pts)

A written test, consisting primarily of multiple choice question and math computations will be given during the Jamboree. Questions will be based upon information in the owner's manual for the 75 in 1 kit, a chapter on electronics in the 7th grade science textbook, a chapter on electricity in the physical science textbook, and handout material provide to the advisor during the advisor's workshop. Two tests will be prepared, one for middle school and second test including more math problems for high school students. Each team members test score will be added then divided by 2 to obtain the team's final score.

CIRCUIT BUILDING: (Maximum of 40 Pts)

Team members must make sure that their 75 in 1 kit is in good working order and have fresh AA batteries (cells). Only one kit is needed for the team. The owner's manual will not be used during the Electrograms actives. The first circuit will be provided with the wiring sequence included. (Note information in the Jamboree description general). The second circuit will be provided without wiring sequence.

HIGH SCHOOL ONLY!

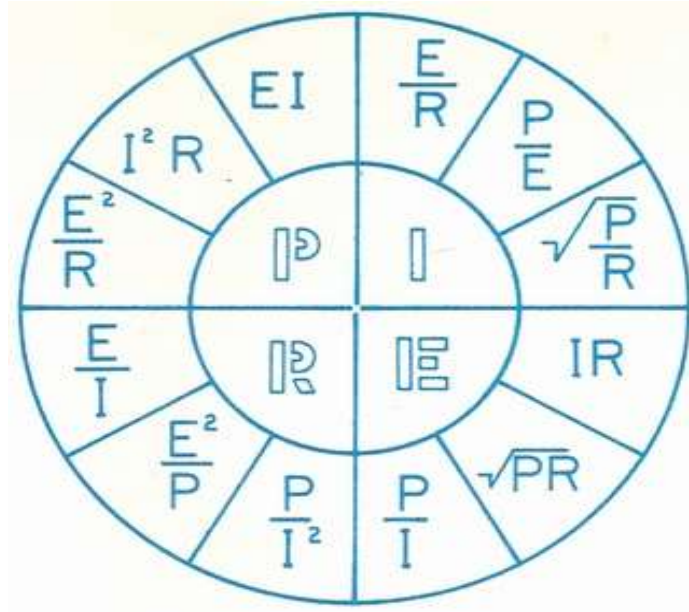


Fig. 3-15. A memory device combining Ohm's Law and Power Laws. Use it to help you solve your problems.

1. $E = I \times R$ Ohm's Law

2. $E = \frac{P}{I}$ Watt's Law

3. $E = \sqrt{PR}$ By transposing equation 12 and taking the square root.

4. $I = \frac{E}{R}$ Ohm's Law

5. $I = \frac{P}{E}$ Watt's Law

6. $I = \sqrt{\frac{P}{R}}$ By transposing equation 9 and taking the square root.

7. $R = \frac{E}{I}$ Ohm's Law

8. $R = \frac{E^2}{P}$ By transposing equation 12.

9. $R = \frac{P}{I^2}$ By transposing equation 11.

10. $P = I \times E$ Watt's Law

11. $P = I^2 \times R$ By substituting $I \times R$ from equation 1, for E .

12. $P = \frac{E^2}{R}$ By substituting $\frac{E}{R}$ from equation 4, for I