

**Product Name :**  
Basic Electricity Trainer, PCB Modular Trainer

**Product Code :**  
BASE101P



**Description :**

Basic Electricity Trainer, PCB Modular Trainer -

**The Basic**

Electricity Trainer should be a modular course covering the fundamentals, concepts, theory and applications of electricity. The trainer should consist of a base station into which are inserted modular boards that match the experiments. The trainer should be able to conduct a number of experiments which covers basic electrical theory, electrical circuits and passive devices in both direct and alternating current. The base station must be provided with the power supplies and accessories that should be required to support the training module boards.

The Basic Electricity Trainer should be included with operation manuals and experiment manuals which includes step-by-step chapters with theoretical information and practical student experiments. Each. The trainer should be able to conduct the following topics of experiments:

1. Introduction to experiments (schematic diagrams, symbols, power sources, instruments)
2. Resistor color code.

3. Measurements of DC voltage.
4. Cells in series and parallel.
5. Conductors and insulators.
6. Measurement of DC current.
7. Ohm's law.
8. Series, parallel and series-parallel circuits.
9. Voltage-divider circuits (unloaded, loaded).
10. Kirchhoff's Law.
11. Trouble shooting electric circuits.
12. Maximum Power transfer in a DC load.
13. Solving linear circuits using mesh currents.
14. Balanced-bridge circuit.
15. Superposition Theorem.
16. Thevenin's Theorem.
17. Norton's Theorem.
18. Millman's Theorem.
19. Magnetic fields and coils.
20. DC relay and magnetism
21. Oscilloscope operation.
22. Signal generator operation.
23. Peak, RMS and average values of AC
24. Characteristics of inductance and reactance.
25. Frequency and phase measurements.
26. Inductances in Series and Parallel.
27. RC time constants.
28. Reactance of a capacitor.

- 29. Capacitors in Series and Parallel.
- 30. Capacitive voltage divider.
- 31. Impedance and voltage relation in series RL circuit.
- 32. Impedance and voltage relation in series RC circuit.
- 33. Power in AC circuits
- 34. Frequency response.
- 35. Impedance of a series RLC circuit
- 36. Effects of changes in frequency on impedance and current in a series RLC circuit.
- 37. Impedance of a parallel RL and RC circuit.
- 38. Impedance of a parallel RLC circuit.
- 39. Resonant frequency and frequency response of a series RLC circuit.
- 40. Effect of Q on frequency response and bandwidth of a series resonant circuits.
- 41. Characteristic of parallel resonant circuits.
- 42. Low-pass and high pass filters.
- 43. Phase-shifting circuit
- 44. Non linear resistors (Thermistors).
- 45. Non linear resistors (Varistors).

**Modules:**

The Basic Electricity Trainer should include a set of experimental board

modules that closely follow the courseware. The modules must be made of high quality epoxy coated fiber glass printed circuit board with the electronic components mounted on the surface. Each board should be printed with a clearly laid out silk screened schematic circuit diagram showing circuit construction and operation. The PCB modules must have all the components requested for the experiments mounted on to them.

Connections should be made by 2mm stackable test leads which are provided together with the modules.

### **Specifications:**

The Basic Electricity Trainer should have the following specifications:

- Student  
Base Station: Serves as the platform for carrying out the student experiments. Provides for all the primary needs of the experiment modules.
- Fixed  
regulated DC power supplies : +5V,  
+15V, -15V
- Fixed  
AC power :  
+6V, -6V, +9V, -9V, +12V, -12V, +15V, -15V, CT
- Variable  
regulated DC power supply : 0 - 25V
- Potentiometers :  
4 units
- Push  
button switches :  
2 units
- Toggle  
switches :

5 spdt

- Speaker :  
2.25 inch, 8 ohm/ 0.25w
- Test  
leads :  
One set of 2mm test leads
- Component  
circuit matrix board (to receive and connect components modules)

(experiment manual to be provided during bidding  
process to ensure all the experiments are covered)

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**Technical Specification :**

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