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SECTION - A

DIODE & ZENER DIODE CHARACTERISTICS EE-1

AIM:

- (a) To study & plot the forward and reverse bias characteristics of a Semiconductor Diode.
- (b) To plot and study the breakdown characteristics of a Zener Diode.

FEATURES:

- (a) 0-10 Volts continuously variable D.C. Power Supply.
- (b) Dual range moving coil voltmeter having ranges 1V & 10V full scale selected by a switch on the front panel.
- (c) Dual range moving coil microammeter having ranges 200 μ A and 10mA full scale, selected by a switch on the front panel.
- (d) Semiconductor Diode mounted behind the panel with its lead well specified on the panel.
- (e) Zener Diode mounted behind the panel with its leads well specified on the panel.
- (f) Current limiting resistance for meter protection.

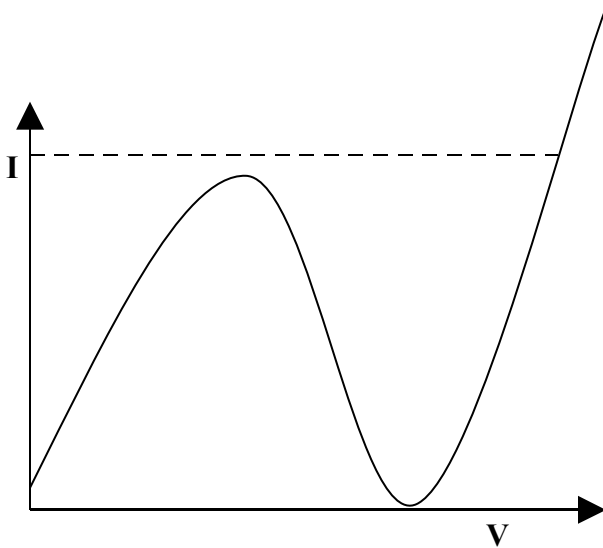
TUNNEL DIODE CHARACTERISTICS

TYPE EE-P50

AIM:

To study the characteristics of a tunnel diode.

V-I CHARACTERISTICS



FEATURES:-

- a) A built-in 5V DC IC regulated Power Supply.
- b) Potentiometer for load Variation.
- c) Two Digital mill voltmeters for accurate observations.
- d) The tunnel diode is mounted behind the panel.

L.E.D. CHARACTERISTICS TYPE EE-02

AIM:

To study the L.E.D. Characteristics.

FEATURES:

The training board consists of the following built-in parts :-

- (a) 0-10 Volts continuously variable D.C. Power supply.
- (b) Dual range moving coil voltmeter having ranges 1V and 10V selected by a switch.
- (c) Moving coil milliammeter having range 0-10mA.
- (d) L.E.D. mounted on the front panel with its leads well specified on the front panel.

TRANSISTOR CHARACTERISTICS WITH 3 METER TYPE EE-3**AIM:**

To study and plot the input and output characteristics of NPN and PNP transistors for:

- (a) Common Emitter Mode
- (b) Common Base Mode
- (c) Common Collector Mode

FEATURES:

The training board consist of the following built-in parts:

- (a) 0-10 Volts continuously variable D.C. Power Supply for base emitter junction.
- (b) 0-10 Volts continuously variable D.C. power supply for collector emitter junction.
- (c) Moving coil voltmeter having range 0-10 Volts full scale.
- (d) Moving coli milliammeter having range 0-10mA full scale.
- (e) Dual range moving coil microammeter having two ranges selected by a switch on the panel range 200 μ A and 10 mA full scale
- (f) NPN & PNP transistors mounted behind the panel with their leads well specified on the panel.
- (g) Current limiting resistance for meter protection.

TRANSISTOR CHARACTERISTICS WITH 4 METER TYPE EE-3A**AIM:**

To study and plot the transistor input and output characteristics of common base mode and common emitter mode.

FEATURES:

- (a) Two built-in IC regulated 0- 10 V variable DC Power Supply.
- (b) Two moving coil ammeters and two moving coil voltmeters for accurate observations.
- (c) Current limiting resistor for meter protection.
- (d) Both n-p-n and p-n-p type transistors are provided.

F.E.T. CHARACTERISTICS TYPE EE-4**AIM:**

- (a) To study and plot the Output Characteristics of the Field Effect Transistor. (F.E.T.)
- (b) To study and plot the Transfer Characteristics of the Field Effect Transistor. (F.E.T.)

FEATURES:

The training board consists of the following built-in parts :-

- (a) 0-10 Volts continuously variable D.C. Power Supply.
- (b) 0-1 Volts continuously variable D.C. Power Supply.
- (c) Dual range moving coil voltmeter having ranges 1 V and 10V full scale selected by a switch on the front panel.
- (d) Moving coil milliammeter having 0-10 mA full scale.
- (e) One F.E.T. mounted behind the panel with its leads well specified on the panel.

M.O.S.F.E.T. CHARACTERISTICS**TYPE EE-05****AIM:**

To study and plot the Drain Characteristics of Metal Oxide Semiconductor Field Effect Transistor, (M.O.S.F.E.T.)

FEATURES:

The training board consists of the following built in parts :-

- (a) 0-10 Volts continuously variable D.C. Power Supply.
- (b) 0-1 Volts continuously variable D.C. Power Supply.
- (c) Dual range moving coil voltmeter having ranges 1V & 10V full scale selected by a switch on the front panel.
- (d) Moving coil milliammeter having range 0-10 mA full scale.
- (e) One M.O.S.F.E.T. mounted behind the panel with its leads well specified on the panel.

U.J.T. CHARACTERISTICS**TYPE EE-6****AIM:**

- (a) To study and plot V-I Characteristics of U.J.T.
- (b) To study U.J.T. as a Relaxation Oscillator.

FEATURES:

The training board consists of the following built-in parts :-

- (a) Two 0-10 Volts continuously variable D.C. Power Supply.
- (b) Dual range moving coil voltmeter having ranges 1V and 10V full scale selected by a switch on the front panel.
- (c) Moving coil milliammeter having range 0-10mA full scale.
- (d) U.J.T. mounted behind the panel with its leads well specified on the panel.

S.C.R. Characteristics**TYPE EE-7****AIM:**

- (a) To study D.C. Gate Control Characteristics of a Silicon Controlled Rectifier (S.C.R.)
- (b) To Study the Anode Current Characteristics of a S.C.R.
- (c) To plot the Phase Firing Characteristics of a S.C.R.

FEATURES:

- (a) Built-in 0-20 Volts continuously variable D.C. Power Supply.
- (b) Built-in 0-2.5 Volts continuously variable D.C. Power Supply.
- (c) Built-in 15 Volts A.C. Power Supply.
- (d) Built-in 2 Volts A.C. Power Supply.
- (e) Moving coil voltmeter having range 0-10 Volts.
- (f) Moving coil milliammeter having range 0-50 mA.
- (g) Moving coil milliammeter having range 0-1 mA.
- (h) S.C.R. and other circuit components mounted behind the panel with their leads well specified on the panel.

THERMISTOR CHARACTERISTICS**TYPE EE-8****AIM:**

- (a) To plot Resistance versus Temperature Characteristics of a given Thermistor.

- (b) To find Resistance Co-efficient of Thermistor from graph and to verify it by comparing with theoretical value.

FEATURES:

The training board consists of the following built-in parts :-

- (a) Power Supply having three fixed D.C. voltages of 5V, 9V & 12V selected by a switch.
- (b) An electrically heated oven to vary the temperature of the Thermistor.
- (c) Moving coil milliammeter having range 0-10 mA.
- (d) Thermistor mounted inside the oven.

DIAC & TRIAC CHARACTERISTICS TYPE EE14

AIM:

To study and plot

- (a) V-I Characteristic of Diac in following 2 modes :

- i) MT2 positive w.r.t. MT1.
- ii) MT1 positive w.r.t. MT2.

- (b) V-I Characteristics of Triac in following 4 modes :

- i) MT2 positive w.r.t. MT1 with positive gate current.
- ii) MT2 positive w.r.t. MT1 with negative gate current.
- iii) MT1 positive w.r.t. MT2 with positive gate current.
- iv) MT1 positive w.r.t. MT2 with negative gate current.

FEATURES:

The training board consists of the following built-in parts :-

- (a) 0-100 Volts continuously variable D.C. Power Supply.
- (b) 0-10 Volts continuously variable D.C. Power Supply.
- (c) Moving coil voltmeter having range 0-100 Volts.
- (d) Dual range moving coil ammeter having ranges 1mA and 10mA selected by a switch.

SEMICONDUCTOR DEVICES CHARACTERISTICS TYPE EE-15

AIM:

To plot and study the characteristics of the following :-

- (a) Semiconductor Diode (Ge & Si both)
- (b) Zener Diode.
- (c) NPN Transistor.
- (d) PNP Transistor.
- (e) F.E.T.
- (f) M.O.S.F.E.T.
- (g) U.J.T.
- (h) S.C.R.

FEATURES:

The training board consists of the following built-in parts :-

- (a) 0-10 Volts continuously variable D.C. Power Supply.
- (b) 0-30 Volts continuously variable D.C. Power Supply.
- (c) 2 Volts fixed A.C. Power Supply.
- (d) 15 Volts fixed A.C. Power Supply.
- (e) Dual range moving coil voltmeter having ranges 1V & 10V full scale, selected by a switch.
- (f) Dual range moving coil microammeter having ranges 200 μ A and 10 mA full scale, selected by a switch.

- (g) Dual range moving coil milliammeter having ranges 5 mA and 50 mA full scale, selected by a switch.
- (h) Dual range moving coil voltmeter ranges 3V and 30V full scale, selected by a switch.
- (i) Decade resistance and other circuit components are mounted behind the panel with their leads well specified on the panel.

R.T.D CHARACTERISTICS

TYPE EE-16

AIM:

- (a) To plot resistance versus temperature characteristics of a given R.T.D.
- (b) To find resistance coefficient of R.T.D. from graph and to verify it by comparing with theoretical value.

FEATURES:

- (a) Three built-in IC regulated variable power supply of 5V, 9V, & 12V selectable by a band switch.
- (b) A moving coil milliammeter is provided on the panel.
- (c) An electrically heated oven to vary the temperature of the R.T.D. which is mounted in side the oven.

SOLAR CELL CHARACTERISTICS

TYPE EE-218

AIM:

To study solar cell characteristics.

FEATURES:

- (a) A solar cell is provided to generate voltage and current.
- (b) A moving coil voltmeter of 500mV range and a moving coil ammeter of 20mA range are provided on the panel.
- (c) A band switch is provided to select different load resistances.

PHOTO DIODE CHARACTERISTICS

TYPE EE-219

AIM:

To study characteristics of a photo diode by changing the intensity of light to which it is exposed.

FEATURES:

- (a) A photo diode is provided with a window on the panel.
- (b) An IC regulated 5V DC variable power supply is provided.
- (c) One digital voltmeter and one digital ammeter are provided on the panel.
- (d) A variable A.C. power supply to vary a 10 Watts bulb is provided.

PHOTO TRANSISTOR CHARACTERISTICS

TYPE EE-220

AIM : To study photo transistor characteristics.

FEATURES:-

- (a) A photo transistor is provided with a window on the panel.
- (b) An IC regulated 10V DC variable power supply is provided.
- (c) A moving coil voltmeter of 10V range and a moving coil ammeter of 5mA range are provided on the panel.

SECTION - B : AMPLIFIERS

SINGLE STAGE TRANSISTOR AMPLIFIER

TYPE EE-21

AIM:

- (a) To observe voltage and current gain of a Single Stage Transistor Amplifier.
- (b) To plot frequency response curve.
- (c) To measure input & output impedance of a Single Stage Transistor Amplifier.

FEATURES:

- (a) Built-in 9V D.C. power supply for proper biasing.
- (b) Well designed circuit mounted on the back side of the front panel.
- (c) Circuit diagram is well engraved on the front panel with terminals provided for connecting signal generator and oscilloscope.

SINGLE STAGE TRANSFORMER COUPLED AMPLIFIER

TYPE EE-21A

AIM:

- (a) To observe voltage and current gain of a single stage transformer coupled amplifier.
- (b) To plot frequency response curve.
- (c) To measure input & output impedance of a single stage transformer coupled amplifier.

FEATURES:

An built-in IC regulated 9V D.C. Power supply is provided for proper biasing.

TRANSISTOR DOUBLE STAGE RC COUPLED CUM FEED BACK AMPLIFIER

TYPE EE-22

AIM:

- (a) To observe gain of amplifier at 1Kz with and without negative feedback in the emitter circuit and external feedback network disconnected.
- (b) To observe variation of gain of amplifier with different amount of negative feedback in the external circuit at 1KHz.
- (c) To determine maximum permissible input signal for no visible distortion at the amplifier output under different feedback conditions.
- (d) To determine bandwidth and gain bandwidth product of amplifier with and without feedback.

FEATURES:

- (a) Two stage transistor amplifier.
- (b) 1 KHz fixed transistorised sine wave oscillator with output amplitude control.
- (c) Feedback network comprising of seven resistors, selected by a switch and fixed feedback capacitor.
- (d) Fixed 9V power supply for amplifier and oscillator operation.

TRANSISTOR EMITTER FOLLOWER AMPLIFIER

TYPE EE-23

AIM:

- (a) To measure the input and output impedances of an emitter follower.
- (b) To measure the power gain of the amplifier.
- (c) To observe the phase relationship between the input and output signal voltage.

FEATURES:

- (a) Built in 12V IC regulated power supply.

- (b) Circuit diagram is engraved nicely on the front panel.
- (c) Multicolored sockets provided on the panel at different places to measure various parameters.

TRANSISTORISED PUSH-PULL AMPLIFIER TYPE EE-24

AIM :

- (a) To study class B Transistor Push-Pull Amplifier.
- (b) To measure output power.
- (c) To plot frequency response curve.
- (d) To measure distortion.

FEATURES:

- (a) Built-in IC regulated fixed power supply.
- (b) Circuit diagram is nicely engraved on the front panel.
- (c) Multicolored terminals are provided on the panel at different places to measure various parameters.

TRANSISTR OR AUDIO POWER AMPLIFIER TYPE EE-25

AIM:-

- (a) To plot the frequency response characteristics.
- (b) To measure the input impedance.
- (c) To observe the phase relationships at the input and output.
- (d) To measure the voltage gain.

FEATURES:-

- (a) Built-in fixed 9V IC regulated power supply.
- (b) Circuit diagram is nicely engraved on the front panel.
- (c) Multicolored terminals are provided on the panel at different places to measure various parameters.

TRANSISTORISED DIFFERENTIAL AMPLIFIER TYPE EE-26

AIM:

- (a) To observe the output wave-forms of a Differential Amplifier resulting from a single ended input and note their phase relative to the input wave form.
- (b) To observe the output wave-forms of a Differential Amplifier resulting from two input signals of the opposite phase (Differential mode).
- (c) To observe the output wave-forms of a Differential Amplifier resulting from two input signals of the same phase (Common mode).

FEATURES:

The training board consists of the following built-in parts:-

- (a) Fixed dual IC Regulated Power Supply.
- (b) Transistors and other circuit components are mounted behind the panel with their leads well specified on the panel.
- (c) Circuit diagram is nicely engraved on the panel with multicolored terminals mounted at various points.

TRNASISTOR WIDE BAND AMPLIFIER TYPE EE-27

AIM:

- (a) To study the Wide Band Amplifier with and without feed back.
- (b) To draw the frequency response of the Amplifier.
- (c) To measure the input and output impedance of the Amplifier.

FEATURES:

- (a) Built-in fixed voltage IC regulated power supply.
- (b) Circuit diagram is nicely engraved on the front panel.
- (c) Multi-coloured terminals are provided on the panel at different places to measure various parameters.

TRANSISTOR TUNED NARROW BAND AMPLIFIER TYPE EE-27A

AIM:

- (a) To study the Narrow Band Amplifier with and without feed back.
- (b) To draw the frequency response to the Amplifier.
- (c) To measure the input and output impedance of the Amplifier.

FEATURES:

- (a) Built-in fixed voltage IC regulated power supply.
- (b) Circuit diagram is nicely engraved on the front panel.
- (c) Multi-coloured terminals are provided on the panel at different places to measure various parameters.

F.E.T. AMPLIFIER TYPE EE-28

AIM:

- (a) To study the frequency response curve.
- (b) To measure the output and input impedance of the Amplifier.

FEATURES:

- (a) Built-in fixed voltage IC regulated power supply.
- (b) Circuit diagram is nicely engraved on the front panel.
- (c) Multi-coloured terminals are provided on the panel at different places to measure various parameters.

M.O.S.F.E.T. COMMON SOURCE AMPLIFIER TYPE EE-29

AIM:

To study and use M.O.S.F.E.T. as a Common Source Amplifier and measure its voltage gain to plot the frequency response curve.

FEATURES:

- (a) Built-in 9V fixed IC regulated power supply.
- (b) Circuit diagram is nicely engraved on the front panel.
- (c) Multi-coloured terminals are provided on the panel at different places to measure various parameters.

DARLINGTON PAIR TRANSISTOR AMPLIFIER / CLASS A TYPE EE-30

AIM:

- (a) To observe voltage and current gain of a Darlington pair transistor amplifier.
- (b) To plot frequency response curve.
- (c) To measure input & output impedance of a Darlington pair transistor amplifier amplifier.

FEATURES:

- (a) An built-in IC regulated 9V D.C. Power supply is provided for proper biasing.
- (b) A POT is provided for load variation.

CLASS A POWER AMPLIFIER**TYPE EE-221****AIM:**

To study Class A Power Amplifier

FEATURES:

- (a) Built-in power supply.
- (b) Circuit diagram is printed on the front panel.
- (c) Multi-coloured terminals are provided on the panel at different places to measure various parameters.

CLASS B POWER AMPLIFIER**TYPE EE-222****AIM:**

To study Class B Power Amplifier

FEATURES:

- (a) Built-in power supply.
- (b) Circuit diagram is printed on the front panel.
- (c) Multi-coloured terminals are provided on the panel at different places to measure various parameters.

CLASS C POWER AMPLIFIER**TYPE EE-223****AIM:**

To study Class C Power Amplifier

FEATURES:

- (a) Built-in power supply.
- (b) Circuit diagram is printed on the front panel.
- (c) Multi-coloured terminals are provided on the panel at different places to measure various parameters.

INTERMEDIATE FREQUENCY (IF) AMPLIFIER**TYPE EE-103****AIM:**

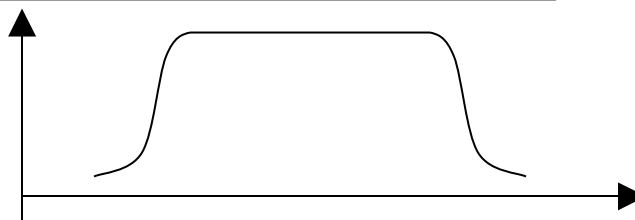
To construct IF amplifier. The input is taken from any R.F. generator and observe amplifier output at first and second IF stage.

FEATURES :-

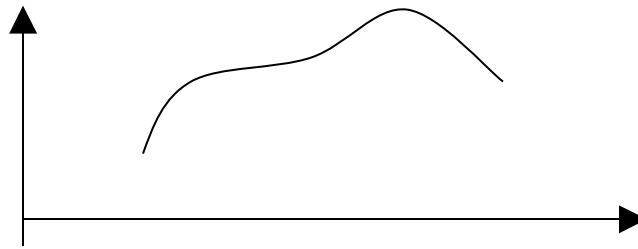
- (a) An built-in IC regulated -15V D.C. Power supply is provided for proper biasing.
- (b) The top of the module is of anodized aluminum panel with circuit diagram and symbol printed nicely on the panel.

RC & TC COUPLED AMPLIFIER**TYPE EE-P53****AIM:**

- (a) To study the amplification characteristics of a single stage R-C coupled amplifier.
- (b) To study the amplification characteristics of a single stage transformer coupled amplifier.

FREQUENCY RESPONSE OF RC AMPLIFIER _____

FREQUENCY RESPONSE OF TC AMPLIFIER



FEATURES:

A built-in 9V DC IC regulated power supply.

SECTION - C : OSCILLATORS

TRANSISTORISED WEIN-BRIDGE OSCILLATOR TYPE EE-31

AIM:

- (a) To obtain oscillations of different frequencies by varying R.C. combination.
- (b) To study the frequency response of phase shift network.

FEATURES:

- (a) Built-in IC regulated power supply.
- (b) Circuit diagram is well engraved on the panel.
- (c) Multi-coloured terminals are provided on the panel at different places to measure various parameters.
- (d) Various combinations of R & C in order to obtain different frequencies.

TRANSISOTRISED HARTLEY OSCILLATOR

TYPE EE-33A

AIM:

To study radio frequency (R.F.) Hartley Oscillator.

FEATURES:

An built-in IC regulated variable power supply of 9V D.C.

TRANSISTORISED COLPITT'S OSCILLATOR

TYPE EE-33B

AIM:

To study radio frequency (R.F.) Colpitt's Oscillator.

FEATURES:

An built-in IC regulated variable power supply of 9V D.C

TRANSISTORISED PHASE SHIFT OSCILLATOR TYPE EE-32

AIM:

- (a) To obtain oscillations of different frequencies by varying R & C combination.
- (b) To study phase and frequency response of the phase shift network.

FEATURES:

- (a) Built-in fixed voltage IC Regulated power supply.
- (b) Circuit diagram is nicely engraved on the front panel.

- (c) Multi-coloured terminals are provided on the panel at different places to measure various parameters.

TRANSISTORISED HARTLEY'S & COLPITT'S OSCILLATOR TYPE EE-34

AIM:

- (a) To study R.F. Hartley's Oscillator.
(b) To study R.F. Colpitt's Oscillator.

FEATURES:

- (a) Built-in IC regulated power supply.
(b) Circuit diagram is well engraved on the panel.
(c) Multi-coloured terminals are provided on the panel at different places for easy connections.
(d) Provision is made on the front panel such that Hartley's or Colpitt's circuit can be wired easily with the help of patch chords individually.
(e) Different combinations of L and C are available to obtain various frequencies.

Note :- Hartley's and Colpitt's oscillators are also available separately as Model 33A and model 33B respectively.

SAW TOOTH (RAMP - FUNCTION) GENERATOR TYPE EE-35

AIM:

To study the characteristics of a Saw Tooth (Ramp-Function) Generator circuit.

FEATURES:

- (a) The Circuit diagram is well engraved on the panel.
(b) Built-in fixed 12V IC regulated power supply.
(c) Multi-coloured terminals are provided to measure various parameters.
(d) A band switch is provided to select different value of Resistances.
(e) UJT, Zener Diode, Transistor and other circuit components are mounted behind the panel.

STUDY OF MULTIVIBRATORS

TYPE EE-36

(Astable, Bistable & Monostable)

AIM:

- (a) To study voltage wave-forms of a Astable Multivibrator.
(b) To study voltage wave-forms of a Bistable Multivibrator.
(c) To study voltage wave-forms of a Monostable Multivibrator.

FEATURES:

- (a) Built-in IC regulated power supply of 5V DC.
(b) Transistor and other circuit components are mounted behind the panel with a number of multi-coloured terminals to measure various parameters.

Note :- Astable Bistable and Monostable multivibrators are also available as individual model as 36A, 36B and 36C respectively.

STUDY OF ASTABLE MULTIVIBRATOR

TYPE EE-36A

AIM:

- (a) To study voltage wave forms of Astable Multivibrator.
(b) To study the frequency variation with different parameters.

FEATURES:

- (a) An in-built IC regulated + 5V D.C. power supply.
(b) A potentiometer to vary frequency of wave form.

STUDY OF BISTABLE MULTIVIBRATOR**TYPE EE-36B****AIM:**

To study voltage wave forms of Bistable Multivibrators.

FEATURES:

- (a) An in-built IC regulated + 5V D.C. power supply.
- (b) A potentiometer to vary frequency of waveform.

STUDY OF MONOSTABLE MULTIVIBRATOR**TYPE EE-36C****AIM:**

To study voltage wave forms of a Monostable Multivibrators.

FEATURES:

- (a) An in-built IC regulated + 5V D.C. power supply.
- (b) A potentiometer to vary frequency of wave form.

STUDY OF SCHMITT'S CIRCUIT**TYPE EE-37****AIM :**

To study OP-AMP Schmitt's Circuit.

FEATURES:

- (a) Built-in IC regulated power supply.
- (b) Multi-coloured terminals are provided on the panel at different places to measure various parameters.
- (c) Circuit diagram is nicely engraved on the panel.

TRANSISTOR BOOTSTRAP SWEEP GENERATOR TYPE EE-38**AIM:**

- (a) To study the amplitude variations of the output wave form.
- (b) To study the frequency variations of the output wave from.
- (c) To study the linearity of the output wave form.

FEATURES:

- (a) Built-in IC regulated power supply.
- (b) Circuit diagram is nicely engraved on the panel.
- (c) Multi-coloured terminals are provided on the panel at different places to measure various parameters.

CRYSTAL OSCIALLTOR USING OPAMP**TYPE EE-231****AIM:**

To study Crystal Oscillator.

FEATURES:

- (a) + 12 V/350 ma DC Power Supply
- (b) Transistor Crystal Oscillator
- (c) Set of Patch Cords and Manual

CLAPP'S OSCILLATOR**TYPE EE-232****AIM:**

To study radio frequency (R.F.) Clapp's Oscillator.

FEATURES:

A built-in IC regulated variable power supply of 9V D.C.

TWIN-T OSCILLATOR

TYPE EE-234

AIM:

To study radio frequency (R.F.) Twin-T Oscillator

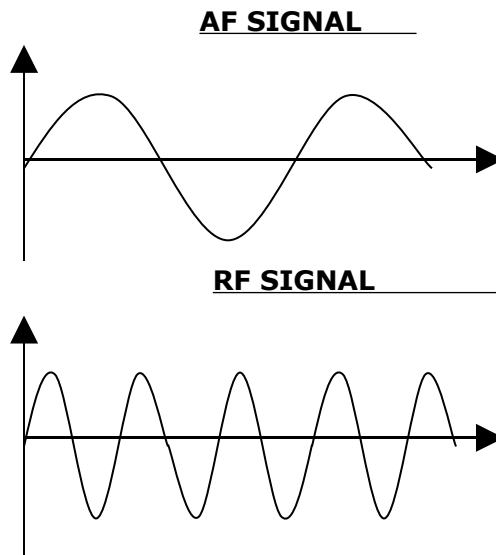
FEATURES:

A built-in IC regulated variable power supply of 9V D.C.

AF & RF OSCILLATOR

TYPE EE-P52

AIM: To study and determine the audio frequency & radio frequency of oscillator.



FEATURES:

a) A built-in 12V DC IC regulated power supply.

The two potentiometer for frequency variation and supply voltage adjustment.

SECTION - D : POWER SUPPLY

RECTIFIER & FILTER CHARACTERISTICS

TYPE EE-41

AIM:

(a) To study Half Wave rectification.

(b) To study Full Wave rectification.

(c) To study Bridge rectification.

(d) To study PI type filter

(e) To study L type filter

FEATURES:

(a) Built-in A.C. Power Supply.

(b) Moving coil voltmeter having range 0-20 Volts full scale.

(c) Moving coil ammeter having range 0-100 mA full scale.

(d) Built-in variable load resistance to study load regulation.

FILTER CHARACTERISTICS**TYPE EE-41A****AIM:**

- (a) To study half wave rectification
- (b) To study full wave rectification.
- (c) To study π type filter.
- (d) To study L type filter.

FEATURES:

A built-in A.C. power supply is provided.

REGULATED POWER SUPPLY (USING TRANSISTOR)**TYPE EE-42****AIM:**

To study Regulated Power Supply and use Transistor as a voltage regulator.

FEATURES:

- (a) Built-in A.C. Power Supply.
- (b) Moving coil milliammeter having range 0-100 mA full scale.
- (c) Moving coil Voltmeter having range 0-20 V full scale.
- (d) Built-in variable load resistance to study load regulation.
- (e) Multicolored spacing? terminals are provided on the panel to measure voltage at different stages.

REGULATED POWER SUPPLY (USING OP-AMP.) TYPE EE-43**AIM:**

To study Regulated Power Supply and use OP-AMP as a voltage regulator.

FEATURES:

- (a) Built-in A.C. Power Supply.
- (b) Moving coil milliammeter having range 0-100 mA full scale.
- (c) Moving coil Voltmeter having range 0-20 V full scale.
- (d) Built-in variable load resistance to study load regulation.
- (e) Multicolored terminals are provided on the panel to measure voltage at different stages.

REGULATED POWER SUPPLY (USING REGULATOR IC 7805) TYPE EE-44**AIM:**

To study Regulated Power Supply using Regulator IC 7805

FEATURES:

- (a) Built-in A.C. Power Supply.
- (b) Moving coil milliammeter having range 0-100 mA full scale.
- (c) Moving coil Voltmeter having range 0-10 V full scale.
- (d) Built-in variable load resistance to study load regulation.
- (e) Multicolored terminals are provided on the panel to measure voltage at different stages.

REGULATED POWER SUPPLY (USING IC 723)**TYPE EE-45****AIM:**

To study Regulated Power Supply using IC 723.

FEATURES:

- (a) Built-in A.C. Power Supply.
- (b) Moving coil milliammeter having range 0-100 mA full scale.
- (c) Moving coil Voltmeter having range 0-15 V full scale.
- (d) Built-in variable load resistance to study load regulation.
- (e) Multicolored terminals are provided on the panel to measure voltage at different stages.

**REGULATED POWER SUPPLY
(USING ZENER DIODE)****TYPE EE-91****AIM:**

To study Regulated Power Supply using Zener diode.

FEATURES:

- (a) Built-in A.C. Power supply.
- (b) Moving Coil milliammeter having range 0-100 mA full scale.
- (c) Moving coil voltmeter having range 0-15 V full scale.
- (d) Built-in variable load resistance to study load regulation.
- (e) Multicolored terminals are provided on the panel to measure voltage at different stages.

**REGULATED POWER SUPPLY
(Using 3 Terminal Variable Voltage Regulator)****TYPE EE-92****AIM:**

To study regulated power supply using 3 terminal variable voltage regulator.

FEATURES:

- (a) Built-in A.C. power supply.
 - (b) Moving coil milliammeter having range 0-100 mA full scale.
 - (c) Moving coil voltmeter having range 0-15 V full scale.
 - (d) Built-in variable load resistance to study load regulation.
 - (e) Multicolored terminals are provided on the panel to measure voltage at different stages.
 - (f) Regulated Voltage can be obtained between the range of 1.25V to 12.5V
- Note :- Positive Voltage Regulator is available as model 92A using IC LM 317 while Negative Voltage Regulator is available as model 92B using IC LM 337.

SECTION - E : GENERAL**INTEGRATING, DIFFERENTIATING CLIPPING & CLAMPING CIRCUITS****TYPE EE-46****AIM:**

- (a) To study integrating circuit response at 1 KHz and 10 KHz for different combinations of R and C.
- (b) To study differentiating circuit response at 1 KHz and 10 KHz for different combinations of R and C.
- (c) To study series and shunt clamping circuits.
- (d) To study series and shunt clipping circuits.

FEATURES:

- (a) Transistorised square wave generator, Frequency 1 KHz and 10 KHz selected by a switch.

- (b) 0-10V continuously variable Solid State D.C. Power supply.
- (c) Resistances 1 K ohms and 10 K ohms are mounted behind the panel.
- (d) Condensers 500 pf., 0.01 μ f, 0.05 μ f, 0.1 μ f and 1 μ f low loss polyester/ceramic capacitors, selected by a band switch.

HYSTERESIS CURVE DEMONSTRATOR

TYPE EE-48

AIM: To display the B-H curve for different iron material.

FEATURES:

- (a) Built-in A.C. power supply with a voltage selector switch to select the voltage 6V, 10V, 20V, 40V & 80V in five steps.
- (b) Provision of connecting different coils and iron lamination from outside to study their B-H curve.
- (c) A phase control potentiometer and an integrate control potentiometer are provided to get proper B-H curve.

SERIES AND PARALLEL RESONANCE

TYPE EE-51

AIM:

To study the frequency response characteristics of Series and Parallel Resonance Circuits.

FEATURES:

- (a) The circuit diagrams for series and parallel resonance are well engraved on the panel.
- (b) There are separate band-switches provided for L, C and R.
- (c) Multicolored terminals are provided for connection.
- (d) Separate terminals are provided for A.F. Milliammeter.

STUDY OF MULTIMETER

TYPE EE-52

AIM: To use a micro ammeter as an ohm-meter, a voltmeter and an ammeter.

FEATURES:

- (a) Micrometer can be used to measure following parameters:-
 - (i) Resistance of different values.
 - (ii) A.C. & D.C. voltages.
 - (iii) A.C. & D.C. current.
- (b) Terminals are provided as test points.
- (c) A Potentiometer is provided to calibrate ohm-meter.

VERIFICATION OF CHILD'S LAW

TYPE EE-54A

AIM:

- (a) To study the variation of plate current with the variation of plate voltage for different values of filament current.
- (b) To study the variation of plate current with the variation of filament current for different values of plate voltage.
- (c) To verify the child's law.

FEATURES:

- (a) A built-in 300V DC Variable power supply and a 6.3V AC filament supply are provided.
- (b) A milliammeter, an ammeter and a volt-meter are provided on the panel.
- (c) One socket is provided on the panel for mounting the valve.

VERIFICATION OF RICHARDSON'S EQUATION

TYPE EE-54B

AIM:

To verify Richardson's thermionic emission formula experimentally & temperature measurement by ohm's law method.

FEATURES:

- (a) A built-in 300V DC variable power supply and a 6.3 VAC filament supply are provided.
- (b) A milliammeter, an ammeter and a voltmeter are provided on the panel.
- (c) One socket is provided on the panel for mounting the valve.

DETERMINATION OF BAND GAP IN SEMICONDUCTOR DEVICE (Ge Diode) TYPE EE-55**AIM:**

To study the effect of temperature on the reverse saturation current in junction diode and hence to determine the Forbidden Energy Band Gap.

FEATURES:

- (a) A Built-in 3V D.C. Power Supply.
- (b) An oven is provided behind the panel.
- (c) The circuit diagram is well engraved on the panel.
- (d) A moving coil microammeter (0-1 mA) is provided on the panel.
- (e) A Ge diode is mounted inside the oven.
- (f) A Thermometer of range 0-110°C is provided with the module.

STUDY OF HYBRID PARAMETERS OF A TRANSISTOR**TYPE EE-56****AIM:**

To study the hybrid parameters of a transistor

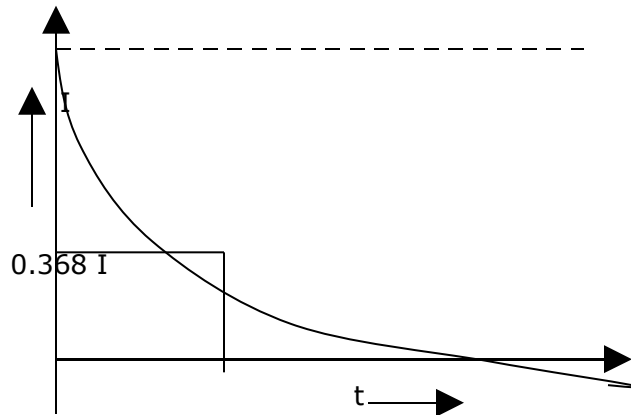
FEATURES:

- (a) The complete circuit diagram is well engraved on the panel.
- (b) Multicolored terminals are provided on the panel to measure various parameters.
- (c) All the components are mounted behind the panel.
- (d) Two variable D.C. power supplies are provided.
- (e) Terminals and switches for connecting A.F. Oscillator on input and output.

STUDY OF DECAY OF CURRENT IN RC CIRCUIT**TYPE EE-P15****AIM:**

TO study the decay of current in a circuit containing resistance and capacitor.

CURRENT Vs TIME GRAPH



FEATURES:

- a) A built-in regulated Power Supply.
- b) Digital ammeter for accurate observations.

TRANSISTOR BIAS STABILITY

TYPE EE-60

AIM:

- (a) To study the variation of leakage current with the change in Transistor temperature.
- (b) To study the shift in the operating point 'Q' at different temperatures.
- (c) To study the stability of a Transistor Amplifier with the variation of temperature.
- (d) To observe the distortion in the output of a Single stage Amplifier as a result of change in the 'Q' point.

FEATURES:

The training board consists of the following built-in parts :-

- (a) 12 Volts D.C. Power Supply.
- (b) An electrically heated oven to vary the temperature of the Transistor under test.
- (c) 1 KHz Oscillator with variable amplitude.
- (d) Moving coil voltmeter having range 0-15V.
- (e) Dual range moving coil milliammeter having ranges 500 μ A and 10mA, selected by a switch.
- (f) Multicolored terminals are provided on the panel at different places to measure various parameters.
- (g) A thermometer of range 0-110^oC is provided with the module.

CHARGING AND DISCHARGING OF A CAPACITOR

TYPE EE-69

AIM:

To study Charging and Discharging of a Capacitor through resistance.

FEATURES:

- (a) A.D.C. Power Supply.
- (b) 3 electrolytic condensers and 5 resistors are mounted behind the panel.
- (c) A Voltmeter is provided on the panel.
- (d) The circuit is well engraved on the panel.
- (e) Multicolored terminals are provided on the panel for connection.

IMPEDANCE AND POWER FACTOR OF LCR CIRCUITS

TYPE EE-70

AIM:

- (a) To find the phase difference between voltage of a LCR circuit.
- (b) To determine impedance and power factor in LCR circuit.

FEATURES:

- (a) A.C. Milliammeter and Voltmeter of suitable range. (0.500 mA and 0-100V)
- (b) The inductors, capacitors and resistors are provided on the panel.
- (c) There are 3 band switches for selecting the value of L.C and R.
- (d) All the components are mounted behind the panel.
- (e) Multicolored terminals are provided on the panel for connections.
- (f) Built in A.C., supply of 20V, 30V and 40V.

STUDY OF A COVERSION OF GALVANOMETER INTO AMMETER

TYPE EE-94

AIM:

To study how to convert a Galvanometer into Ammeter.

FEATURES:

- (a) A built in Variable Power Supply (0-10 Volts) whose terminals are accessible on front panel.
- (b) Desired Galvanometer and Ammeter are mounted on front panel.
- (c) A built-in Decade Resistance Box capable of selecting values in multiple of 10 ohms, 100 ohms and 1 K ohms.
- (d) Multicolored terminals are provided to make necessary connections and measurements.

STUDY OF CONVERSION OF GALVANOMETER INTO VOLTMETER

TYPE EE-95

AIM:

To study how to convert a Galvanometer into Voltmeter.

FEATURES:

- (a) A built-in Variable Power Supply (0-10 Volts) whose terminals are accessible on front panel.
- (b) Desired Galvanometer and Voltmeter are mounted on front panel.
- (c) A built-in Decade Resistance Box capable of selecting values in multiple of 10 ohms, 100 ohms and 1K ohms.
- (e) Multicolored terminals are provided to make necessary connections and measurements.

VOLTAGE MULTIPLIER: DOUBLER, TRIPLER AND QUADRUPLER

TYPE EE-110

AIM:

Study of Voltage Multiplier

FEATURES:

- (a) 8V/350 mA, 50 Hz AC Sources
- (b) Independent Doubler, Tripler, Quadrupler Circuits
- (c) Variable Load Resistor
- (d) Set of Patch Cords & Manual

STUDY OF LISSAJOUS FIGURES

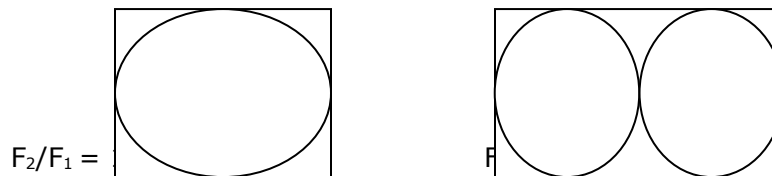
TYPE EE-P44

AIM: To study the waveform of alternating current source with the help of cathode ray oscilloscope (CRO) and to determine the unknown frequency by the analysis of Lissajous figures.

REQUIREMENT FOR THE EXPERIMENT:

1. E&E Make trainer Type: EE-P44,
2. E& E Make A.F. Generator Type:EE-AF-01
3. Cathode Ray Oscilloscope

SOME SPECIAL SHAPES OF LISSAJIOUS FIGURES



FEATURES:-

A band switch to select three unknown frequencies is provided.

SECTION - F : TRAINERS

TRANSISTOR TRAINER & DESIGNER

TYPE EE-61

The module is designed to meet the requirements of almost all laboratory experiments performed in Electronics/Electrical Engineering & Physics laboratories. Its main feature is that it allows a chain of experiments on the same unit giving a clear-cut understanding of transistor behavior. Different experiments which can be performed are so chosen that maximum topics on transistor applications are covered. With different combinations of accessories it can be used to perform many other experiments. It also provides field for a creative mind to work individual ideas and guidance of teachers.

Panel of the module is made in slanting position so that it is easier for student to check the whole circuit in a single sight. The module is provided with multicolored terminals at various places to measure different parameters.

SPECIFICATIONS :-

The training board consists of the following built-in parts :-

1. 0-15V continuously variable DC Power Supply.
2. A built-in 1 KHz sine wave oscillator with variable amplitude.
3. Moving coil DC Voltmeter having range 0-15V full scale.
4. Necessary components, resistances, capacitors, transistors, potentiometers are mounted behind the panel, just below their respective places.

LIST OF EXPERIMENTS :-

1. Common Emitter Amplifier
2. Common Base Amplifier
3. Common Collector Amplifier (Emitter Follower)
4. Two Stage RC Coupled Amplifier
5. Feed - Back Amplifier
6. Narrow Band Amplifier
7. Wein-Bridge Oscillator
8. Phase Shift Oscillator
9. Free Running Multivibrator
- 10 Mono-Stable Multivibrator.
11. Flip-flop Circuit.
12. Schmitt Trigger Circuit
13. Hartleys Oscillator
14. Colpitt's Oscillator
15. Phase Splitter etc.

OP- AMP. (IC 741) TRAINER & DESIGNER TYPE EE-62

The module is designed to study the basic experiments based on operational amplifier. With only a general purpose Oscilloscope and an Oscillator the module can perform chain of experiments.

The Operational Amplifier and other associate components are mounted behind the panel with their leads well specified on the panel. Panel of the module is made in slanting position so that it is easier for students to check the whole circuit in a single sight. The module is provided with multi-colored terminals at various place to measure different parameters Bottom of the module is made of transparent acrylic sheet so that students can see the internal connections.

SPECIFICATIONS :

The training board consists of the following built-in parts :-

1. Built in IC regulated 15-0-15 V DC Power Supply.
2. Two nos. 0-10 V variable DC Power Supply.
3. Moving coil DC voltmeter of 0-10 V full scale deflection
4. Various Resistances, Capacitors, Potentiometers are mounted behind the panel.

LIST OF EXPERIMENTS :

Following experiments based on IC 741 can be performed :

1. Schmitt's Trigger
2. Square Wave Generator.
3. Pulse Generator.
4. Astable Multivibrator.
5. Bistable Multivibrator
6. Monostable Multivibrator.
7. Phase Shift Oscillator.
8. Adder.
9. Subtractor.
10. Differentiator.
11. Integrator.
12. Clipper etc.

TIMER (IC 555) APPLICATION & TRAINER TYPE EE-63

The module is designed to study to the basic experiments based on Time IC 555. With only a general purpose Oscilloscope the module can perform chain of experiments.

The Timer IC 555 and other associate components are mounted behind the panel with their leads well specified on the panel. Panel of the module is made in slanting position so that it is easier for student to check the whole circuit in a single sight. The module is provided with multi colored terminals at various places to measure different parameters. Bottom of the module is made of transparent acrylic sheets so that students can see the internal connections.

SPECIFICATIONS :

The training board consists of the following built-in parts :

1. Built-in IC regulated 5 V DC Power Supply.
2. All necessary components like IC, Resistances, Capacitors and Potentiometers are mounted behind the panel.

LIST OF EXPERIMENTS :

Following experiments based on IC 555 can be performed :-

1. Schmitt's Trigger.
2. Square Wave Generator
3. Astable Multivibrator.
4. Bistable Multivibrator
5. Monostable Multivibrator etc. etc.

DIGITAL IC TRAINER

TYPE EE-64

This E&E make Digital IC Trainer Type: EE-64 is completely self contained with built-in power supplies, logic level generator, logic level indicators, clock oscillator etc. Panel of the module is made in slanting position so that it is easier for student to check the whole circuit in a single sight. The module is provided with multicolored terminals at various places to measure different parameters. The complete range of laboratory experiments based on Digital IC's can be performed on the module.

SPECIFICATIONS :-

The training board consists of the following built-in parts :

1. Built-in IC regulated fixed 5V, 1A and 12-0-12V, 1A power supply.
2. Following IC sockets are provided on the module with their leads well specified on the panel and have the facility of making multiple connections on each pin.
 - a. 4 Sockets for 14 pin ICs.
 - b. 8 Sockets for 16 pin ICs.
 - c. 2 Sockets for 24 pin ICs.
3. Clock oscillator of output 100 Hz, 1 KHz & 10 KHz is provided from which the desired output can be set by a band-switch (COARSE) and then by a knob marked (FINE).
4. A Manual pulse generator is provided which gives a pulse when the switch is pressed.
5. Ten nos. logic level generators.
6. Ten nos. logic level indicators.
7. A Digital Counter is provided which counts pulses from 0 to 9.
8. A separate seven segment display (FND) with its terminals is provided on the left bottom side of the module.
9. A Bread-board is provided on the same board for developing and implementing different circuits etc.

LOGIC GATE TRAINER

TYPE EE-65

The module is designed to study the basic gates used in Digital Electronics. Its main feature is that it allows a chain of experiments in Digital Electronics. The module is complete in all respects and requires no extra accessories to perform the experiment.

The gates are engraved on the panel with their leads well specified on the panel. Panel of the module is made in slanting position so that it is easier for student to check the whole circuit in a single sight. The module is provided with multicolored terminals at various places to measure different parameters.

SPECIFICATIONS

The training board consists of the following built-in parts :-

1. Four nos. AND Gate. 2. Four nos. NAND Gate. 3. Four nos. OR Gate, 4. Four nos. NOR Gate. 5. Four nos. INVERTOR. 6. Four nos. Logic Level Indicators. 7. Four nos. Logic Level Generators. 8. Built-in 5V DC IC Regulated Power Supply. 9. Various Resistors, Capacitors : Potentiometers, Diodes are mounted behind the panel.

LIST OF EXPERIMENTS :

1. Study and verification of truth table of various TTL Gates. 2. Verification of truth table of Half Adder and Full Adder. 3. Study of a Astable Multivibrator. 4. Study of a Monostable Multivibrator. 5. Study of a Bistable Multivibrator. 6. To study Schmitt's Circuit. etc.

LINEAR IC TRAINER

TYPE EE-66

The module is designed to study the different linear ICs used in electronics laboratory. Number of experiments can be performed based on these ICs by just using General Purpose Oscilloscope.

The ICs are mounted behind the panel with their leads well specified on the panel and have the facility of multi-connections on each lead. Panel of the module is made in slanting position so that it is easier for student to check the whole circuit in a single sight. The module is provided with multi-colored terminals at various places to measure different parameters.

SPECIFICATIONS :

The training board consists of the following built-in-parts :-

1. Two nos. 0-10 V DC continuously variable power supply.
2. 15-0-15 V IC regulated power supply.
3. 5 V IC regulated power supply.
4. Moving Coil Voltmeter having range 0-15 Volts full scale.
5. Moving Coil Milliammeter having range 0-50 mA full scale.
6. IC 741, IC 555, IC 565 & IC 723 are mounted behind the panel with their lids well specified on the panel.
7. 44 nos. of assorted value Resistances are mounted.
8. 27 nos. of assorted value Capacitors are mounted.
9. 10 nos. of assorted value Potentiometers are mounted.
10. 02 nos. of assorted value Diodes are mounted.
11. 03 nos. of assorted value Zener Diodes are mounted.
12. Junction points are provided at 12 places on the panel.

DISCRETE COMPONENT TRAINER

TYPE EE-67

AIM:- To study characteristics of various following devices:

- (a) Various types of diodes.
- (b) Various types of transistors.
- (c) FET
- (d) MOSFET
- (e) UJT
- (f) DIAC
- (g) TRIAC
- (h) SCR

FEATURES:

- (a) Two nos. 0-15V DC variable power supplies and two nos. IC regulated +5V & -5V DC power supplies.
- (b) A moving coil voltmeter of dual range 1V & 10V.
- (c) A moving coil ammeter of dual range 200 A & 10mA.

- (d) A clock oscillator of 1KHz, 10KHz & 100KHz selectable by a band switch.
- (e) A sine wave oscillator of 1KHz with amplitude control pot.
- (f) 4 nos. logic level generator & 4 nos. logic level indicators.
- (g) A speaker, a indicator, an audio transformer, a relay, 4 nos., potentiometers, 60 nos. different resistances, 20 nos. different capacitors & 13 nos. junction points are provided.

BREAD BOARD TRAINER

TYPE EE-100

AIM:

To implement a circuit and check its performance.

FEATURES:

- (a) Various IC regulated D.C. supplies +5V, -5V, +15V, -15V, and a variable D.C. supply 0-15V are provided.
- (b) Two clock frequencies 1KHz & 10KHz selectable by a toggle switch are provided.
- (c) A sine wave generator of 1KHz frequency is provided.
- (d) Four nos. logic level generators and four nos. logic level indicators are provided.
- (e) One nos. mono pulse generator is provided.
- (f) A breadboard of size 2.5" x 6.75" is provided.
- (g) A moving coil voltmeters of dual range 1V & 10V DC are provided.
- (h) A moving coil ammeter of dual range 200 A & 10mA DC are provided.

SECTION – G : DIGITAL

ANALOG TO DIGITAL CONVERTER

TYPE EE-58

AIM:

To study Analog to Digital Converter circuit.

FEATURES:

The training boards consists of the following built-in parts :

- (a) Built-in power supply to give signal variation from 0-15 V DC.
- (b) LED indications to display the state of various important points.
- (c) Provisions for Manual pulses as well as internal clock.
- (d) Decoder display (Using 7-segment) 0-15V.
- (e) Digital word length 4 bits.
- (f) Block diagram is well engraved on the panel.

DIGITAL TO ANALOG CONVERTER

TYPE EE-59

AIM:

To study R-2R ladder network D/A converter.

FEATURES:

- (1) A built in 15V Power Supply.
- (2) The circuit diagram is well engraved on the panel.
- (3) There are four logic indicators and four switches.
- (4) The Op-Amp and other components are mounted behind the panel.
- (5) A Voltmeter is provided on the panel.

(6) Multicolored terminals are provided on the panel.

BINARY COUNTER

TYPE EE-71

AIM:

To study Binary Counter using ICs 7400, 7447 and 7490.

FEATURES:

- (a) Built-in fixed voltage IC regulated power supply.
- (b) The ICs 7447, 7490 and 7400 are mounted behind the panel.
- (c) Seven Segment LEDs display is mounted on the panel.
- (d) The circuit is well engraved on the front panel.
- (e) A mono pulse switch for clock pulse generator is provided on the front panel.

SEVEN SEGMENT DISPLAY

TYPE EE-72

AIM:

To study Seven Segment Display.

FEATURES:

- (a) Built-in fixed + 5V DC IC regulated power supply.
- (b) The circuit diagram is nicely engraved on the front panel.
- (c) Seven Segment LEDs is mounted on the panel.
- (d) There are multiple terminals and switch provided on the panel.

RS, J-K, D AND T FLIP - FLOP

TYPE EE-73

AIM:

- (1) To study RS Flip - Flop
- (2) To study J-K Flip - Flop
- (3) To study D Flip - Flop
- (4) To study T Flip - Flop

FEATURES:

- (1) Built-in fixed D.C, Voltage IC regulated power supply.
- (2) The ICs 7400, 7476 and 7404 are well mounted behind the panel.
- (3) The circuit diagram is well engraved on the panel.
- (4) Multicolored terminals are provided on the panel for connection.
- (5) There are logic level generator switches and logic level indicator (LEDs) provided on the panel.

R-S, D, T, J-K & MASTER-SLAVE FLIP FLOP

TYPE EE-73A

AIM :- To study and experimentally verify the truth-table of following:-

- (1) R-S Flip-Flop
- (2) D Flip-Flop
- (3) T Flip-Flop
- (4) J-K Flip-Flop
- (5) J-K Master Slave Flip-Flop

FEATURES :-

- (a) A in-built 5V DC IC regulated power supply.
- (b) Logic level generator & indicators are provided.
- (c) All flip-flops are realized using basic NAND gates.

(d) A mono pulse generator is provided.

4- BIT RIPPLE COUNTER

TYPE EE-74

AIM:

To construct 4- Bit Ripple Counter and study its operation.

FEATURES:

- (1) Built-in fixed + 5V D.C. IC Regulated Power Supply.
- (2) Circuit diagram is well engraved on the panel.
- (3) The ICs 7476 and 7400 are mounted behind the panel and the terminals are given on the panel.
- (4) On the panel there are logic level generators switches and logic level indicators.
- (5) A mono pulse switch is provided for clock pulse generator.

PROGRAMMABLE SHIFT REGISTER

TYPE EE-75

AIM:

To study the characteristics and operation of a Programmable Shift Register.

FEATURES:

- (1) A built-in fixed + 5V D.C. IC regulated power supply.
- (2) The ICs 7495 and 7400 are mounted behind the panel.
- (3) A monopulse switch is provided on the for clock pulse.
- (4) The logic level indicators and logic level generators are provided on the panel.

MULTIPLEXER AND DEMULTIPLEXER

TYPE EE-76

AIM:

- (1) To construct a two input Multiplexer and study its operation
- (2) To construct a two input Demultiplexer and study its operation

FEATURES:

- (1) A built-in + 5V D.C. IC regulated power supply.
- (2) The circuit diagram is well engraved on the front panel.
- (3) The ICS 7400 & 7408 are mounted behind the front panel.
- (4) The logic level indicators and logic level generators are provided on the panel.

UP-DOWN COUNTER

TYPE EE-77

AIM:

To study the characteristics and operation of a Programmable Up-Down Counter.

FEATURES:

- (1) A Built-in fixed + 5V D.C. IC regulated power supply.
- (2) The ICs 74193 and 7400 are mounted behind the panel.
- (3) A Mono-Pulse switch is provided on the panel to generate pulse.
- (4) There are multiple terminals, switches and LEDs for connection.

LEFT-RIGHT SHIFT REGISTER

TYPE EE-78

AIM:

- (a) To construct a Left-Right Shift Register and study its operation.
- (b) To study the arithmetic operation performed by a Shift Register.

FEATURES:

- (a) A built-in fixed + 5V D.C. IC regulated power supply.
- (b) The ICs 7495 and 7400 are mounted behind the panel.
- (c) A mono pulse switch for clock pulse is provided on the panel.
- (d) The logic level indicators and logic level generators are provided on the panel.
- (e) The circuit diagram is well engraved on the panel.

CLOCK OSCILLATOR

TYPE EE-79

AIM :

- (1) To construct a Clock Oscillator and study its operation.

FEATURES:

- (1) Built-in fixed + 5V D.C. IC regulated power supply.
- (2) The circuit is well engraved on the front panel.
- (3) The clock IC is mounted behind the panel.
- (4) Multicolored terminals are provided on the front panel.
- (5) The logic level indicators are provided on the panel.
- (6) The Oscillator can provide multiple frequencies.
- (7) Two separate band switches are provided to select the different combinations of R & C.

HALF AND FULL ADDER

TYPE EE-80

AIM:

- (1) To study and verify truth table of Half Adder.
- (2) To study and verify truth table of Full Adder.

FEATURES:-

- (a) Built + 5V D.C. IC regulated power supply.
- (b) The circuits are well engraved on the panel.
- (c) IC 7486, 7432, and 7408 are mounted behind the panel.
- (d) Set of Logic level generators and logic level indicators is provided on the panel.
- (e) There are multi-colored terminals switches and LEDs available for connections.

**STUDY OF OR/NOR GATE
STUDY OF AND/NAND GATE
STUDY OF NOT GATE**

**TYPE EE-82
TYPE EE-83
TYPE EE-84**

AIM:

To study and verify truth table of respective Gates.

FEATURES:

- (a) Built-in + 5V D.C. IC regulated power supply.
- (b) Symbols are well engraved on front panel.
- (c) Multi colored terminals are provided on the panel to make connections.
- (d) Set of Logic Level Generators (consisting of LEDs) and Logic Indicators (consisting of switches) are provided on the front panel.

ENCODER AND DECODER

TYPE EE-85

AIM:

- (a) To study a BCD to Decimal Encoder.
- (b) To study a Binary 1 of 8 or Binary to octal Decoder.

FEATURES:

- (a) Built-in + 5V D.C. IC regulated power supply.
- (b) The circuit is well engraved on the front panel.
- (c) IC 74147 and 74138 are mounted behind the panel with its pin suitably brought out at front panel Multi-colored terminals to make necessary connections.
- (d) A sets of Logic Level Indicators and Logic Level Generators.

ADDER AND SUBTRACTOR

TYPE EE-81

AIM:

- (a) To study an Adder.
- (b) To study a Subtractor.

FEATURES:

- (a) Built-in + 5V D.C. IC regulated power supply.
- (b) The circuits are well engraved on the front panel.
- (c) IC 7486, 7432, 7408 and 7404 are mounted behind the panel.
- (d) Set of logic level generators and logic level indicators is provided on the panel.
- (e) There are multicolored terminals, switches and LEDs available for connections.

VERIFICATION OF DEMORGAN'S THEOREMS

TYPE EE-86

AIM:

- (a) To verify Demorgan's First Theorem.
- (b) To verify Demorgan's Second Theorem.

FEATURES:

- (a) Built-in + 5V D.C. IC regulated power supply.
- (b) The IC 7404, 7408 & 7432 are mounted behind the panel.
- (c) Two sets of Logic Level Generators and Logic Level Indicators are provided each consists of two switches and one LED along with terminals.
- (b) Circuits are well engraved on the front panel.

VERIFICATION OF BOOLEAN'S EXPRESSIONS **TYPE EE-87**

AIM:

To verify various Boolean's expressions and laws.

FEATURES:

- (a) Built-in + 5V D.C. IC regulated power supply.
- (b) IC 7404, 7408 & 7432 are mounted behind the panel.
- (c) Availability of A,B,C and their complements as inputs selectable by switches.
- (d) Circuit diagram are well engraved on panel in the form of product of sum (POS) and sum of product (SOP) forms.
- (e) Set of Logic level indicators is provided.
- (f) Multi-colored terminals are provided on the front panel to make suitable connections.

DECADE COUNTER & DIVIDE BY N CIRCUITS

TYPE EE-88

AIM:

To practically study decade counter and divide by 2,3,4,5,6,7,8,9 & 10 circuits using decade counter IC 7490.

FEATURES:

A in-built 5V DC IC regulated power supply.

4-BIT MAGNITUDE COMPARATOR

TYPE EE-151

AIM:

To study 4-bit MAGNITUDE COMPARATOR.

FEATURES:

- (a) n-built 5V DC IC regulated power supply.
- (b) Four logic level generators for data input for a 4-bit number A and another four logic level generators for another 4-bit number B . Toggle switches are used as logic level generators.
- (c) Three logic level indicators are used for result of data comparison whether A is greater than B , A is lesser than B or A is equal to B. LED's are Used as logic level indicators.

4-BIT BINARY FULL ADDER

TYPE EE-152

AIM:

To study 4-bit binary full adder.

FEATURES:

- (a) A in-built 5V DC IC regulated power supply.
- (b) Four logic level generators for data input for a 4-bit number A and another four logic level generators for another 4-bit number B . Toggle switches are used as logic level generators.
- (c) Four logic level indicators are used for result of data addition. LED's are Used as logic level indicators.

READ ONLY MEMORY (ROM)

TYPE EE-153

AIM:

To study Read only Memory

FEATURES:

- (a) IC for Read Only Memory
- (b) 9 Logic Level Generators.
- (c) 8 Logic Level Indicators
- (d) Built in 5V/350mA Power Supply & Manual

RANDOM ACCESS MEMORY (16 WORDS OF 4-BITS)

TYPE EE-154

AIM:

To study Random access memory (16 words of 4-bits) .

FEATURES:

- (a) A in-built 5V DC IC regulated power supply.
- (b) Four logic level generators for data input for a 4-bit number and another four logic level generators for another 4-bit address . Toggle switches are used as logic level generators.
- (c) Four logic level indicators are used for result of data storage . LED's are used as logic level indicators and two toggle switches for memory enable and write enable.

BCD TO 7-SEGMENT DECODER

TYPE EE-155

AIM:

To study BCD to 7-Segment Decoder

FEATURES:

- IC for BCD to 7-Segment Decoder
- 7-Segment LED Display
- 4 Logic Level Generators

Built-in Power Supply

DECIMAL TO BINARY CONVERTOR

TYPE EE-99A

AIM:

To study and experimentally verify the truth-table of decimal to binary converter.

FEATURES:

- (a) A in-built 5V DC IC regulated power supply.
- (b) Nine logic level generators for decimal data input are provided. Toggle switches are used as logic level generators.
- (c) Four logic level indicators are used for binary data output. LED's are used as logic level indicators.

DECIMAL TO OCTAL CONVERTOR

TYPE EE-99B

AIM:

To study and experimentally verify the truth-table of decimal to octal converter.

FEATURES:

- (a) A in-built 5V DC IC regulated power supply.
- (b) Nine logic level generators for decimal data input are provided. Toggle switches are used as logic level generators.
- (c) Eight logic level indicators are used for hexadecimal data output. LED's are used as logic level indicators.

DECIMAL TO HEXADECIMAL CONVERTOR

TYPE EE-99C

AIM:

To study and experimentally verify the truth-table of decimal to hexadecimal converter.

FEATURES:

- (a) A in-built 5V DC IC regulated power supply.
- (b) Nine logic level generators for decimal data input are provided. Toggle switches are used as logic level generators.
- (c) Sixteen logic level indicators are used for hexadecimal data output. LED's are used as logic level indicators.

DEBOUNCING CIRCUIT

TYPE EE-99D

AIM:

To study debouncing circuit.

FEATURES:

- (a) A in-built 5V DC IC regulated power supply.
- (b) One mono pulse generator for pulse generator.
- (c) One logic level indicator is used to show pulse generation. LED is used as logic level indicator.

16 LINE TO 1-LINE MULTIPLEXER

TYPE EE-156

AIM:

To study and experimentally verify the truth-table of 16 to 1 Multiplexer.

FEATURES:

- (a) A in-built 5V DC IC regulated power supply.
- (b) Sixteen logic level generators for data input and four logic level generators for control lines are provided. Toggle switches are used as logic level generators.
- (c) One logic level indicator is used for data output line. LED is used as logic level indicator.
- (d) A toggle switch for data strobe

FET AS A SWITCH

TYPE EE-160

AIM:

To study FET as a series and shunt switch.

FEATURES:

- (a) A in-built 5V DC IC regulated power supply.
- (b) A logic level generator (a toggle switch) is provided.
- (c) A logic level indicator (a LED) is provided.

SECTION – H : AC BRIDGE

ANDERSON'S BRIDGE

TYPE EE-53

AIM:

To measure inductance of a given coil by Anderson Bridge Method.

FEATURES:

- (a) The Anderson Bridge circuit is engraved on the panel.
- (b) There are separate terminals for connecting head phone & Oscillator.
- (c) All the components are mounted behind the panel.
- (d) Head Phone is supplied with each board.

SCHERING'S BRIDGE

TYPE EE-93

AIM:

(i) To study the Schering Bridge and measurement of unknown Capacitance with the help of it.

FEATURES:

- (a) The Schering Bridge circuit is engraved on the panel.
- (b) There are separate terminals for connecting head phone & Oscillator.
- (c) All the components are mounted behind the panel.
- (d) Various Standard Capacitors to measure their values.
- (e) Headphone is supplied with each module.

HAY'S BRIDGE

TYPE EE-121

AIM:

To measure inductance of a given coil by Hay's bridge method.

FEATURES:

- (a) A head phone is supplied with each board.
- (b) One POT and two band switches are provided to attain null points.
- (c) Three inductors are provided.

KELVIN'S BRIDGE

TYPE EE-122

AIM:

To measure low value resistance (range up to 1 ohm).

FEATURES:

- (a) A built-in IC regulated 5V D.C. supply.
- (b) A moving coil galvanometer is provided on the panel.
- (c) A band switch and a POT to vary resistances to attain null points.

DE-SAUTY'S BRIDGE

TYPE EE-123

AIM:

To determine unknown capacitance of a given capacitor by De-Sauty's Bridge method.

FEATURES:

- a) There are separate terminals for connecting headphone & audio oscillator.
- b) A headphone is supplied with each board..
- c) Two POTs and two band switches are provided to attain null points.

MAXWELL'S BRIDGE**TYPE EE-124****AIM:**

To determine unknown inductance of a given coil by Maxwell's bridge method.

FEATURES:

- a) A headphone is supplied with each board..
- b) Two POTs and two band switches are provided to attain null points.
- c) Three different values inductors are provided.

WHEATSTONE'S BRIDGE**TYPE EE-125****AIM:**

To determine unknown resistance by Wheat stone's Bridge method.

FEATURES:

- (a) A built-in IC regulated 5V D.C. supply.
- (b) A moving coil galvanometer is provided on the panel.
- (c) One POT and one band switch are provided to attain null points.

OVEN'S BRIDGE**TYPE EE-126****AIM:**

To measure inductance of a given coil by Oven's Bridge method.

FEATURES:

- (a) A headphone is supplied with each board.
- (b) One POT and two band switches are provided to attain null points.
- (c) Three inductors are provided.

WEIN'S BRIDGE**TYPE EE-127****AIM:**

To verify unknown frequency from an audio frequency generator using Wein's Bridge.

FEATURES:

- (a) A headphone is supplied with each board.
- (b) One POT and two band switches are provided to attain null points.

SECTION – I : NETWORKANALYSIS**THEVNIN'S THEOREM****TYPE EE-131****AIM:**

To verify Thevenin's Theorem.

FEATURES:

- (a) A built-in IC regulated 10V D.C. variable supply.
- (b) A moving coil voltmeter of 10V range is provided on the panel.

SUPERPOSITION THEOREM**TYPE EE-132****AIM:**

To verify Thevenin's Theorem.

FEATURES:

- (a) A built-in IC regulated 10V D.C. variable supply.
- (b) A moving coil voltmeter of 10V range is provided on the panel.

NORTON'S THEOREM**TYPE EE-133**

AIM:

To verify Norton's Theorem.

FEATURES:

- (a) A built-in IC regulated 10V D.C. variable supply
- (b) A moving coil voltmeter of 10V range and a moving coil ammeter of 10mA range are provided on the panel.

RECIPROCITY THEOREM**TYPE EE-134****AIM:**

To verify Reciprocity Theorem.

FEATURES:

- (a) Three numbers built-in IC regulated 5V, 9V and 12V power supplies selectable by a band switch.
- (b) A moving coil ammeter of 10mA range is provided on the panel.

MAXIMUM POWER TRANSFER THEOREM**TYPE EE-135****AIM:**

To verify Maximum Power Transfer Theorem.

FEATURES:

- (a) Three numbers built-in IC regulated 5V, 9V and 12V power supplies selectable by a band switch.
- A moving coil ammeter of 5mA range is provided on the panel.

NETWORK THEOREMS**TYPE EE-136****AIM:**

To verify following five theorems.

- (a) Thevenin's theorem
- (b) Superposition theorem
- (c) Norton's theorem
- (d) Reciprocity theorem
- (e) Maximum power transfer theorem.

FEATURES:

- (a) Two numbers built-in IC regulated 10V D.C. variable power supply.
- (b) A moving coil voltmeter of 10V range and a moving coil ammeter of 10mA range are provided on the panel.

MILLMANN'S THEOREM**TYPE EE-137****AIM:**

To verify Millmann's theorem of electrical network.

FEATURES:

- (a) Three numbers built-in IC regulated 5V D.C. variable power supply.
- (b) A moving coil ammeter of 5mA range is provided on the panel.

KIRCHHOFF'S LAWS**TYPE EE-138****AIM:**

To verify Kirchhoff's current law & Kirchhoff's Voltage law.

FEATURES:

- (a) One number built-in IC regulated 9V D.C. variable power supply.
- (b) A moving coil ammeter of 10mA range is provided on the panel.

OHM'S LAW**TYPE EE-139****AIM:**

To study and verify Ohm's Law

FEATURES:

- (a) Built-in Power Supply
- (b) Three independent Resistors

TWO PORTS NETWORK**TYPE EE-140****AIM:**

To study two port network.

FEATURES:

- (a) One number built-in IC regulated 10V D.C. variable power supply.
- (b) A group of resistances, capacitors & common points are provided on the panel.

LEAD LAG NETWORKS

TYPE EE-141

AIM:

To study Lead Lag Characteristics of networks.

FEATURES:

- (a) Built-in Power Supply
- (b) L.C.R. Circuit

ACCESSORIES:

1Khz Sine Wave Generator

SECTION - J : COMMUNICATION

STUDY OF AMPLITUDE MODULATION & DEMODULATION.

TYPE EE-57

AIM:

To study Amplitude Modulation & Demodulation.

FEATURES:

- (a) A built-in fixed IC Regulated D.C. Power Supply.
- (b) A built-in fixed Carrier Signal Generator.
- (c) The circuit diagram is well engraved on the panel.
- (d) All the components are mounted behind the panel.
- (e) Terminals are provided to connect CRO and A.F. Signal Generator.

STUDY OF FREQUENCY MODULATION AND DEMODULATION

TYPE EE-104

AIM:

To study frequency modulation & demodulation .

FEATURES:

- (a) Three built-in IC regulated 5V D.C., -5V D.C. & 15V D.C. power supplies are provided.
- (b) A built-in high frequency carrier is provided.

STUDY OF ACTIVE FILTERS

TYPE EE-49

AIM:

- (a) To study the High Pass, Low Pass, Band Pass and Notch Active Filters.
- (b) To plot the frequency response curve of different types of Active Filters.
- (c) To find the cut-off frequency from the graph.
- (d) To find the cut-off slope from the graph.

FEATURES:

- (a) Built-in IC regulated power supply.
- (b) Circuit diagram is well engraved on the front panel.
- (c) Multicolored terminals are provided for easy connections.

STUDY OF PASSIVE FILTERS

TYPE EE-50

AIM:

- (a) To study the High Pass, Low Pass, Band Pass Passive Filters.
- (b) To plot their frequency response curve.

FEATURES:

- (a) The inductors, capacitors & resistors are mounted behind the panel.
- (b) Multicolored terminals are provided on the panel to measure various parameters.
- (c) Terminals are provided to connect Oscilloscope & Oscillators.

PULSE AMPLITUDE MODULATION AND DEMODULATION

TYPE EE-301

AIM:

To study pulse amplitude modulation & demodulation and to observe single & dual polarity pulse amplitude modulation.

FEATURES:

- (a) An built-in IC regulated 12V D.C. Power supply is provided.

- (b) An built-in radio frequency (R.F.) carrier signal is provided.
- (c) The top of the module is of anodized aluminum panel with circuit diagram and symbol printed nicely on the panel.
- (d) Terminals are provided as test points..
- (e) A well illustrated manual is provided with the module.
- (f) All the components are mounted behind the panel with their leads well specified on the panel.
- (g) The module is of slant shape, which enables one to perform the experiment with ease.

PULSE WIDTH AND PULSE POSITION MODULATION AND DEMODULATION

TYPE EE-302

AIM:

To study pulse width & position modulation & demodulation .

FEATURES:

- (a) Two built-in IC regulated 5V D.C. & 9V D.C. power supply are provided.
- (b) Two preamplifiers for modulated & demodulated signals.
- (c) The top of the module is of anodized aluminum panel with circuit diagram and symbol printed nicely on the panel.
- (d) Terminals are provided as test points..
- (e) A well illustrated manual is provided with the module.
- (f) All the components are mounted behind the panel with their leads well specified on the panel.
- (g) The module is of slant shape, which enables one to perform the experiment with ease.

PLL FREQUENCY MULTIPLIER AND SYNTHESIZER

TYPE EE-102

AIM:

To construct PLL multiplier & synthesizer. The clock is onboard using IC 555. The PLL locks the input signal with the VCO and the locked frequency is multiplied by X1 to X9 .

FEATURES:

- (a) An built-in IC regulated 5V D.C. Power supply is provided .
- (b) An built-in clock signal is provided.

SECTION-K : OPERATIONAL AMPLIFIER

OPAMP SUMMING, SUBTRACTING, INTEGRATING AND DIFFERENTIATING AMPLIFIER

TYPE EE-362

AIM:

To use OPAMP as a Summing, Integrating and Differentiating Amplifier

FEATURES:

- (a) Built in IC Regulated Power Supply.
- (b) OPAMP IC 741 is mounted behind the panel with its lids well specified on the panel.
- (c) Circuit Diagram is printed on the panel.

OPAMP AS V TO I AND I TO V

TYPE EE-363

AIM:

To use OPAMP as a V to I and I to V

FEATURE:

- (a) Built in IC Regulated Power Supply.
- (b) OPAMP IC 3140 is mounted behind the panel with its lids well specified on the panel.
- (c) Circuit Diagram is printed on the panel.

OPAMP BASED PRECISION RECTIFIER

TYPE EE-364

AIM:

Use OP Amp as a Precision Rectifier

FEATURES:

- (a) Built in IC Regulated Power Supply.
- (b) OPAMP IC 741 is mounted behind the panel with its lids well specified on the panel.
- (c) Circuit Diagram is printed on the panel.

OPAMP BASED NOTCH FILTER(BAND REJECTION)**TYPE EE-367****AIM :**

To construct and study frequency response of a OPAMP based notch filter (band rejection)

FEATURES :

Two built-in IC regulated +15V D.C. and -15V D.C. Power supplies are provided.

OPAMP AS A VOLTAGE FOLLOWER**TYPE EE-368****AIM:**

Use OP Amp as a Voltage Follower

FEATURES:

- (a) Built in IC Regulated Power Supply.
- (b) OPAMP IC 741 is mounted behind the panel with its lids well specified on the panel.
- (c) Circuit Diagram is printed on the panel.

OPAMP AS A V TO F CONVERTER**TYPE EE-369****AIM:**

Use OP Amp as Voltage to Frequency Converter

FEATURES:

- (a) Built in IC Regulated Power Supply.
- (b) OPAMP IC 741 is mounted behind the panel with its lids well specified on the panel.
- (c) Circuit Diagram is printed on the panel.

OPAMP AS F TO V CONVERTER**TYPE EE-370****AIM:**

Use OP Amp as Frequency to Voltage Converter

FEATURES:

- (a) Built in IC Regulated Power Supply.
- (b) OPAMP IC 741 is mounted behind the panel with its lids well specified on the panel.
- (c) Circuit Diagram is printed on the panel.

OPAMP AS ACTIVE BAND PASS FILTER**TYPE EE-371****AIM:**

To study use of OP Amp as Active Band Pass Filter

FEATURES:

- (a) Built in IC Regulated Power Supply.
- (b) OPAMP IC 741 is mounted behind the panel with its lids well specified on the panel.
- (c) Circuit Diagram is printed on the panel.

LOG AND ANTILOG AMPLIFIER USING OPAMP**TYPE EE-101****AIM:**

- (a) To observe voltage and current gain of a Log & Antilog amplifier.
- (b) To plot frequency response curve.
- (c) To measure input & output impedance of a Log & Antilog amplifier.

FEATURES:

- (a) Two built-in IC regulated +15V D.C. and -15V D.C. Power supplies are provided.
- (b) A POT is provided for input voltage variation.

OP-AMP AS VOLTAGE COMPARATOR**TYPE EE-96****AIM:**

To study Op-Amp as Voltage Comparator.

FEATURES:

- (a) Built in A.C. Power Supply.
- (b) Two Moving Coil Voltmeter having range 0-15V, are provided to observe input and output voltages.
- (c) Two Zener Diode are provided to have different range of reference voltages.
- (d) Multicolored terminals are provided on the panel to measure voltage at different statge.
- (e) 0-12 V continuously variable D.C. Supply to obtain variable input voltage.

OPAMP AS INVERTING AND NON INVERTING AMPLIFIER**TYPE EE-62A****AIM:**

- (a) To observe voltage and current gain of a inverting & non-inverting amplifier.
- (b) To plot frequency response curve.

FEATURES:

- (a) Two built-in IC regulated +15V D.C. and -15V D.C. Power supplies are provided.
- (b) A POT is provided for 0-1 Volt D.C. input voltage variation and another POT for D.C. offset null adjustment.
- (c) A moving coil voltmeter is provided for D.C. voltage measurements.
- (d) Three band switches are provided to select different resistance values.

MULTIVIBRATORS USING OPAMP**TYPE EE-372****AIM:**

To construct and study astable, bistable and monostable multivibrator.

FEATURES:

Two built-in IC regulated +15V D.C. and -15V D.C. Power supplies are provided.

SECTION - L : INSTRUMENT**e/m BY THOMPSON METHOD (BAR MAGNET)****TYPE EM-21**

The apparatus consists of the following :-

1. POWDER SUPPLY :- For the C.R. Tube having three controls :-
 - (a) Intensity
 - (b) Focus
 - (c) Vertical Deflection.

It is also provided with a meter for measuring voltage between the deflecting plates of the C.R. Tube. Other voltages can be measured from the socket provided on the front panel. All the control are linear and the controls at the high voltages are isolated from the chassis. The Power supply is regulated and works on the Mains Supply. It is also provided with a switch to reverse the direction of the deflection.

2. CATHODE RAY TUBE :- Screen dia. 7.5 cms.
3. WOODEN STANDS :- For the C.R. Tube, magnet and magnet needle. The magnet stage has a meter scale attached on it for measuring the distance of the magnets from the plates of the C.R. Tube.
4. ACCESSORIES :-
 - (a) Engraved or printed graph (on Perspex plastic) transparent for the measurement of shift in the position of spot on CRT face. It is calibrated in cms. and has subdivisions of 2mm. on the centre line.
 - (b) Schematic diagram of the CRT with data.
 - (c) Instructions manual showing operation of the instrument and the details about the experiment.
 - (d) A pair of bar magnets.

DEFLECTION SENSITIVITY OF CRO**TYPE EM-21A****AIM:**

To study deflection sensitivity of C. R. O.

FEATURES:

The apparatus consists of the following :-

- (1) **POWER SUPPLY** :- For the C.R. tube having three controls :
 - (a) Intensity
 - (b) Focus
 - (c) Vertical deflection.

It is also provided with a meter for measuring voltage between the deflecting plates of the C.R. tube. Other voltages can be measured from the socket provided on the front panel. All the controls are linear and the controls at the high voltages are isolated from the chassis. The power supply is regulated and works on the main supply. It is also provided with a switch to reverse the direction of the deflection.

- (2) **CATHODE RAY TUBE** :- Screen diameter 7.5 cms.
- (3) **WOODEN STAND** :- The cathode ray tube is fitted in a wooden stand securely.
- (4) **ACCESSORIES** :-
 - (a) Engraved or printed graph (on Perspex plastic) transparent for the measurement of Shift in the position of spot on the C.R.T. face. It is calibrated in cms. and has subdivisions of 2 mm. on the center line.
 - (b) Instructions manual showing operation of the instrument and details about the experiment.

REGULATED POWER SUPPLY (0-30V, 1 AMP)**TYPE PS-12**

- Voltage can be obtained continuously variable from 0V to 30 volts selectable by a band switch in range of 0-10V, 10-20V and 20V 30V and can be adjusted in between with the help of pot.
- Built-in Over load protection.
- Built-in Short circuit protection.
- Provided with 1 moving coil D.C. Voltmeter having range 0-30V and 1 moving coil D.C. Ammeter of range 0-1A.

REGULATED POWER SUPPLY (5V, 1 AMP)**TYPE PS-05**

- Fixed regulated 5V, 1 AMP Output
- Built in over-load protection
- Built in short-circuit protection.
- IC 7805 in To-3 package is used.

IC REGULATED POWER SUPPLY (15-0-15V, 1 AMP) TYPE PS-15

- Fixed output of +15V and -15V capable of delivering 1 AMP current.
- Built in over load protection.
- Built in short circuit protection.

DECADE RESISTANCE BOX TYPE RB

- Accuracy 1%
- Power Rating 1 watt each.
- Working Voltage 500 volts maximum.

Resistance Boxes are available as under :-

1. Dial Type : RB-01
2. Dial Type : RB-02
3. Dial Type : RB-03
4. Dial Type : RB-04
5. Dial Type : RB-06

Resistances are available in steps of 1 OHM, 10 OHMs, 100 OHMs, 1 K, 10 K, 100 K, 1 M AND 10 M.

DECADE CAPACITANCE BOX TYPE CB

- Accuracy 1%
- Maximum Working D.C. Voltage 400 Volts.
- Capacitance use are of polystyrene Type.

Available in following models.

1. Dial Type : CB-01
2. Dial Type : CB-02
3. Dial Type : CB-03
4. Dial Type : CB-04

Capacitor are available in steps of 10pF, 1nF, 10nF, 100nF and 1 MF.

THE MAIN FEATURES OF E & E TRAINING MODULES ARE AS UNDER:-

Most of the training modules are self contained and requires no extra accessories to perform the experiment.

Modules are with built-in required power supplies/meters/oscillators etc. wherever required.

The modules are given slant shape which enables one to perform the experiment with ease.

The panel of the module is made in white color with circuits and symbols well printed on the panel.

The multicolored terminals are provided at different points on the circuit diagram to make necessary connections/ observe the readings.

ACCESSORIES SUPPLIED WITH EACH E & E TRAINING MODULES ARE :-

Sufficient nos. of patch chords, required in the experiment.

A well described and illustrated instruction manual to guide the students in the experiment.

Dust proof cover.

Note: Training Modules can also be designed/ manufactured as per the customer's specification.