NAAC A++ ACCREDITED CGPA 3.52/4.0

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PDEU PANDIT DEENDAYAL ENERGY UNIVERSITY

Formerly Pandit Deendayal Petroleum University (PDPU)

CENTRE OF EXCELLENCE STATUS BY GOVT. OF GUJARAT

SCHOOL OF ENERGY TECHNOLOGY

Department of Physics

Name of Laboratory : M.Sc.

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NAME OF EQUIPMENT :
Solar PV Training System

TECHNICAL SPECIFICATIONS :

- **Make :** Ecosense.
- **PV modules :** two 40Wp Solar panels
- **Artificial Sun with Irradiance Control :** Two lamps illuminating solar pannels with dimmer for intensity variation
- **Measurement Panel :** Panel Temperature Indicator, DC Voltmeters, DC Ammeters, AC Voltmeters, AC Ammeters
- **Potentiometer :** For tracing V-I Characteristics
- **Loads :** DC Load, AC Load

NAME OF EQUIPMENT :
Gouy's Experiment

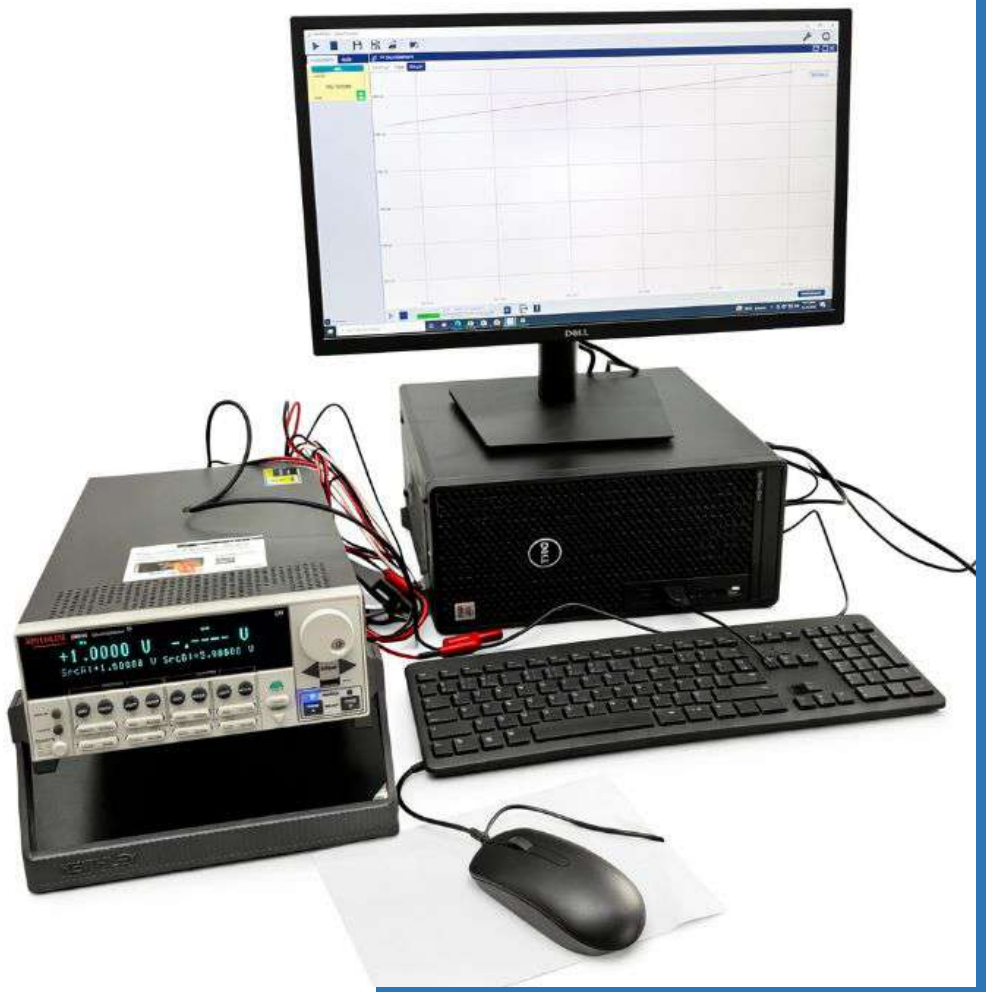
TECHNICAL SPECIFICATIONS :

- **Make :** SES Instruments.
- **Model :** GMX-02
- **Constant current power supply :** DPS-175M
- **Digital Gauss meter :**DGM-202
- **Electromagnet :** Model EMU-75T
- Multipurpose Stand(iv) GMX-02 Trolley
- Al. Samples and Glass Tube for powder samples
- Digital Balance, CA-44

NAME OF EQUIPMENT :
Probe Station with Keithley 2604B (Source meter)

TECHNICAL SPECIFICATIONS :

- **Type:** Electrical Characterization Setup
- Keithley 2604B
- **Measurement Mode:** Current–Voltage (I–V) characterization
- **Probe Type:** Two metallic micro probes
- **Voltage Range:** ±10 V to ±100 V (depending on SMU)
- **Current Measurement Range:** pA to mA
- Integrated Source Measure Unit (SMU)
- Probe station with micrometer precision positioning
- Compatible with semiconductor and memristor devices



NAME OF EQUIPMENT :
Solar Thermal Training System

TECHNICAL SPECIFICATIONS :

- **Make :** Ecosense.
- **Collector Type :** Flat Plate Solar Collector
- **Collector Dimensions :** 915 mm × 810 mm
- **Absorber Material :** Copper
- **Glazing Type :** Toughened Glass
- **Hot Water Tank :** Non-pressurized storage tank
- **Temperature Measurement :** Multiple temperature sensors with digital meter
- **Flow Measurement :** Flow meter with sensor and flow regulator
- **Measurement Panel :** Centralized real-time display unit
- **Operating Modes :** Thermosyphon and forced circulation

NAME OF EQUIPMENT :
High Temperature Two probe setup

TECHNICAL SPECIFICATIONS :

- **Make :** SES Instruments.
- **Model :** TPX600C
- Two Probe Arrangement with built-in thermocouple sensor
- **Oven Unit (upto 600C) :**TPO-TPX-600
- **High Performance PID Controller :** PID-TZN
- **High Voltage Power Supply :** EHT-11P-C1
- **Digital Picoammeter :** DPM-111-C2
- **Computer Aided Measurement Module :** SES CAMM-2

NAME OF EQUIPMENT :
UV-VIS Spectrophotometer

TECHNICAL SPECIFICATIONS :

- **Make:** Shimadzu UV-1900i
- **Wavelength Range :** 190 to 1100 nm
- **Light source :** 20-W halogen lamp and deuterium lamp Built-in light source auto position adjustment
- **Detector :** Silicon photodiode
- **Sample compartment :** Internal dimensions: W110 × D250 × H115 mm Distance between light beams: 100 mm
- **PC compatibility :** LabSolutions UV-Vis software (standard)
- **Display :** 24-bit color touch screen

NAME OF EQUIPMENT :
Magnetoresistance Experiment System

TECHNICAL SPECIFICATIONS :

- **Make :** SES Instruments.
- **Model :** MRX-01
- **Constant Current Power Supply :** DPS-50
- **Digital Gaussmeter :** DGM-202
- **Electromagnet :** EMU-50V
- **Magnetoresistance Setup :** DMR-02
- Hall Probe Multipurpose Stand
- **Sample :** Ge crystal (n-type)
- **Four Probe Arrangement** : FPA-MRX-02

NAME OF EQUIPMENT :
Di-electric Constant

TECHNICAL SPECIFICATIONS :

- **Make :** Indosaw.
- **Model :** SK042
- **HV Power Supply :** Input Voltage 220V, ± 5%, 50Hz AC, Output 0-600V DC
- **Dielectric Constant Kit**
- Electrometer Amplifier :
- Input Impedance : >1013 Ω,
- Input current : < 0.5pA,
- Output Voltage : up to +10V,
- Output Current : 5mA (SC), Output impedance :< 1 Ω,
- **Supply voltage :** 12V AC

NAME OF EQUIPMENT :
Four Probe Experiment

TECHNICAL SPECIFICATIONS :

- **Make :** Indosaw.
- **Power supply :** (0-200.0mV DC) & X10 (0-2.00 V DC), Current Range 0-20mA DC
- **Oven Supply:** 60V AC, Heating resistance 35 ohm, Temp. range ambient to 200ºC, Fuse 2A
- **Temp. sensor:** PT-100, range -10 to 250º C
- **Four Probe :** Spring loaded, spacing 2.5mm, connection via 4mm
- **Sample :** p-type Ge Wafer, Size : 12 x14 x 0.5mm
  Resistivity 1~10 ohm-cm

NAME OF EQUIPMENT :
B-H Curve

TECHNICAL SPECIFICATIONS :

- **Make :** Indosaw.
- **Power Supply :** Variable Input Frequency (5-500Hz) and voltage (0 to 10VAC), 3 types of graph plotting in XY mode of CRO.
- **Coils :** Coil 300 turns, Wire Cu. 18SWG
- **Sample :** Ferromagnetic core, U-Core 150 x 130mm (LxH), 40 x 40mm, I-Core 150mm(L), 40x40mm

NAME OF EQUIPMENT :
High Resistance by Leakage Method

TECHNICAL SPECIFICATIONS :

- **Make :** Omega
- **DC Power Supply :** 0-5V at 500mA continuously variable
- Digital D.C. Microvoltmeter
- Digital stop clock

NAME OF EQUIPMENT :
Study of Characteristic of Ultrasound

TECHNICAL SPECIFICATIONS :

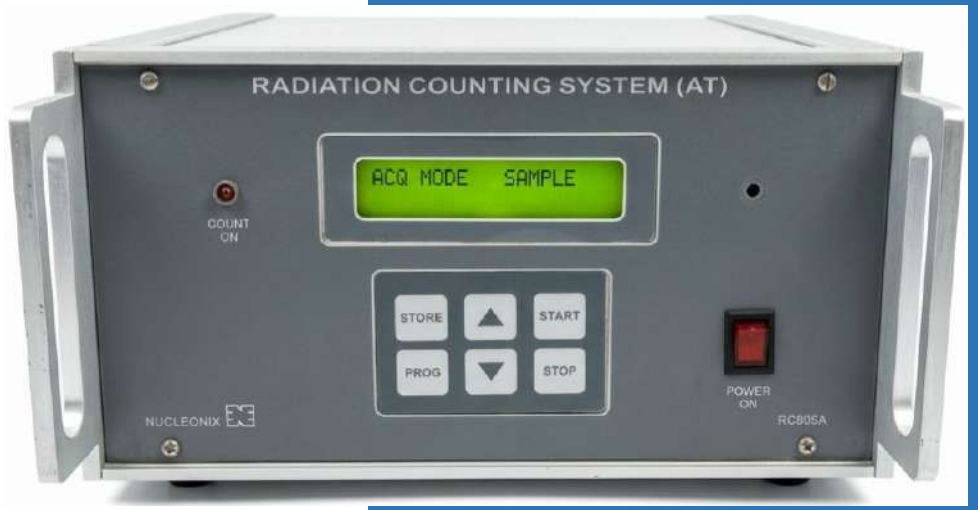
- **Make :** NVIS
- **Ultrasonic Interferometer Quartz Crystal Diameter** :
  20 /14 mm Thickness : 1.4 mm Frequency : 2 MHz
- **Liquid Cell 3 Optimum**
  Quantity of Liquid : 12 cm Max.
  Displacement : 25 mm of the Reflector
  Least Count of Micrometer : 0.01 mm
- **Mains Supply :** 230V ±10%, 50Hz

NAME OF EQUIPMENT :
Gamma Ray Spectrometer (Microcontroller Based)

TECHNICAL SPECIFICATIONS :

- **Make :** Nucleonix
- **Model :** GR611
- **Input voltage :** 230V AC, 50 Hz
- **HIGH VOLTAGE UNIT TYPE: HV 502 :**
- Output voltage variable continuously from 0 to 2000 volts
- Output current (maximum) 1mA.
- **SINGLE CHANNEL ANALYSER TYPE: SC 530 :**
- Input : Unipolar or Bipolar with a +ve leading edge 0 to 10V
- **COUNTER TIMER TYPE: CT 541A :**
- Input :100 mV to 10V, unipolar or positive bipolar semi Gaussian / Gaussian pulse
- Display :16x2 LCD dot-matrix display
- Preset time :0-9999 seconds
- **SCINTILLATION DETECTOR (S) :**
- Scintillation detector with flat type NaI crystal of 1"X1" / 2" X 2" /3" X 3“.
- **FIVE Gamma sources :** Co-57 , Ba-133, Na-22, Cs-137, Co-60

NAME OF EQUIPMENT :
Radiation counting system for Alpha Sample counting



TECHNICAL SPECIFICATIONS :

- **Make :** Nucleonix
- **Model :** RC805A
- **P.M. Input (From alpha, beta, gamma scintillation detector probe) :**
- (a) Polarity : Negative
- (b) Amplitude : -100 mV (min)
- **G.M. Input (From G.M.Counter) :**
- (a) Polarity : Negative
- (b) Amplitude : -500 mV (min)
- (c) Built-in load resistor : 4.7 or 3.3M Ohms
- **HV Output :** HV (0-1500V) @1mA,
- **Display :** 20 x 2 LCD dotmatrix
- **Counts Capacity :** 999999 counts
- **Command Buttons:** START, STOP, PROG, STORE, INC & DEC command buttons
- **Power :** 230V, AC, 50Hz through power / adapter which delivers +12V input to unit.

NAME OF EQUIPMENT :
Geiger Counting System

TECHNICAL SPECIFICATIONS :

- **Make :** Nucleonix
- **Model :** GC602A
- **G.M. Input (From G.M.Counter) :**
- (a) Polarity : Negative
- (b) Amplitude : 250 mV (min)
- **EHT Output :** Variable EHT using ten turn pot upto a maximum of 1500 volts at 1mA.
- **Display :** 20x2 LCD dot-matrix
- **Counts Capacity:** 999999 counts
- **Preset time :** (0-9999) sec.
- **Data Storage:** Upto 1000 readings
- **Command Buttons:** START, STOP, PROG, STORE, INC & DEC command buttons
- **Power:** Unit is powered through a 12v Adaptor at Dc Power socket.

NAME OF EQUIPMENT :
NaI Scintillation Detector

TECHNICAL SPECIFICATIONS :

- **Make :** Nucleonix
- **Size :** 2 “X2” WELL TYPE
- 2”x2” NaI Integral assembly
- **Phospher :** NaI (Tl), 2×2 inches crystal
- **Photomultiplier :** 2” Bialkali phototube with mu metal magnetic/light shielding.
- **Operating Voltage :** 700 – 900V
- **Resolution :** Better than 9% with Cs-137
- **Pre-amplifier :** Built-in
- **Gain (Approx) :** 25
- **Noise :** (rms referred to input) Less than 50 micro volts
- **Output :** Positive tail pulse
- **Output Impedance :** 90 Ohms
- **Power Requirement :** -12V @12mA

NAME OF EQUIPMENT :
Alpha Probe

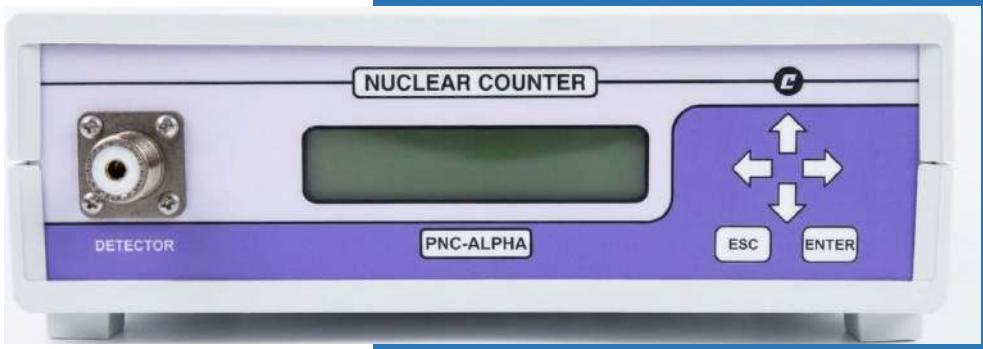
TECHNICAL SPECIFICATIONS :

- **Make :** Nucleonix
- **Detector material :** Zns (Ag) Screen covered with Aluminized mylar foil
- **Density :** 10mg/cm2 (1.5 micros thick)
- **Efficiency :** Greater than or equal to 25% for Am-241 alpha
- **Background counts :** ess than or equal to 5 counts in 1hour
- **Photomultiplier tube :** PMT of ETL / Hamamatsu make or its equivalent
- **Operating Voltage Range :** 800 to 900V
- **Size :** 50.8 dia (2″)
- **Drawer Assembly :** Holds both 25mm dia SS planchets or 50mm dia filter paper
- **Probe housing material for PMT(Shell) :** Cylindrical shell of SS material.
- **Probe drawer assembly material :** Aluminium with black polyeuiethyne paint / Anodyzing.

NAME OF EQUIPMENT :
Para Nuclear Counter

TECHNICAL SPECIFICATIONS :

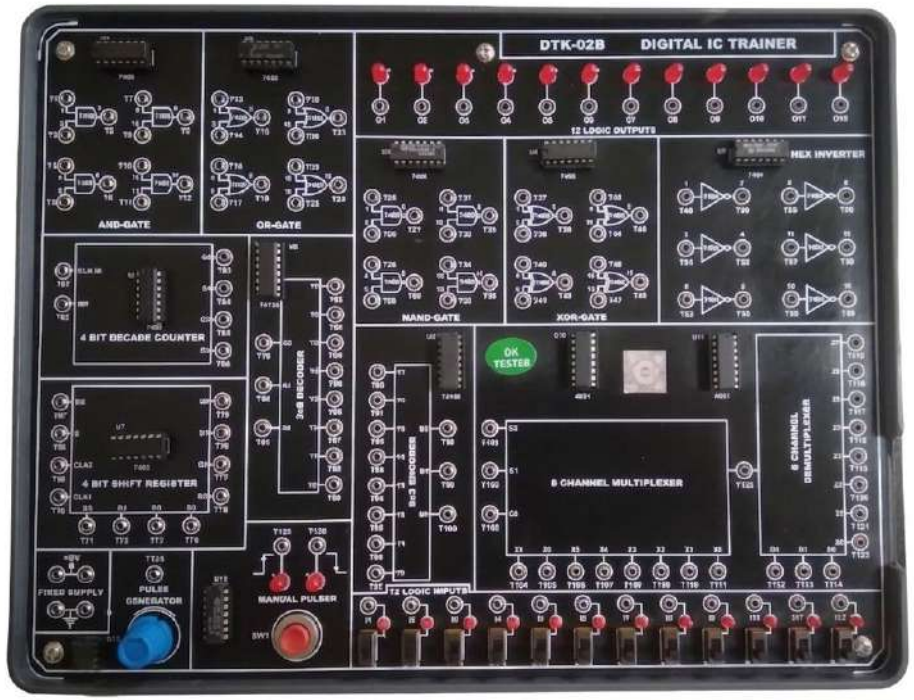
- Model PNC-Alpha
- micro-controller based, economical, stand alone instruments for Alpha counting applications
- **Operating Voltage :** 12V battery
- ZnS(Ag) alpha scintillator
- 1000 readings
- LCD display



NAME OF EQUIPMENT :
Digital IC Trainer

TECHNICAL SPECIFICATIONS :

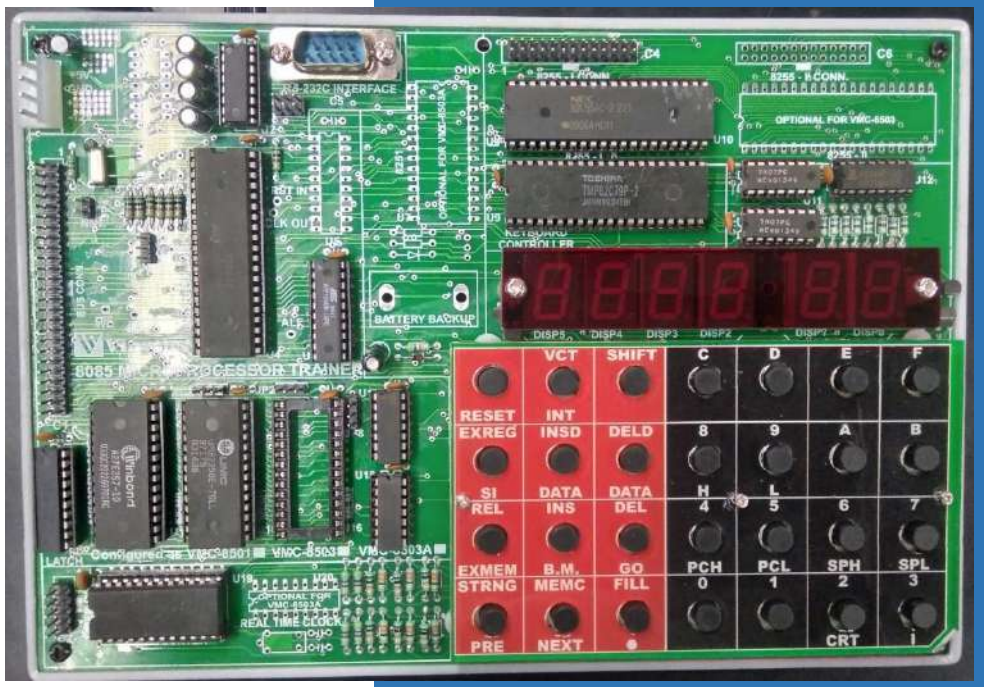
- **Make :** KITEK
- **Model :** DTK02B
- **Power Supplies :**
- Fixed DC Power Supply: +5V, ±12V with LED Indication
- **Pulse Generator :**
- Variable Clock generation of 1Hz-1KHz
- 1 No of Logic Pulsar provides single pole double throw bounce less pulses of Low to High
- **On-Board Circuits :**
- On Board 4 No’s of AND gate, OR gate, NAND gate, NOR gate, XOR ga Hex Inverter.
- On Board 4 Bit decade Counter using IC 7490
- On Board 4 bit Shift Register using IC 7495
- On Board 8x3 Encoder using IC 74148 & 3x8 Decoder using IC 74138
- On board 8 channel Multiplexer & Demultiplexer.
- **Indicators :**
- 12 TTL/CMOS Logic Level Inputs with LED indication for logic low and logic high



NAME OF EQUIPMENT :
Microprocessor 8085 Training Kit

TECHNICAL SPECIFICATIONS :

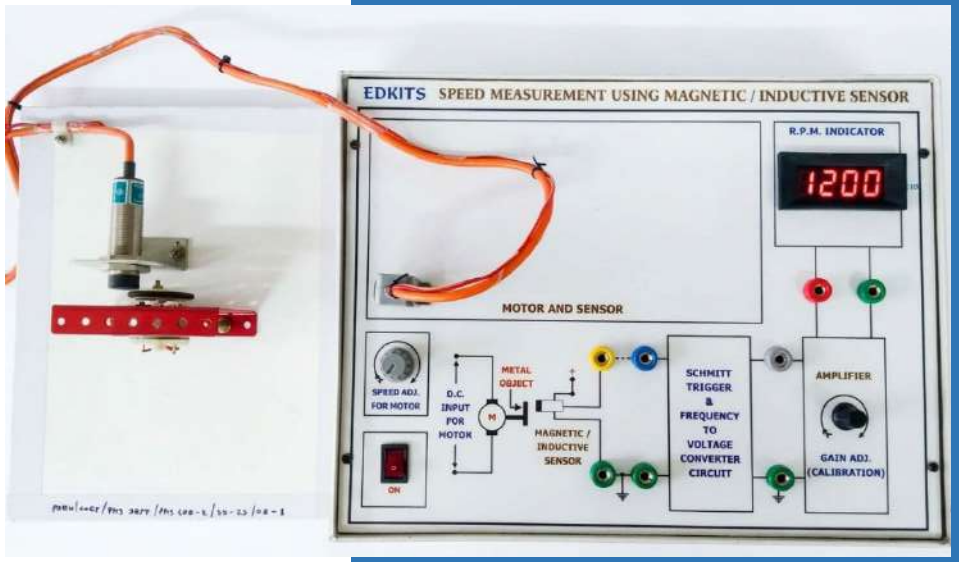
- **Make :** ATMOS
- Model : VMC-850X
- **CPU:** 8085 CPU operating 8 bit Microprocessor.
- Memory : 64K bytes
- Power Supply : +5V, 1.5 amp for the kit, +12V, 250 mA for PC interface
- Interface : RS-232
- Bus : All Data, address and control signals



NAME OF EQUIPMENT :
Speed Measurement using Magnetic/ Inductive Sensor

TECHNICAL SPECIFICATIONS :

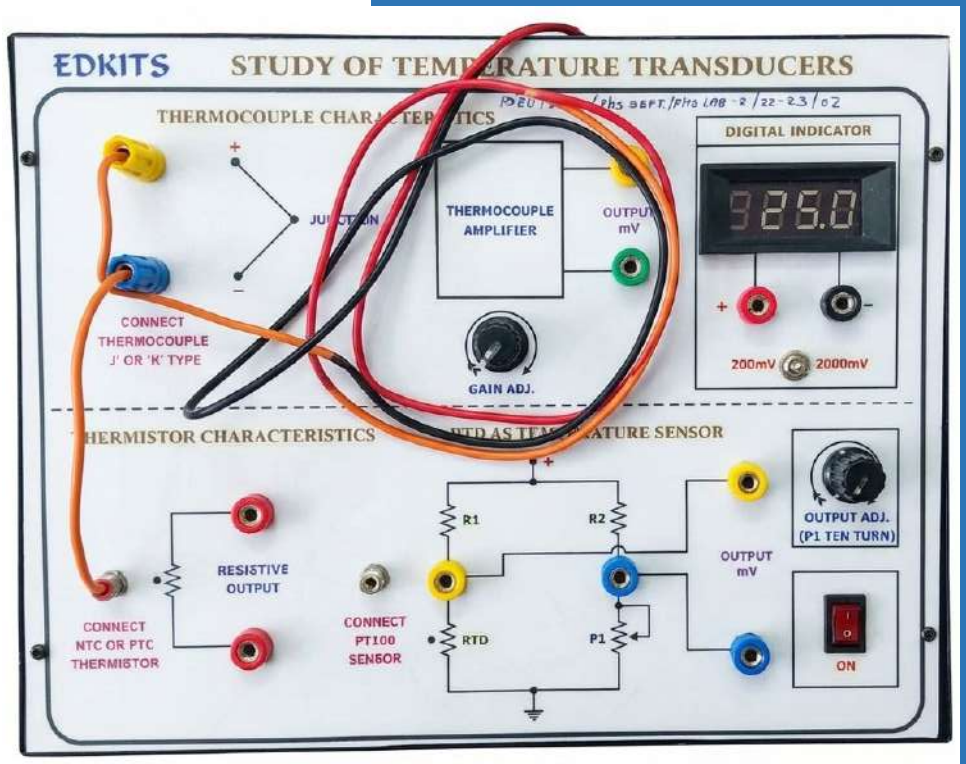
- **Make :** EDKITS
- DC Motor
- Magnetic Sensor
- Speed Adjustment for motor
- RPM Indicator



NAME OF EQUIPMENT :
Study of Temperature Transducers

TECHNICAL SPECIFICATIONS :

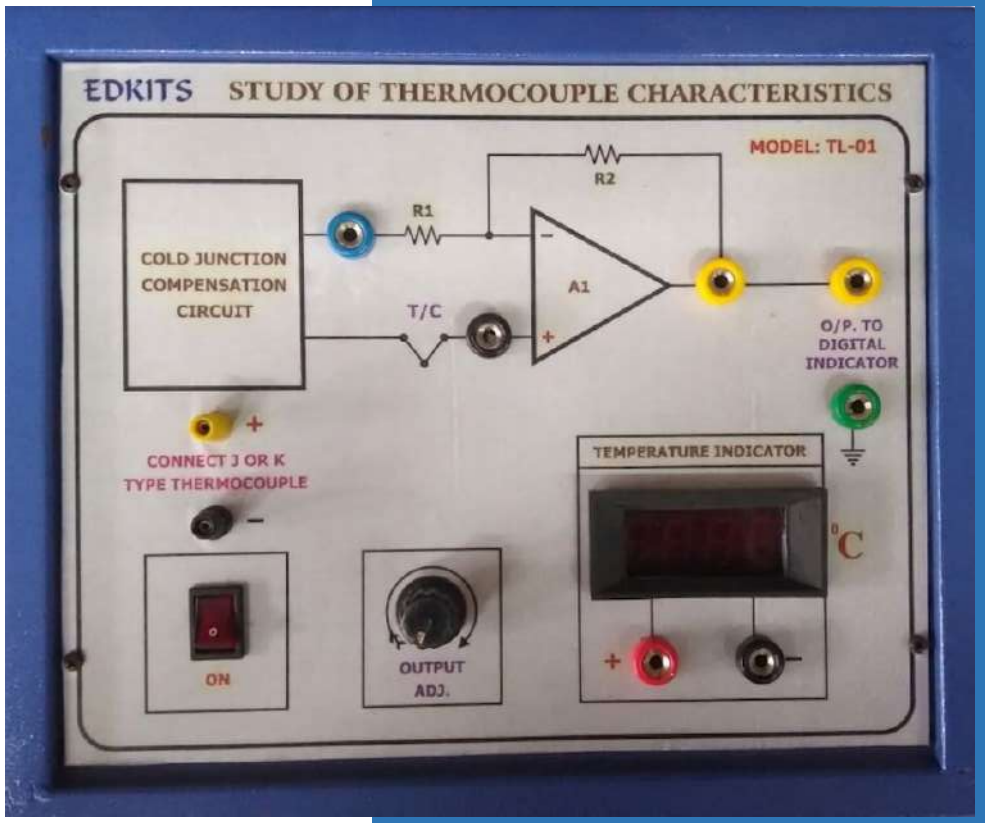
- **Make :** EDKITS
- Digital Indicator
- Thermocouple Amplifier
- Output adjustment



NAME OF EQUIPMENT :
Study of Thermocouple Characteristics

TECHNICAL SPECIFICATIONS :

- **Make :** EDKITS
- Temperature Indicator
- Output adjustment



NAME OF EQUIPMENT :
Digital Storage Oscilloscope

TECHNICAL SPECIFICATIONS :

- **Make :** Rohde- Schwarz
- **Model :** RTB2004
- **Channel :** 4 Analog, optional 16 Digital (MSO)
- **Bandwidth :** 70 MHz (standard), upgrades to 100/200/300 MHz
- **Sample Rate :** Up to 2.5 GSa/s (1.25 Gsa/s per channel)
- **Vertical Sensitivity:** 1 mV/div to 5 V/div

NAME OF EQUIPMENT :
Function Generator

TECHNICAL SPECIFICATIONS :

- **Make :** Tektronix
- **Model :** AFG1062
- Dual-channel,
- 25 MHz or 60 MHz sine waveforms
- 12.5 MHz or 30 MHz square waveforms