

**COMPARATIVE STATEMENT FOR PROJECT:193186-INTRODUCTION OF ADDITIONAL TECHNOLOGIES IN POLYTECHNIC INSTITUTES OF FATA
GPI WANA SOUTH WAZIRISTAN
DATE OF TENDER OPENING 09-03-2022
ELECTRICAL TECHNOLOGY**

Item No.	Name of Items	Electrical Engineering Services, Lahore							Al-Waqas Associate, Lahore								
		C.S		P.C		P.L.P		T	Model	C.S		P.C		P.L.P		T	Model
		40	5	5	2	4	4	60		40	5	5	2	4	4	60	
1	BASIC ELECTRONIC TRAINER KIT Universal training and instruction system 1018 for the principles of electrical engineering / electronics / analog technology. With integrated DC, AC and three - phase current sources as well as a function generator. Function generator, DC and three-phase current sources short-circuit proof and LED-monitored. The out signals of the voltage generator can be adjusted with a PC via built in USB-connection and the operators software. These signals can be simultaneously projected with a beamer offers a universal training and instruction system perfectly suitable for conducting following experiments: DC, AC and three-phase current technology Characteristics of diodes and transistors Characteristics of thyristors and triacs Amplifier circuits Oscillator circuits Modulators and demodulators Multivibrators Power supply circuits Switched power supplies and DC voltage converters Power electronic circuits With measuring interface incl. measuring Software the measured data are easily shown on a PC-monitor. With the USB-Oscilloscope student can view all signals time or frequency based. Technical Features: AC and DC voltages - DC voltage: +15 V (± 5 %); 800 mA - 15 V (± 5 %); 800 mA + 5 V; 100 mA 0 ... 25 V; 300 mA - AC voltage: 24 V AC; max. 100 mA Function generator - Sinewave / Squarewave / Triangle: V = 0 ~ 20 V; 100 mA F = 1 Hz ... 250 kHz - Squarewave, positive: V = 5 V / TTL - PWM 10 kHz; Pulse width 0 ... 100 % - DC Offset +12 V ... -12 V Three-phase current generator	40	0	5	0	2	4	51	1018.1USB+1018.4+1018.11+1018.11.1+V0101-GB+V0102-GB+V0103-GB+V0104-GB+PCSU1000+9102.13-3 HPS GERMANY Complete Brushar not Provided	40	0	5	0	2	4	51	1018.1USB+1018.4+1018.11+1018.11.1+V0101-GB+V0102-GB+V0103-GB+V0104-GB+PCSU1000+9102.13-3 HPS GERMANY

<p>- Phase voltage: 7 VAC - Line voltage: 12 VAC - Line current: max. 50 mA - Frequency: approx. 50 Hz The outputs of the function generator, DC and three-phase current sources are short-circuit-proof and LED-monitored. Digital 2-channel storage oscilloscope with USB interface, max. sampling rate: 1 GS/s, spectrum analyzer, transient recorder, incl. 2 test probes, USB interface cable, software, manual for operating systems: Windows 98 SE or higher Set of connections: 70 connecting plugs, 2 mm/5 mm 6 connecting leads, 2 mm, 30 cm 2 connecting leads, 2 mm, 50 cm Experiment manual with CD: Direct Current Technology Alternating Current Technology Semiconductor Components Basic Electronic Circuits UK, Germany or Equivalent</p>																			
<p>2 BASIC ELECTRICITY TRAINING KIT Universal training and instruction system 1019 for non-electrical professions. With integrated DC and AC sources. All functions are short-circuit-proof and monitored by LEDs. Clear arrangement of accessories directly on the basic unit. Detailed instructions for experiments with solutions. Components protected against incorrect connection It contains numerous experiments with problems and solutions for the following subjects (excerpt): The electrical circuit - Ohm's law - Electric measuring equipment - Electric power - Electric resistors - Resistors in series - Resistors in parallel - Voltage dividers - Mixed electric circuits - Electric fuse - Lamp circuits - Relay circuits - Voltage sources in series Voltage sources in parallel - Capacitor - Diode - LED - Transistor as a switch - Half-wave rectifier - Logic circuits Technical Data: DC and AC voltages available on the Board - DC voltage and current: 1.25 ... 15 V; 0.2 A - Sinewave voltage and current: 14 V (rms); 0.1 A The outputs of both voltage sources are short-circuit-proof and monitored by LEDs. Relay</p>	40	0	5	0	4	4	53	1019+V0106-GB+PCSU1000+9102.13-3 HPS GERMANY	40	0	5	0	4	4	53	1019+V0106-GB+PCSU1000+9102.13-3 HPS GERMANY			

- Contacts: 2 changeovers
- Contact power: max. 1 A
- Operating voltage: 15 V DC

The individual electric components are connected by 4 mm safety jacks with 4 mm plugs or leads.
 Digital 2-channel storage oscilloscope with USB interface, max. sampling rate: 1 GS/s, spectrum analyzer, transient recorder, incl. 2 test probes, USB interface cable, software, manual for operating systems: Windows 98 SE or higher
 Experiment manual: Fundamentals of Electrical Engineering

3	<p>DIGITAL ELECTRONICS TRAINER Universal training and exercise unit 3910 for fundamental digital technology/ microcomputer technology. The DIGI BOARD 2 contains all function groups and the power supply for fast experiment setup .Can be used as a desktop, demonstration or portable training unit. Individual expansion possibilities. With an adapter for connection to a computer Features: 2 input keys with 4 pairs of keys (L/H) each</p> <ul style="list-style-type: none"> - Clock generator with divider, TTL level, crystal-controlled - DC signal source 0...5 V/10 mA - Hexadecimal/dual coding switch (double) - LED display, divided into 3 groups with the colours red, yellow, green - HIGH/LOW, for tapping HIGH, LOW states - 7-segment display (2-digit), with decoder - Adapter (2 mm jacks/ SUB-D socket), for adapting 2 mm jacks to SUB-D connector (25-pin), pins 1...13 and 18 assigned - 8 AND gates, with pull-up resistors, one of which is disconnectable - 6 OR gates, with pull-down resistors, one of which is disconnectable - 3 AND/OR combi-gates - 1-bit comparator <p>4-bit comparator</p> <ul style="list-style-type: none"> - 4 JK-flip flops, can also be used as RS flip flops - 4 D-type flip flops - 2 adders (4-bit), with input and output carry - Mono flop, settable times: 0.1 s; 1 s; 5 s - Multiplexer, 4 channels - Demultiplexer, 4 channels - Shift register (4-bit), parallel and serial operation possible, bidirectional - ALU, for conducting 16 arithmetic and 16 logical computing operations with 4-bit dual numbers - Binary counter (4-bit), up/down counter - 2 inverters with open collector (pull-up resistors can be connected) - 2 Schmitt triggers, inverting - Units complements for negating a 4-bit binary number - Antivalence and equivalence gates - RAM 8x4, static RAM, 8 addresses, 4 bits data Width <p>Basic logical circuits</p> <ul style="list-style-type: none"> - Schmitt triggers - Bistableflipflops - Monostableflipflops 	40	0	5	0	4	4	53	3910+3910.1-1+V0160-GB HPS GERMANY	40	0	5	0	4	4	53	3910+3910.1-1+V0160-GB HPS GERMANY
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	<ul style="list-style-type: none"> - Code converters, coders - Computing circuits - Counting circuits - Register circuits - Multiplex mode - ALU - Memory circuits - Analog-digital converter, - Digital-analog converter <p>Technical Data: Integrated power supply for additional plug-in modules 5 V DC/max. 1 A; the power is supplied via the plugs in the base of the modules. DC voltage source +5 V/0.5 A For connecting external equipment IC components All IC components are inserted in sockets. Connection Leads: 22 connecting leads, 2 mm, 7.5 cm 12 connecting leads, 2 mm, 20 cm 12 connecting leads, 2 mm, 30 cm 14 connecting leads, 2 mm, 50 cm 8 connecting plugs, 2 mm Experiment manual with CD Experiments in Digital Technology UK, Germany or Equivalent</p>																							
4	<p>AM TRANSMITTER AND RECEIVER TRAINER and FM TRANSMITTER AND RECEIVER TRAINER Complete radio trainer in one Board 4070. All the important signals tappable at measuring points. With built-in AM and FM tuner. With stereo decoder and integrated loudspeakers. With built-in sinewave generator Experiment with the Tone Control _ Experiments with the AM - Generation of an AM Signal with the FM/AM Transmitter - Measuring the AM Antenna Signal - Determination of the Oscillator Frequency - Measurements at the AM Mixer - Measurements at the IF Stage and at the Demodulator - Automatic Gain Control AGC The FM/AM Transmitter is a module for generation of a FM and AM signal. Technical data - Modulation input: 700 mV - Modulation output: AM signal: carrier 1 MHz FM signal: carrier 100 MHz - Supply voltage:9 V DC AM unit - Ferrite antenna at the input circuit</p>	40	0	5	0	4	4	53	4070+4070.1+4070.2+PCSU1000+9102.13-3 HPS GERMANY	40	0	5	0	4	4	53	4070+4070.1+4070.2+PCSU1000+9102.13-3 HPS GERMANY							

- Frequency range: 540 ... 1600 kHz, tunable by LC input circuit, consisting of capacitance diodes
- HF amplifier
- Oscillator for generating the IF frequency by means of a mixer, oscillator frequency: approx. 900 Hz ... 2 MHz
- IF circuit with filter (455 kHz), IF amplifier and AGC

Sound adjuster

- 2 inputs: right channel / left channel
- Adjustable: volume, treble, bass and balance

2 AF amplifiers

- Output power: 3 W

Sinewave generator

- 5 frequency ranges: 300 Hz ... 34 kHz, adjustable
- Output voltage: $V_{pp} = 400$ mV

Complete radio trainer in one Board. All the important signals tappable at measuring points. With built-in AM and FM tuner. With stereo decoder and integrated loudspeakers. With built-in sinewave generator

Experiments with the FM

- Measuring the Adjustable Oscillator Frequency
- Measurements in the IF Stage
- Measuring at the Demodulator Output with Mono Reception
- Measuring at the Demodulator Output at Stereo Reception
- Measurements in the Stereo Decoder
- Behaviour with and without DE-Emphasis

The FM/AM Transmitter is a module for generation of a FM and AM signal.

Technical data

- Modulation input:

700 mV

- Modulation output:

AM signal: carrier 1 MHz

FM signal: carrier 100 MHz

- Supply voltage: 9 V DC

FM unit

- Antenna input for throw antenna
- Input circuit with LC element, tunable with capacitance diodes
- Frequency range: 88 ... 108 MHz
- HF amplifier
- Oscillator for generating the IF frequency by means of a mixer
- IF amplifier with level detector output
- Demodulator for generating the MPX signal
- PLL demodulator with mono/stereo switching and deemphasis

inputs

Sound adjuster

- 2 inputs: right channel / left channel
- Adjustable: volume, treble, bass and balance

2 AF amplifiers

- Output power: 3 W

Sinewave generator

- 5 frequency ranges: 300 Hz ... 34 kHz, adjustable
- Output voltage: $U_{pp} = 400$ mV

PC Based Interface Unit:

Digital 2-channel oscilloscope with USB interface, max. sampling rate: 1 GS/s, spectrum analyzer, transient recorder, incl. 2 test probes, USB interface cable, software, manual for operating systems: Windows 98 SE or higher

5	<p>TRAINER FIBER OPTICS TRANSMISSION SYSTEM</p> <p>For plastic and glass fibres 4290. With built-in transmit diodes in different wavelengths of the light. Characteristic recording and attenuation measurement also possible with DC voltages. Coupling attenuations can be simulated directly on the Receiver Board. All necessary power supplies and generators on Board</p> <p>Experiments on fibre optics with plastic fibre</p> <ul style="list-style-type: none"> - Characteristics of transmit diodes - Attenuation of plastic fibres and connectors - Transmission of TTL signals - Immunity to interference of the optical fibre - Experiments on optic fibre with glass fibre - Measurement of propagation time <p>Optical Transmitter</p> <p>Inputs (2 mm jacks)</p> <ul style="list-style-type: none"> - 1 analog / 1 digital <p>Optical outputs</p> <ul style="list-style-type: none"> - 660 nm / 850 nm (plastic fibre) - 850 nm (glass fibre, ST-standard) <p>Electrical output (via 2 mm jacks)</p> <ul style="list-style-type: none"> - With preceding driver circuit for connecting a two-wire line or coaxial cable for comparative measurements on a fibre optic transmission path - Output impedance: 50 Ω; 75 Ω <p>Function groups</p> <ul style="list-style-type: none"> - Sinewave generator: F = 1 kHz; Vpp = 3 V - Squarewave generator: F = 10 kHz (TTL) - Pulse generator: impulse duration 400 ns - Patch field and power supply for plug-in transformer to simulate Interferences <p>Optical Receiver</p> <p>Optical input</p> <ul style="list-style-type: none"> - Plastic fibre / Glass fibre <p>Electrical input (2 mm jacks)</p> <ul style="list-style-type: none"> - For connecting a two-wire line or coaxial cable for comparative measurements - Input impedance: 50 Ω; 75 Ω <p>Output amplifier</p> <ul style="list-style-type: none"> - Voltage gain: 1 ... 6 (adjustable) - DC offset: +0,5 V... -5,5 V (adjustable) <p>Outputs (2 mm jacks)</p> <ul style="list-style-type: none"> - DC: Vout = 0 ... +/-8 V - AC: Vout pp = 0 ... 16 V - TTL: with Schmitt trigger; fan-out = 10; <p>Set of accessories:</p> <ul style="list-style-type: none"> Plastic fibre, 0,5 m, without plug Plastic fibre, 5 m, without plug Plastic fibre, 20 m, without plug Glass fibre, 1 m, with ST plug Glass fibre, 20 m, with ST plug Optical coupling for glass fibre Connecting plug, 2 mm, spacing: 5 mm Coil, N = 100 Coil, N = 900 Tape-wound core (1 pair) Connecting lead, 2 mm, 30 cm, yellow Connecting lead, 2 mm, 100 cm, yellow Experiment manual with CD Fibre optics 	40	0	5	0	3	4	52	4290+4291+4290.1+4282.20+4282.21+4282.23+4290.21+4290.23+4290.30+9101.1+9120.18+9120.20_9120.21+9103.2-YE+9103.4-YE+V0134-GB HPS GERMANY	40	0	5	0	2	4	51	4290+4291+4290.1+4282.20+4282.21+4282.23+4290.21+4290.23+4290.30+9101.1+9120.18+9120.20_9120.21+9103.2-YE+9103.4-YE+V0134-GB HPS GERMANY Complete Brushar not Provided
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<p>6 BASIC POWER ELECTRONICS MODULE</p> <p>The whole power electronics on one Board 5125 With built-in three-phase source Connection field for Temperature and Brightness Controlled System</p> <p>All experiments with protective low voltage (12 V)</p> <p>Four-quadrant operation with H-circuit (MOS-FET) or anti parallel thyristor bridges</p> <p>Can be combined with PID BOARD, MOTOR BOARD and STEPPING BOARD</p> <p>Experiments on the single-phase AC supply</p> <ul style="list-style-type: none"> - The uncontrolled half-wave rectifier - The uncontrolled bridge rectifier - The half-controlled bridge Rectifier - The fully controlled bridge rectifier - The line-commutated inverter - Two fully controlled bridge rectifiers, anti parallel with circulating current-free wiring and optical indication by 2 LEDs - Pulse group control <p>Experiments on the three-phase supply:</p> <ul style="list-style-type: none"> - The uncontrolled rectifier (M3) - The uncontrolled rectifier (B6) - The controlled rectifier (M3) - The controlled rectifier (B6) <p>Experiments on the DC supply:</p> <ul style="list-style-type: none"> - Basic pulse width modulation (PWM) circuits - PWM with H-circuit, DC-evaluated - PWM with H-circuit, sine-evaluated <p>Contains resistive, inductive and capacitive loads for conducting the experiments mentioned above.</p> <p>Bridgeable shunts are integrated in all the important load current branches for measuring the currents.</p> <p>The basic frequency of the PWM control can be varied for investigation of the smoothing with uniform inductance.</p> <p>Module connected to the single-phase mains, the required three phase voltage is generated internally.</p> <p>Technical Data:</p> <p>Integrated power supplies</p> <ul style="list-style-type: none"> - DC voltage: +/-15 VDC / 2.5 A - AC voltage (L1): 12 V AC / 1 A - Three-phase source: switchable for M3 or B6 circuit; <p>Vrms = 12 V DC</p> <p>All power supplies are electrically isolated from each other.</p> <p>Controls</p> <ul style="list-style-type: none"> - Phase gate control I, II and III - Pulse group control - Pulse width modulation - Block-up logic for circulating current-free four-quadrant drive - GTO pulse shaper - Signal generator: f = 2 ... 100 Hz (for sine-evaluated PWM) Rectifiers - Uncontrolled rectifiers - Controlled rectifiers (thyristors) - H-circuit (Power MOS-FET) <p>Additional semiconductor components</p> <ul style="list-style-type: none"> - 1 diode, transistor, GTO thyristor, TRIAC <p>Load components</p> <ul style="list-style-type: none"> - Resistive load (27 Ω) - Inductive load (20 mH) - Capacitive load (47 μF) <p>PC Based Interface Unit:</p> <p>Digital 2-channel oscilloscope with USB interface, max. sampling rate: 1 GS/s, spectrum analyzer, transient recorder, incl. 2</p>	40	0	5	0	4	4	53	5125+5125.1-1+V0121-GB+PCSU1000+9102.13-3 HPS GERMANY	40	0	5	0	0	4	49	5125+5125.1-1+V0121-GB+PCSU1000+9102.13-3 HPS GERMANY Brushar not Provided
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<p>7 CONTROL OF INDUSTRIAL MOTORS TRAINING SYSTEM MODULE</p> <p>Universal speed control system 5130. Extendable with plug-in module for temperature and brightness control</p> <p>.With integrated four-quadrant display</p> <p>.With variable centrifugal mass</p> <p>.Dual-channel encoder</p> <p>.Built-in four-quadrant Amplifier</p> <p>The module contains a machine set comprising:</p> <ul style="list-style-type: none"> - DC motor with current actual value acquisition - DC generator with connectable load - Tacho generator with decoupling amplifier - Connectable mechanical centrifugal mass, realized electronically - Dual-channel encoder for direct acquisition of speed and direction of rotation - Built-in sight window for optical recognition of speed and direction of rotation and stroboscopic scanning a four-quadrant indicator is integrated which links the current and direction of rotation via a logical circuit and then indicates them on 4 LEDs. <p>The following disturbance variables can be applied:</p> <ul style="list-style-type: none"> - Variation of the mechanical centrifugal mass and the related time constant fluctuation - Connectable load on the Generator / Motor - Rated voltage: 12 V - Rated speed: 5900 / min - Speed: max. 8000 / min - Current: max. 0.5 A <p>Generator</p> <ul style="list-style-type: none"> - Rated voltage: 12 V - Maximum current: 0.5 A <p>Tachogenerator</p> <ul style="list-style-type: none"> - Output voltage: 2 V@ 1000 / min decoupled by amplifier <p>RI = 200</p> <p>Encoder</p> <ul style="list-style-type: none"> - Resolution: 100 lines / rev. - Output channels: 2 - Output voltage: TTL (decoupled by TTL module) <p>Load</p> <ul style="list-style-type: none"> - Connectable load resistance: 33 / 5 W ; with parallel-circuited lamp <p>Current actual value acquisition</p> <ul style="list-style-type: none"> - Measuring resistance <p>Series-connected amplifier</p> <ul style="list-style-type: none"> - Gain factor: 10 - Internal resistance: 200 <p>DC amplifier</p> <ul style="list-style-type: none"> - Input I: 0 ... +/-10 V - Gain factor: V = 1.2 - Input II: 0 ... +/-5 V - Gain factor: V = 2.4 - Output voltage in four-quadrant operation: 0 ... +/-12 V - Output current: max. 0.5 A <p>Four-quadrant indicator</p>	40	0	5	0	4	4	53	5130+5125.5+V	40	0	5	0	0	4	49	5130+5125.5+V0122-	0122-GB	HPS	GERMANY													
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8	<p>MOTOR WINDING KIT MODULE</p> <p>Kit for instructions in design and assembly of three phase asynchronous induction motor SE2670 in four versions depending upon the kind of statoric winding that has been used.</p> <p>It includes magnetic circuits, insulating material, mechanical parts, to realise the motors</p> <p>3PH 2 poles motor 0,5kVA - 230/400V, 50Hz; 3PH 4 poles motor 0,5kVA - 230/400V, 50Hz; 3PH 6 poles motor 0,75kVA - 230/400V, 50Hz; 3PH 8 poles motor 0,75kVA - 230/400V, 50Hz;</p> <p>4 stator casing 4 squirrel cage rotor with shaft and bearings 8 shields 4 fan with housing 4 terminal block with terminal, related cover and fixtures 4 set of statoric winding of four different kind.</p> <p>NOTE: Should be provided all the accessories including books etc. UK, Germany or Equivalent</p>	40	0	5	0	4	4	53	109.1 ITALTEC ITALY	40	0	0	0	4	4	48	109.1 ITALTEC ITALY
9	<p>EXPERIMENTER UNIT:</p> <p>Experimenter SO4203-2B for coupling to the Experimenter modules.</p> <p>Connects to the UniTrain-I Interface and additional Experimenters via UniTrain-I bus UniTrain-I bus connection for experiment cards Direct connection to the standard UniTrain-I power supply for use without an UniTrain-I Interface Fixed and variable voltages available via 9 2-mm sockets Accommodates UniTrain-I experiment cards Accommodates a breadboard for experimenting with discrete components and integrated circuits Accommodates a multimeter using IrDa interface Dimensions: 28 x 19 x 9 cm UK, Germany or Equivalent</p>	40	0	5	0	0	4	49	CO4203-2B LUCAS-NULLE GERMANY	40	0	5	0	0	4	49	CO4203-2B LUCAS-NULLE GERMANY
10	<p>EXTENDED POWER SUPPLY</p> <p>SO4203-2D Supplementary power supply unit for UniTrain-I system. This power supply unit is used in addition to the basic power supply unit where variable higher-power alternating voltages, adjustable higher-power direct voltages or a three-phase current system with variable frequencies and amplitudes are required for experiments. The UniTrain-I Interface is required for the power supply generation functions. Adjustment is carried out with virtual instruments.</p> <p>Mains input: 100 - 250 V AC, 50 - 60 Hz via IEC socket (non-heated devices) and included mains cable Output: 2 x 24 V / 2 A via cable approx. 2 m long with 6-pin DIN socket Shunt resistors on a PCB SO4203-2J, for current measurement using the analog inputs of the UniTrain-I system. 6 Shunt resistors: 2 x 1 ohm, 2 x 10 ohm, 2 x 100 ohm Screen print of symbols for identifying resistors, the voltage taps and current inputs 24 x 2-mm sockets Dimensions: 100 x 40 mm Set of connection cables 2mm (22 pcs) for UniTrain-I consisting of: 8 x connection leads 2mm, 15cm, blue 4 x connection leads 2mm, 15cm, yellow 2 x connection leads 2mm, 45cm, black 2 x connection leads 2mm, 45cm, yellow 2 x connection leads 2mm, 45cm, red 2 x connection leads 2mm, 45cm, blue 2 x adapter connection leads 4mm to 2mm, 50cm,</p>	40	0	5	0	0	4	49	CO4203-2A+CO4203-2J LUCAS-NULLE GERMANY	40	0	5	0	0	4	49	CO4203-2A+CO4203-2J LUCAS-NULLE GERMANY

17	STAR I DELTA STARTER (MANUAL) FOR INDUCTION MOTOR . Power: 350 VA . Voltage: 230/400 V-50 Hz . Rpm: 3000 2 poles . Excitation voltage: 220 Vdc . Operation also as synchronous motor with induction starting . Delta/star connection . Constructive form: 1M 83 . Protection: I P 22 . Integrated thermal protector	40	0	5	0	0	4	49	PAK	0	0	0	0	0	0	0	0	Not Quoted
18	CONTROL UNIT The Control Unit 2730 controls the three-phase induction motor of the Brake Unit It comprises: - Frequency converter - Control unit - RPM display - Torque display Technical data - Mains connection: 220 ... 230 V AC; 50 ... 60 Hz - Working range of the Control Unit: 0.5 ... 120 Hz in both directions Accessories included - Connecting Lead, 4-pin - Connecting Lead, 8-pin - 2 Connecting Leads UK, Germany or Equivalent	40	0	5	0	0	4	49	2730 2719 HPS GERMANY	40	0	5	0	4	4	53	2730 2719 HPS GERMANY	
19	CAPACITOR MOTOR 2715 Power: 0.3 kW speed: 1425 rpm at 50 Hz; cos : 0.93; AC voltage 230 V current: 2.1 A; phase-shift and starting capacitor: 10uF/14uF UK, Germany or Equivalent	40	0	5	0	0	4	49	2715 HPS GERMANY	40	0	5	0	4	4	53	2715 HPS GERMANY	
20	UNIVERSAL MOTOR 2705 Power: 0.3 kW speed: 2250 rpm AC voltage and current: 230 V/3.4 A; DC voltage and current: 130 V/3.4 A; UK, Germany or Equivalent	40	0	5	0	0	4	49	2705 HPS GERMANY	40	0	5	0	4	4	53	2705 HPS GERMANY	
21	REPULSION MOTOR 2706 Power: 0.25 kW speed: 2100 rpm at 50 Hz; cos : 0.69; AC voltage and current: 230 V/2.9 A; UK, Germany or Equivalent	40	0	5	0	0	4	49	2706 HPS GERMANY	40	0	5	0	4	4	53	2706 HPS GERMANY	
22	Split-Pole Motor 2716 Power: 0.12 kW speed: 2700 rpm at 50 Hz; cos : 0.6; AC voltage and current: 230 V/3.2 A; UK, Germany or Equivalent	40	0	5	0	0	4	49	2716 HPS GERMANY	40	0	5	0	4	4	53	2716 HPS GERMANY	

23	THREE-PHASE SYNCHRONOUS GENERATOR/ MOTOR WITH ASYNCHRONOUS STARTING 2707 Three-Phase Induction Motor Power: 0.37 kW speed: 1400 rpm at 50 Hz; cos : 0.72 star connection: 400 V/0.85 A delta connection: 230 V/1.47 A Synchronous Machine Power: 0.3 kW speed: 1500 rpm at 50 Hz; cos : 0.97 excitation current: 0,95 A star connection: 400 V/0.66 A delta connection: 230 V/1.44 A; UK, Germany or Equivalent	40	0	5	0	0	4	49	2707.1 2711+2289 HPS GERMANY	40	0	5	0	4	4	53	2707.1 2711+2289 HPS GERMANY
24	SPEED SLIP INDICATOR	40	0	5	0	0	4	49	5511 HPS GERMANY	40	0	5	0	0	4	49	5511 HPS GERMANY
25	CONTACT TECHOMETER	40	0	5	0	0	4	49	CHINA	40	0	5	0	0	4	49	CHINA
26	DIGITAL TACHOMETER . Table-top metal container, treated chemically with silk screen printed steel front panel . Reflection optical probe and reflection strip . Microprocessor measurement instrument with CPU Z 80 . Digital display (4 digits) . Measurement range: 0+9999 rpm 0+9999 ms (period) 0+9999 pulses 0+99.99 seconds (timer) . 4-digit selector for maximum measurement value	0	0	0	0	0	0	0	Rejected Under Specific & Bruchaer Missing	0	0	0	0	0	0	0	Rejected Under Specific & Bruchaer Missing
27	STROBOSCOPE type 4203 Germany/UK	40	0	5	0	0	4	49	461825 EXTECH USA	40	0	0	0	0	4	44	461825 EXTECH USA
28	AUTO-TRANSFORMER	40	0	5	0	0	4	49	CHINA at least 2.5AMP	0	0	0	0	0	0	0	Not Quoted
29	THREE PHASE SUPPLY UNIT This power supply unit 2740.1 guarantees a clear experimental set-up and a short set-up time. Technical data - Mains connection, three phase: 380 ... 415 V AC - Outputs, three-phase: with phase pilot lamp and safety switch, 3-pole (6 A) - Fixed DC: 200 V / 4 A (at 230 V mains) for field current supply of DC machines, with pilot lamp - DC, continuously adjustable: 0 ... 250 V/4 A UK, Germany or Equivalent	40	0	5	0	0	4	49	2740.1 HPS GERMANY	40	0	5	0	4	4	53	2740.1 HPS GERMANY
30	MOTOR STARTER The Universal Resistor 2750 carries out the following functions in conjunction with the electric machines: - Starters and field rheostats for DC motors - Field rheostats for DC generators - Load resistors for DC generators - Starting resistors for slip ring motors - Load resistors for synchronous machines Technical Data Ring rheostat, 500 W - With protection series resistor: 1.8 /150 W	40	0	5	0	0	4	49	2750 HPS GERMANY	40	0	5	0	0	4	49	2750 HPS GERMANY

40	SET 32 SAFETY CONN. LEADS. 4mm safety connecting leads with 2.5 mm cable, current rating 322?A.m consisting of: 2 each safety connecting lead red 100cm 2 each safety connecting lead, Blue 100 cm 2each safety connecting lead red 50 cm 2each safety connecting lead blue 50 cm 2each safety connecting lead red 25 cm 2each safety connecting lead blue 25 cm 4each safety connecting lead black 100 cm 6each safety connecting lead black 50cm 6each safety connecting lead black 25 cm	40	0	5	0	4	4	53	PAK	0	0	0	0	0	0	0	Not Quoted
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64	CURRENT TRANSFORMER , Primary 100 amp. Secondary 5 amp, maximum 600 volt.	40	0	5	0	0	4	49	CHINA	0	0	0	0	0	0	0	0	Not Quoted
65	PETENTIAL TRANSFORMER, Primary 110 volt, secondary 11 KV	40	0	5	0	0	4	49	CHINA	0	0	0	0	0	0	0	0	Not Quoted
66	AMPERE METER WITH MOVING COIL, range 15• to 6A, 3 version, Demonstration type.	40	0	5	0	0	4	49	PAK	0	0	0	0	0	0	0	0	Not Quoted
67	VOLTMETER(AC)BENCH TYPE FOR DEMONSTRATION , range 0 to 300 V, 0 to 500V,	40	0	5	0	0	4	49	PAK	0	0	0	0	0	0	0	0	Not Quoted
68	INSULATOR , • Disc type 15 KV • Pin type: 15 KV, • Post type 15 KV Low voltage capacitance 750 V	40	0	5	0	0	4	49	PAK	0	0	0	0	0	0	0	0	Not Quoted
69	12 LINE INTERCOM: With Digital Dialing and Provision for Secrecy Analog-with Connecting Accessories.	40	0	5	0	0	4	49	PAK	0	0	0	0	0	0	0	0	Not Quoted
70	INDUCTION MOTOR. Capacitor type 5HP AC 3 phase	40	0	5	0	0	4	49	PAK	0	0	0	0	0	0	0	0	Not Quoted
71	INDUCTION MOTOR , Capacitor 2 HP, AC Single phase.	40	0	5	0	0	4	49	PAK	0	0	0	0	0	0	0	0	Not Quoted
72	COIL WINDING MACHINE: Hand operated, with counter, small size, mounted type.	40	0	5	0	0	4	49	PAK	0	0	0	0	0	0	0	0	Not Quoted
73	ELECTRIC IRRON 220v, 1000w	40	0	5	0	0	4	49	PAK	0	0	0	0	0	0	0	0	Not Quoted
74	PEDESTAL FAN 24"	40	0	5	0	0	4	49	PAK	0	0	0	0	0	0	0	0	Not Quoted
75	VACUUM CLEANER 220V, 1300w	40	0	5	0	0	4	49	PAK	0	0	0	0	0	0	0	0	Not Quoted
76	WASHING MANCHINE WITH DYRER	40	0	5	0	0	4	49	PAK	0	0	0	0	0	0	0	0	Not Quoted
77	MICROWAVE OVERN	40	0	5	0	0	4	49	PAK	0	0	0	0	0	0	0	0	Not Quoted
78	EXHAUST FAN	40	0	5	0	0	4	49	PAK	0	0	0	0	0	0	0	0	Not Quoted

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