Curriculum of Matric Tech

Applied Electrician

GRADE IX-X
2020

GOVERNMENT OF PAKISTAN

Ministry of Federal Education and Professional Training ISLAMABAD

In Collaboration with

National Vocational and Technical Training Commission

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Introduction

Pakistan is a developing country with 5th largest population in the world. 64% of our population is below 30 years of age which makes it second youngest country in South Asia. This "youth bulge" provides unique challenges as well as opportunities for the country's social and economic development. The only remedy is to develop youth of Pakistan through education and training. To control the increasing un-employment, promoting entrepreneurship (self-employment), alleviate poverty and provide skilled manpower for industrial/economic growth, The Govt. of Pakistan has decided to introduce Technical Scheme at SSC Level. For this a stream of technical subjects has been selected including Industrial Electrician as one of the elective subjects.

The curriculum of Industrial Electrician is designed to produce middle level human resource work force equiped with knowledge, skills and attitudes related to the field of construction technology so as to meet the demand of such workforce in the country and aboard to contribute in the national streamline of poverty reduction of Pakistan.

Electrician is a trade person specializing in electrical wiring of buildings, stationary machines and related equipment. Electricians may be employed in the installation of new electrical components or the maintenance and repair of existing electrical infrastructure. Electricians may also specialize in wiring and cables. Electricians work in a variety of settings, including homes, industries, schools, hotels, workshops and hospitals-any type of facility that needs electricity to function.

Working conditions for electricians vary by specialization. Generally an electrician's work is physically demanding such as climbing ladders and lifting tools and supplies. Occasionally an electrician must work in a cramped space or on scaffolding, and may frequently be bending, squatting or kneeling, to make connections in awkward locations. Electricians may spend much of their days in outdoor or semi-outdoor noisy and dirty worksites. Industrial electricians may be exposed to the heat, dust, and noise of an industrial plant. Power systems electricians may be called to work in all kinds of adverse weather to make emergency repairs.

Rationale

The Trade of Industrial Electrician is a profession that is increasingly getting attention in Pakistan because of the population growth and the resultant immense opportunities in the construction technology not only among the youth seeking to enter the industry but also among adults who wish to polish their skills to develop a career out of it.

On completing the course/curriculum, students should have acquired a set of knowledge and concepts, and have developed a range of technical, personal, interpersonal, organizational

and generic skills, that can be applied in various contexts, both within and related to trade of electrician and construction technology domain. Furthermore, this course will stimulate the learners towards entrepreneurship in the industry.

Within this qualification relating to Industrial Electrician interventions in schools, there are important interventions that integrated within school settings. The purpose of this qualification is to strengthen connections between schools and trade, and drawing on the concept of the sociotechnical network, theories the interactions between the relevant market and school contexts.

Industrial Electrician, Matric Tech (9^{th}&10^{th})

Aims and Objectives

The specific objectives of developing these qualifications are as under:

- Provide students with a smooth transition to work.
- Develops job-readiness & enhance students' trade-specific employable skills and provide opportunities for the development of new skills.
- Provide students with the opportunity to obtain from Level II -IV technical training certification or equivalent in a given trade.
- To set high profile standard professions for the industry to generate standard outputs.
- To validate an individual skill, knowledge and understanding regarding relevant occupations.
- Provide flexible pathways and progressions in training and assessment field.

Objectives

After completing this, the students will be able to:

- Perform routine skilled and semi-skilled tasks to carry out a variety of electrical/electronic installations
- Repair of electrical equipment, facilities and system.
- Perform maintenance jobs and assist other team members in the assigned preventive maintenance.
- Awareness to PV Solar system

Grade –IX

Ch#01 Fundamentals of Electricity		**28 =Periods12=(T), 16= (P)**			
Theme/Content	**Student Learning Outcome**	**Activities/Practical**	**Duration**	**Tools/Equipment**	**Workplace**
• Matter and its states • Atom and Ions • Atomic structure • Basic concept of Electricity (Voltage , current and resistance) • Basic Units of Electricity • Electrical Symbols	the student will be able to: • understand matter and its states • define atom and its structure • define current, voltage and resistance • describe electrical units(current, voltage, resistance)	• Carryout Orientation Visit of Electrical Lab/ workshop and record the observation. • Recognize Electrical symbols with fixed component and equipment (in workshop/lab) • Draw electrical symbols	Periods (T) Periods(P)		Classroom/ Labs
• Conductor, Insulator, Semi-Conductor • Ohm's Law	• define conductor, insulator, semiconductor • describe characteristics of conductors, insulator, semiconductor • define ohm's law • describe application of ohm's law for measuring current, voltage and resistance	• Apply ohm's law for measuring Current, Voltage and Resistance	Periods (T) Periods(P)	• Stationary • Conductor • Insulator • Semi-conductor	Classroom/ Labs

Ch#02. Cells and Batteries		36 Periods 12=(T), 24 = (P)			
Theme/Content	**Student Learning Outcome**	**Activities/Practical**	**Duration**	**Tools**	**Workplace**
Cell and Batteries	students will be able to: • define cell and batteries • describe the importance of cell and batteries • explain the types of cell and batteries • explain the charging procedure/principle of battery • use cell and battery as a series and parallel source	• Enlist types of cell and battery • Enlist use of cell and battery • Perform series and parallel connection of cells. • Perform series and parallel connection of batteries. • Perform charging of a battery	Periods (T) Periods(P)	Plier, screw driver set, insulating material, multi-meter, Clamp meter, thimble press, spanner set	Classroom/ Labs
• Construction and working Principles of Cells and battery • Battery tests	• describe the components/parts of cell and battery • explain the construction and working principles of cells and batteries • explain the procedure for maintaining a battery. • describe the importance of electrolyte in the battery • explain the testing procedure of batteries. • explain the use of tools and equipment required for testing of batteries.	• Perform Maintenance of battery • Check gravity of battery with the help of hydrometer • Perform testing of cell and battery by DC ammeter.	Periods (T) Periods(P)	Hydrometer, Cells, Batteries, Charging device	Classroom/ Labs

Ch#03. Magnetism and Electro Magnetism		28 =Periods 12=(T), =16 (P)			
Theme/Content	**Student Learning Outcome**	**Activities/Practical**	**Duration**	**Tools**	**Workplace**
• Magnet and magnetic material • Properties of magnetic material • Nature of magnetic field • Electro magnetism • Faraday's laws of Electromagnetic induction	Students will be able to: • define a magnet • describe magnetic and nonmagnetic materials • explain the properties of magnetic materials • state the types of magnetism • define electromagnetism • describe the shapes of magnetic field by using magnet of different shapes and nature • explain how electromagnetism is produced. • explain faraday's laws of electromagnetic induction	• Identify Magnetic and nonmagnetic material with the help of magnet • Identify the poles and magnetic field of different types of magnets. • The magnetic effect of electric current • Apply Faraday's laws of electromagnetic induction	Periods (T) Periods(P)	• Different types of magnets	Classroom/ Labs

Ch#04. Electrical power and Energy		48=Periods 18=(T), =30 (P)			
Theme/Content	**Student Learning Outcome**	**Activities/Practical**	**Duration**	**Tools**	**Workplace**
• Series and Parallel circuit	Students will be able to: • explain the construction of series circuit for calculation of current, voltage and	• Construct a series circuit and measure Current, Voltage and Resistance • Construct parallel circuit	Periods (T) Periods(P)	Resistor, , Multi-meter Lamp, lamp holder, power supply	

	resistance. • explain the construction of parallel circuit for calculation of current, voltage and resistance • explain the construction of combinational circuit for calculation of current, voltage and resistance	and measure Current, Voltage and Resistance • Construct combinational circuit and measure Current, Voltage and Resistance			
• Electrical power	• define electrical power • understand the unit and symbol of electrical power • draw the circuit for electrical power • calculate electrical power	• Connect the circuit according to the given equipment • Calculate/ measure the power of given load	Periods (T) Periods(P)	• Tool kit • Multi-meter • Lamp • Resistor • wires	Classroom/ Labs
• Electrical Energy	• define various types of energies. • define electrical energy • understand the unit and symbol of electrical energy • understand the	• Connect energy meter with the load • Read the energy meter • Note the units consumed • Calculate the cost of energy consumed	Periods (T) Periods(P)	• Tool kit • Energy meter • wires	Classroom/ Labs

	formula for calculation of electrical energy • explain the tariff • calculate the energy consumed and determine its cost.				

Ch#05. Capacitor and inductor		**30= Periods 12=(T), 18=(P)**			
Theme/Content	**Student Learning Outcome**	**Activities/Practical**	**Duration**	**Tools**	**Workplace**
• Capacitor and inductor	The Student will be able to: • explain Capacitance • describe capacitor and its types • understand the connection procedure of capacitors in series and parallel • explain Inductance • describe Inductor and its Types • understand the behaviour of capacitors and inductors connected with AC and DC	• Connect the capacitor in series and measure total capacitance • Connect the capacitor in parallel and measure total capacitance • Check the behaviour of capacitor in AC and DC • Check the behaviour of inductor in AC and DC	Periods (T) Periods(P)	• Different types of Capacitor • Different types of Inductor • Power supply, • Multi-meter • Regulator	Classroom/ Labs

Ch.9. Digital Communication and Social media			14 Period 05 (T) 09 (P)		
Themes	**Students' Learning Outcomes**	**Activities**	**Duration**	**Tools**	**Workplace**
Effective email writing	The Student will be able to: • Create, access and manage email account • Learn how to write and respond official email	• Create email account • Write an official email to school principal on subject of any importance	Periods (T) Periods(P)	Multi media System, Internet connection	Classroom / Labs
Introduction to Social Media Platforms ○ Facebook, ○ Instagram ○ Twitter, ○ YouTube,	• Role of social media in marketing and business development • Merits and de-merits of social media	• Create social media page for your self	Periods (T) Periods(P)	System, Internet connection	Classroom / Labs

Grade –X

Ch#1. Motors and Generators		**54 Periods 18 =(T), 36 = (P)**			
Theme/Content	**Student Learning Outcome**	**Activities/Practical**	**Duration**	**Tools**	**Workplace**
Motor	Students will be able to: • define motor • explain types of DC motors (Series, shunt and compound) • explain types of AC motors (single/3 phase induction motors) • describe parts of DC motor • describe parts of AC motor • describe the working principles of AC/DC motors • explain types of motor connections (star,delta) • explain visual inspection of mechanical defects such as, tight bearings, bent shaft, noisy running, temperature etc. • explain the connection techniques of motor.	• Enlist parts of motor • Perform connection of motor. • Develop a data sheet of Electric motor with Reading name plate & manufacturer manuals power supply • Check bearing status, shaft status, winding status, Capacitors status, armature status, commutator status.	Periods (T) Periods(P))	Complete Plier set, screw driver set, insulating material, multi-meter, Clamp meter, thimble press, hammer, spanner set	Classroom/ Labs 11+10
Generators	• Define Generators	• Enlist parts of generator	Periods (T) Periods(P)	Complete Plier set,	Classroom/ workshop

	• Describe types of Generators • Describe parts of Generators. • Describe the working principles of Generators. • Explain generator connections • Describe the procedure for checking of generators by using specified test instruments to detect electrical defects such as loose/or burnt electrical connections, burnt windings, low insulation resistance etc.	• Perform connection of generator with load. • Identify the required tools for preventive maintenance. • Identify the required materials for preventive maintenance.		screw driver set, insulating material, multi-meter, Clamp meter, thimble press, hammer, spanner set	
Service and Maintenance of Electrical Machines(Motors &Generators)	• Explain the importance of service and maintenance of electrical machines. • Comprehend importance of preventive maintenance of motors, generators etc. • Explain tagging procedure (maintenance card) of motors, generators etc.	• Select the tool/equipment required for service and maintenance of electrical machines(Motors and Generators) • Perform service and maintenance of electric motor and generator • Maintain service and maintenance chart (cleaning/ lubrication) of electrical machines (Motors and Generators)	Periods (T) Periods(P)	Complete Plier set, screw driver set, ring spanner set, Ln-Key set	Classroom/lab

Ch#02. Introduction to AC		24, Periods 8=(T), 16= (P)			
Theme/Content	**Student Learning Outcome**	**Activities/Practical**	**Duration**	**Tools**	**Workplace**
• AC and DC • Time and Frequency • RMS value of sine wave	students will be able to: • define AC and DC • describe the term time period and frequency • describe maximum value of current and voltage • describe RMS value of sine wave	• Measure the peak value of current and voltage • Measure the RMS value	Periods (T) Periods(P)	• Oscilloscope • Wires	Classroom/ Labs
• Impedance • Power in AC • Effective and reactive power • Power factor	• describe the impedance of AC circuit • describe the power in AC • describe effective, reactive and apparent power • explain power factor • explain the procedure for measurement of effective and apparent power	• Identify the tools/equipment used for measurement of effective and Apparent power • Measure effective and Apparent power	Periods (T) Periods(P)	• Oscilloscope • Wires	

Ch#03. Transformers	24 Periods 8=(T), 16= (P)

Theme/Content	Student Learning Outcome	Activities/Practical	Duration	Tools	Workplace
• Transformer • Self-inductance • Mutual inductance • Eddy current loss	students will be able to: • define transformer • describe self-inductance • describe the principal of transformer • understand the function of transformer • describe types of transformer (step up, step down • define eddy current loss	• Identify input/output of Transformers • Connect the transformer with the supply • Check the voltage of input/output • Identify step-up and step-down transformers and check their functions	Periods (T) Periods(P)	• Step-up transformer • Step-down transformer	Classroom/ Labs

Ch#4. Power backup systems		42 Periods 14 =(T), 28 = (P)			
Theme/Content	**Student Learning Outcome**	**Activities/Practical**	**Duration**	**Tools**	**Workplace**
Introduction to power backup systems	students will be able to: • define power backup systems • explain the importance of power backup system • describe various types of power backup systems • select appropriate power backup systems as per requirements	• Enlist types of power backup system • Select appropriate power backup systems as per requirements	Periods (T) Periods(P)	Complete Plier set, screw driver set, insulating material, drill machine, Chisel, electric grinder, multi-meter, Clamp meter, wire stripper, thimble press	Classroom/ Labs

Load Calculation for power backup system	• calculate load for the desired power backup systems • explain importance of load calculation for power backup system • explain nature of load (single/ three phase)	• Enlist the appliances with specifications required for load calculation to be connected with power backup system	Periods (T) Periods(P)	Required stationary	
Source of power backup (Generator, UPS, PV Solar system)	• describe sources of power backup system • explain the functions of various components of power backup system • describe the appropriate tools/materials for installation of power backup system • explain installation techniques of the desired power backup system • explain procedure for maintaining pv solar system	• Install the Power backup system (UPS) • Install the Power backup system (Generator) • Operate the power back up system • Maintain the Power backup system (PV Solar system)	Periods (T) Periods(P)	Complete Plier set, screw driver set, insulating material, drill machine, Chisel, electric grinder, ring spanner set, Ln-Key set	Classroom/lab

Ch#5. Safety/Security & Communication Systems	**36 Periods 12 =(T), 24 = (P)**

Theme/Content	Student Learning Outcome	Activities/Practical	Duration	Tools	Workplace
Selection of Safety / Security & Communication System	The Student will be able to: • describe types of safety, security and communication system(CCTV, fire alarms, smoke detectors) • explain importance of the safety/ security & communication systems • explain requirements of the organization regarding safety, security and communication system. • describe the criteria for inspection of the premises for installation of safety / security and communication system as per requirement	• Inspect the premises and get the client requirements for selection of the most appropriate type of Safety / Security & Communication System • prepare the material list with labour cost, and accessories cost	Periods (T) Periods(P)	Stationary items, computer with accessories	Classroom/ Labs
Installation of Safety / Security & Communication System	• describe the required tools/equipment and testing instruments as per job requirements. • explain procedure and techniques for laying the wires / cables according to wiring diagram • explain the installation techniques for the stand by power back up system as per requirement	• Install the dome CCTV security system with layout / wiring diagrams • Install the day-night CCTV security system with layout diagram & wiring diagrams • Install the Network IP CCTV security with layout diagram • Install the backup ups system of CCTV security system	Periods (T) Periods(P)	Complete Plier set, screw driver set, insulating material, drill machine, Chisel, electric grinder, multi-meter, Clamp meter, wire stripper, thimble	Class room/Lab

				press	
Testing of the installed security, safety and communication system	• Explain the Connection procedure of the system to the power source as recommended by the manufacturer • Describe the techniques required for adjustment, Setting directions where necessary for correct functioning of the system • Explain the checking procedure of the standby power backup for its proper functioning • Describe the testing and commissioning of the system • Explain operating procedure and periodic testing of the system.	• Demonstrate the settings//adjustment of directions of the safety/security communication system • Check the standby power backup for its proper functioning • Perform testing and commissioning of the system	2 Periods (T) 6 Periods(P)	lamp, Resistor, Power supply, Wires, Measuring /Testing Instruments	Classroom/ Labs

Ch.9. **Personal and professional development**			18 Period 07 (T) 11 (P)		
Themes	**Students' Learning Outcomes**	**Activities**	**Duration**	**Tools**	**Workplace**
CV & Resume Writing	• learn the importance of cv in job application • create and format CV/resume	Create a CV with the help of teacher	Periods (T) Periods(P)	Computer system with MS office	Classroom/ Labs
Job Portals	• access and register email account on various online job	Register on online job portals, follow job hunting procedure and	Periods (T) Periods(P)	Computer system	Classroom/ Labs

	portals • search job as per job description and title	steps to apply for an advertised job		with internet connection	
Introduction to e-commerce	• familiarize oneself with online travel e-commerce websites • learn about hotel websites • learn about freelancing websites	• Create a travel booking on any online travel website • Create an account on any freelancing website	Periods (T) Periods(P)	Computer system with internet connection	

Assessment and Evaluation

Assessment is the practice of collecting evidence of student learning. It aims at improving learning and teaching as well as recognizing the achievement of students. It determines students 'progression through their learning experiences and enables them to demonstrate that they have achieved the intended learning outcomes. The assessment is aligned with curriculum aims, design and learning processes.

Evaluation is an integral part of teaching-learning process. It involves gathering information through various assessment techniques, making valuable judgment and sound decisions. Assessment provides information and teaching about students' achievement in relation to learning objectives. With this information, the teacher makes informed decisions about what should be done to enhance the learning of students or to improve teaching methods. Assessment must be:

- mainly open-ended, allowing for discussion and revision of new understanding.
- tolerant of divergent thinking of students and promote the notion of no ''one right answer''.
- presented in alternative mode, not just paper-and-pencil responses to limiting questions.
- designed to foster analysis, comparison, generalization, prediction, and modification according to the grade and development level.
- capable of promoting collaboration and team effort in demonstration of competence.
- ongoing and cumulative, showing growth over time.

Formative (Internal) Assessment

Internal assessment refers to the assessment practices employed as part of the learning and teaching process. It is an ongoing process throughout the session and uses Test — Feedback — Adjust cycle repeatedly to improve students' performance and efficiency in learning and teaching. In designing internal assessment for the subject, teachers should maintain a proper balance between the formative and summative functions of assessment. It should be comprehensive to cover all the objectives as per curriculum. A diversity of assessment modes should be adopted so that students are given opportunities to develop and demonstrate the full range of learning outcomes of the curriculum, including those of knowledge, skills and values and attitudes.

Methods for Internal/Formative Assessment

Following tasks can help in formative assessment.

- Assignments
- Quizzes
- Tests

- Group discussions
- Oral/multimedia presentations
- Worksheets
- Online interactive activities
- Role play
- Demonstration
- Practical exercises

Feedback on students' work in all the above tasks must be prompt, effective, and efficient assessment should have questions setting that specifically help in finding out knowledge, understanding and skills.

Summative /External Assessment

Summative assessment will be managed by concerned Board of Intermediate and Secondary Education. It will be composed of two parts.

1) Theory Assessment /Written examination: The theory examination is suggested to consist of a wide variety of questions. Its overall weight age should be 40 %. It should be based on the curriculum rather than textbook. The assessment should be designed to examine the candidate's understanding of the whole syllabus and should test the range of abilities according to Bloom Taxonomy.

2) Practical Assessment/Practical examination: This is designed to test Practical skills of students. Its overall weight age should be 60%. It will comprise of written exam (10%), practical (70 %) and viva/oral exam (20%).

A standards-referenced approach will be adopted for grading and reporting student performance. The purpose of this approach is to recognize what each student can do the in the subject at the end of the 2-year secondary school level education. The performance of each student will be matched against a set of performance standards, rather than comparing to the performance of other students. It makes the implicit standards explicit by providing specific indication of individual student performance. Descriptions will be provided for the set of standards.

Guidelines for Writing a Textbook

A textbook is an important teaching and learning resource and one of the most extensively used resources in classrooms. To reflect national needs and aspirations the needs and aspirations, the textbooks should be written in accordance with this curriculum. This curriculum meets not only the general aims and objectives but also fulfills the specific requirements of the individual subject. As the textbook serves as a framework for teaching, the author/authors should consider the following features:

- A textbook must include an introduction to the textbook, explaining how to use the textbook
- The textbook must be in line with the National Curriculum, covering all SLOs of each theme or concept.
- Content and illustrations must be culturally, contextually and age appropriate.
- All text and material must be accurate, up-to-date and error-free.
- The continuity of the concepts, their integration and logical development should be ensured.
- Horizontal and vertical overlapping of the concepts should be avoided.
- The textbook should be informative and interactive with questions to be put at suitable intervals to provoke the students to think.
- The language used should be simple, clear, straight forward, unambiguous, and easily comprehensible by the students of the level.
- Simple questions may be asked within the chapter, which requires students to recall, think, and apply what they have just learnt as well as to reinforce the learning of the concepts and principle.
- The examples and applications should be from everyday life and be supportive of our cultural values.
- Photographs and illustrations should be clear, labeled, and supportive of the text. Tables, flow charts and graph may be given wherever needed.
- Key points at the end of each chapter should provide a summary of the important concepts and principles discussed in the chapter.
- End-of-the-Chapter exercises must include a variety of assessment styles based on levels of Bloom's Taxonomy. These should encourage students to think, develop skills, and use information for a variety of purposes.
- Textbooks should be free from all kinds of biases including, gender, religion, occupation, social background etc.
- To make the students self-learner use of IT based resources may be encouraged. Relevant internet links and other online resources may be included.
- Glossary of the new vocabulary must be included.

Guideline for planning and writing a chapter

The textbook author may decide the titles of each chapter and can choose to cover students' learning outcomes (SLOs) from any themes in developing the content of the chapter. The textbook author must also keep in mind that a number of SLOs cannot be addressed in the text (as if this is done it would lead students to simply memorize the text and not serve the

realization of the curriculum). These SLOs could be realized through questions and practical activities within and at the end of the chapter exercises.

- Learning outcomes must be given at beginning of each chapter.
- Decide on key ideas, facts, concepts, skills, and values that can be developed.
- Illustrations must clearly convey the desired concept.
- Activities must demand from students to do inquiry and problem solving according to grade level.
- Ensure that the content is up to date, accurate and developmentally appropriate.
- Contents must be in line with chapter outcomes.
- Language must be consistent, culturally appropriate, and grammatically correct (as if talking to a group).
- Language must engage and hold reader's attention.
- Recall previous learning, where possible.
- Structure the writing so that the sentence is simple, paragraphs deal with single ideas etc.
- Interesting information in the form of tidbits, fact file, point to ponder etc. must be given.
- Write a summary/concept map at end of each chapter, reviewing key knowledge and skills.
- End-of-chapter exercises
- Recall and integrate previous learning
- Engage students and develop their creativity
- Move from lower to higher order thinking
- Focus on multiple intelligences
- Keep the text contextually relevant in line with local teaching andlearning.
- Provide website links for further research

Guidelines for Writing Learner Workbook

Workbooks are books that contain writing activities and exercises that build upon each chapter in the textbook. Workbook exercises help students to develop conceptual understanding of the concepts dealt with in the text, to develop skills and to apply knowledge to new situations. Basic features of a workbook A workbook should have:

- Various exercises and activities for each chapter, topic, subtopic.
- Exercises and activities that will enable student to develop and practice the content knowledge, skills and higher order thinking.
- Accurate and variety of exercises.
- Clear illustrations/ examples/ explanations to show what students are supposed to do, and/or what product looks like.

- Exercises and activities with a variety of purposeful, stimulating, challenging and innovative items to encourage students to review and practice the knowledge and skills they have learnt.
- Exercises that include both constructed and restricted response items.
- Activities, which requires readily available, acceptable, and affordable materials and resources.

Basic Requirements for Lab (Tools/Equipment)

S.No.	Items
1.	AC & DC Motors
2.	Am-meter
3.	BatteryCharger
4.	Battery CleaningKit
5.	BearingPuller
6.	Bench Vice
7.	Cable / Wire Gauge
8.	Cable Cutter
9.	Cable Knife
10.	Celltester
11.	Chisel
12.	Circuit Boards
13.	Clamp Meter
14.	Combination Plier Set
15.	Disk Grinder
16.	Duct Rod
17.	Earth Tester
18.	Files (set)
19.	Fillergauge
20.	Flux
21.	Generator
22.	Gloves
23.	Hand electricGrinder
24.	Hacksaw
25.	Hammer
26.	Handsaw
27.	Holesaw
28.	Hydrometer
29.	IR Temperature Gun

30.	L Scale
31.	Lugs Punching Machine (Hydraulic
32.	Lux Meter
33.	Magnetic Conductor
34.	Insulation Resistance Tester
35.	Micron Meter
36.	Multi-meter
37.	OTDR Meter
38.	Overall Combination
39.	Phase Sequence Meter
40.	Philips ScrewdriversSet
41.	Ring SpannerSet
42.	Safety Belt
43.	Safety Goggles
44.	Safety Helmet
45.	Safety Shoes
46.	Set of Nose Pliers
47.	Set of Screw Drivers
48.	SolderingIron
49.	SolderingLead
50.	Specific GravityChart
51.	Splicing Machine
52.	Spring tension checkingmeter
53.	Tachometer
54.	Testlamp
55.	Thermometer
56.	Thimble Press Plier
57.	TorqueWrench
58.	Transformer
59.	Voltmeter
60.	Wire Striper
61.	PLC system with all peripheral
62.	Software for PLC programming
63.	Desktop Computers for PLC systems
64.	Training Gadgets(e.g. conveyer belt, lift Elevator, traffic signal etc)