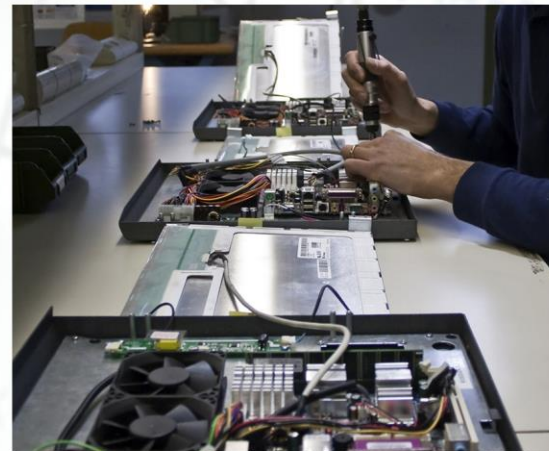
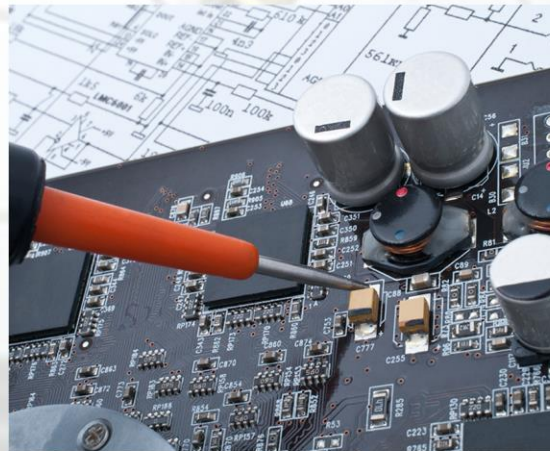


# National Vocational Certificate Level 2 in Electrical-Electronic Assembly

## Competency Standards



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### **Date of approval by NCRC:**

29th -30th October 2014

### **Date of Notification:**

10th December 2014, vide notification no F.2-1/2013-DD(VT)

This curriculum has been produced by the National Vocational & Technical Training Commission (NAVTTCC) with the technical assistance of TVET Reform Support Programme, which is funded by the European Union, the Embassy of the Kingdom of the Netherland, Federal Republic of Germany and the Royal Norwegian Embassy. The Programme has been commissioned by the German Federal Ministry for Economic Cooperation and Development and is being implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.

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## Competency Standards: Electrical & Electronic Assembler (Assistant) - Level 2

### Competency Standard A: Maintain workplace safety

**Overview:** This competency standard is intended for those who carry out electrical operations. People holding credit for this competency standard are able to: Follow safe work procedures; apply tools and equipment safety measures; and follow workplace emergency procedures.

Competency Unit	Performance Criteria	Knowledge and Understanding
<b>A1:</b> Follow safe work procedures	<p><b>P1-</b> Organise and arrange duties, tools, equipment materials and work area</p> <p><b>P2-</b> Use and store PPE</p> <p><b>P3-</b> Perform tasks in a safe manner</p>	<p><b>K1-</b> Company safety SOP/policy; Housekeeping practices; Factors that may influence safety at the workplace, such as anger and stress</p> <p><b>K2-</b> Types of personal protective equipment</p> <p><b>K3-</b> Safety signs and symbols; Isolation and lockout procedures</p>
<b>A2:</b> Apply tools & equipment safety measures	<p><b>P1-</b> Check earthing for safety of equipment</p> <p><b>P2-</b> Store tooling and equipment securely</p>	<p><b>K1-</b> Method of earthing and its effects on safety</p> <p><b>K2-</b> Storage and stacking methods of tools &amp; equipment</p>
<b>A3:</b> Follow workplace emergency procedures	<p><b>P1-</b> Follow safe workplace procedures for dealing with accidents, fires and emergencies within scope of responsibility</p>	<p><b>K-</b> Scope of responsibility; First aid procedures; Fire safety and fire fighting procedures; Risk control measures</p>

**Competency Standard B: Apply continuing professional development**

**Overview:** This competency standard is intended for those who carry out electrical operations. People holding credit for this competency standard are able to: Identify professional development needs; develop professional knowledge, skills and attitudes, and maintain professional proficiency.

Competency Unit	Performance Criteria	Knowledge and Understanding
<b>B1:</b> <b>Identify professional development needs</b>	<b>P1-</b> Discuss professional development needs <b>P2-</b> Identify professional development programmes	<b>K1-</b> Reasons for professional development <b>K2-</b> Access to programmes; Career guidance
<b>B2-</b> <b>Develop professional knowledge, skills and attitudes</b>	<b>P1-</b> Participate in training programmes <b>P2-</b> Document training outcome	<b>K1-</b> Outcomes and relevance of training <b>K2-</b> Report and portfolio writing
<b>B3-</b> <b>Maintain professional proficiency</b>	<b>P1-</b> Identify and use self-study sources <b>P2-</b> Implement self-study plan	<b>K1-</b> Research methods; Access to sources <b>K2-</b> Planning your career

**Competency Standard C: Perform preventive maintenance as part of electrical operations**

**Overview:** This competency standard is intended for those who carry out electrical operations. People holding credit for this competency standard are able to: Plan and prepare for preventive maintenance; perform routine inspections; carry out preventive maintenance; and complete work.

Competency Unit	Performance Criteria	Knowledge and Understanding
<b>C1:</b> <b>Plan and prepare for preventive maintenance</b>	<b>P1-</b> Identify and obtain safety and other regulatory requirements for maintenance <b>P2-</b> Interpret circuit diagrams <b>P3-</b> Identify and select tools and equipment	<b>K1-</b> Safety requirements; Specifications; Hazard identification <b>K2-</b> Drawings and symbols specifications <b>K3-</b> Tools and equipment and calibration thereof
<b>C2:</b> <b>Perform routine Inspection</b>	<b>P1-</b> Check for safety hazards <b>P2-</b> Carry out procedures for routine checks <b>P3-</b> Document results	<b>K1-</b> Inspection requirements <b>K2-</b> Maintenance of electrical instruments and equipment <b>K3-</b> Types of common faults of wiring; Load balance; Safety precautions <b>K4-</b> Test and preventive reports
<b>C3:</b> <b>Carry out preventive maintenance</b>	<b>P1-</b> Perform basic measurements tests <b>P2-</b> Perform minor adjustments and calibrations <b>P3-</b> Replace worn out or damaged parts	<b>K1-</b> Measurement and calculation of electrical parameters <b>K2-</b> Basic operation of appliance and settings to adjust performance <b>K3-</b> Communication skills
<b>C4:</b> <b>Complete work</b>	<b>P1-</b> Complete work related documents and procedures <b>P2-</b> Perform final quality inspection <b>P3-</b> Clean up and store tools, equipment and materials	<b>K1-</b> Importance of documentation; Customer care procedures and techniques <b>K2-</b> Importance of quality; handing over to client <b>K3-</b> Waste disposal procedures; Care of tools and equipment

**Competency Standard D: Perform corrective maintenance as part of electrical operations**

**Overview:** This competency standard is intended for those who carry out electrical operations. People holding credit for this competency standard are able to: Plan and prepare for corrective maintenance; perform troubleshooting; carry out corrective maintenance procedures; and complete work.

Competency Unit	Performance Criteria	Knowledge and Understanding
<b>D1:</b> <b>Plan and prepare for corrective maintenance</b>	<b>P1-</b> Identify and obtain safety and other regulatory requirements for maintenance <b>P2-</b> Interpret circuit diagrams <b>P3-</b> Identify and select tools and equipment	<b>K1-</b> Safety requirements; Specifications; Hazard identification <b>K2-</b> Drawings and symbols specifications <b>K3-</b> Tools and equipment and calibration thereof
<b>D2:</b> <b>Perform troubleshooting</b>	<b>P1-</b> Check for safety hazards <b>P2-</b> Carry out diagnostic procedures <b>P3-</b> Identify faulty parts and/or equipment <b>P4-</b> Analyse system fault	<b>K1-</b> Troubleshooting requirements <b>K2-</b> Identification of electrical faults by checking shape, size and colour of components and parts; Measurement of electrical parameters; Safety precautions <b>K3-</b> Methods of fault identification in electrical components <b>K4-</b> System operations in an electrical environment
<b>D3:</b> <b>Carry out corrective maintenance procedures</b>	<b>P1-</b> Dismantle faulty parts or components <b>P2-</b> Replace or repair faulty parts or components <b>P3-</b> Perform commissioning	<b>K1-</b> Dismantling procedures <b>K2-</b> Replacing and repairing procedures <b>K3-</b> Electrical load management; commissioning procedures
<b>D4:</b> <b>Complete work</b>	<b>P1-</b> Complete work related documents and procedures <b>P2-</b> Perform final quality inspection <b>P3-</b> Clean up and store tools, equipment and materials	<b>K1-</b> Importance of documentation; Customer care procedures and techniques <b>K2-</b> Importance of quality; handing over to client <b>K3-</b> Waste disposal procedures; Care of tools and equipment

**Competency Standard E: Test electrical and electronic parameters**

**Overview:** This competency standard is intended for those who carry out electrical operations. People holding credit for this competency standard are able to: Perform testing; diagnose faults; and remove faults.

Competency Unit	Performance Criteria	Knowledge and Understanding
<b>E1:</b> <b>Perform Testing</b>	<b>P1-</b> Conduct visual inspection <b>P2-</b> Implement testing procedures	<b>K1-</b> Damage identification in terms of cracks, disorder in shape and structure, broken parts <b>K2-</b> Process of different tests; Electrical parameters
<b>E2:</b> <b>Diagnose fault</b>	<b>P1-</b> Interpret test results <b>P2-</b> Implement troubleshooting procedures and identify fault	<b>K1-</b> Interpretation of drawings and circuit diagrams <b>K2-</b> Troubleshooting procedures; Electrical and electronic parameters
<b>E3:</b> <b>Remove faults</b>	<b>P1-</b> Repair or replace component parts <b>P2-</b> Carry out operational testing	<b>K1-</b> Interpretation of drawings and circuit diagrams; product knowledge <b>K2-</b> Product knowledge; Testing procedures and equipment



**Competency Standard F: Assemble electrical and electronic circuits**

**Overview:** This competency standard is intended for those who carry out electrical operations. People holding credit for this competency standard are able to: Plan and prepare for assembling; assemble electrical circuits; assemble electronic circuits; and complete work.

Competency Unit	Performance Criteria	Knowledge and Understanding
<b>F1:</b> <b>Plan and prepare for assembling</b>	<b>P1-</b> Draw wiring layout <b>P2-</b> Identify, obtain and confirm material requirements <b>P3-</b> Prepare tools, equipment and materials <b>P4-</b> Prepare circuit board	<b>K1-</b> Interpretation of drawings, symbols, cable number according to load, and colour coding <b>K2-</b> Material requirements <b>K3-</b> Tools, equipment and materials required for the job <b>K4-</b> Methods of preparing
<b>F2:</b> <b>Assemble electrical circuits</b>	<b>P1-</b> Interpret assembly manual and circuit diagram <b>P2-</b> Install components <b>P3-</b> Perform wiring and connect electrical circuits <b>P4-</b> Carry out operational testing	<b>K1-</b> Interpretation of drawings and circuit diagrams <b>K2-</b> Installation procedures <b>K3-</b> Types of wiring, cables and joints <b>K4-</b> Testing procedures and equipment
<b>F3:</b> <b>Assemble electronic circuits</b>	<b>P1-</b> Design layout <b>P2-</b> Prepare PCB <b>P3-</b> Connect electronic components in PCB <b>P4-</b> Carry out operational testing	<b>K1-</b> Methods of PCB design <b>K2-</b> HNO <sub>3</sub> acid and chemical reactions; Drilling procedure <b>K3-</b> Interpretation of drawings and circuit diagrams; Soldering <b>K4-</b> Testing procedures and equipment
<b>F4:</b> <b>Complete work</b>	<b>P1-</b> Complete work related documents and procedures <b>P2-</b> Perform final quality inspection <b>P3-</b> Clean up and store tools, equipment and materials	<b>K1-</b> Importance of documentation; Customer care procedures and techniques <b>K2-</b> Importance of quality; handing over to client <b>K3-</b> Waste disposal procedures; Care of tools and equipment

**Competency Standard G: Use and maintain electrical tools and equipment**

**Overview:** This competency standard is intended for those who carry out electrical operations. People holding credit for this competency standard are able to: Use electrical tools and equipment; maintain electrical tools, equipment and instruments; maintain batteries; and calibrate measuring equipment.

Competency Unit	Performance Criteria	Knowledge and Understanding
<b>G1:</b> <b>Use electrical tools and equipment</b>	<b>P1-</b> Identify and select tools, equipment and instruments <b>P2-</b> Demonstrate safe use of tools, equipment and instruments	<b>K1-</b> Purpose of electrical tools, equipment and instruments <b>K2-</b> Use of electrical tools, equipment and instruments
<b>G2:</b> <b>Maintain electrical tools, equipment and instruments</b>	<b>P1-</b> Describe preventive maintenance procedures <b>P2-</b> Maintain and/or replace tool insulation <b>P3-</b> Clean and store electrical tools, equipment and instruments	<b>K1-</b> Preventive maintenance; Types of maintenance schedules or programmes for: - Tools - Equipment - Instruments - Machinery - Facilities <b>K2-</b> Types of insulation and reports <b>K3-</b> Storage requirements
<b>G3:</b> <b>Maintain batteries</b>	<b>P1-</b> Determine state of charge <b>P2-</b> Maintain electrolyte level <b>P3-</b> Charge batteries	<b>K1-</b> Types of batteries <b>K2-</b> Role of electrolyte <b>K3-</b> Charging procedures
<b>G4:</b> <b>Calibrate measuring instruments</b>	<b>P1-</b> Check calibration of measuring instruments <b>P2-</b> Document and interpret calibration procedure <b>P3-</b> Calibrate measuring instrument	<b>K1-</b> Types and methods of calibration <b>K2-</b> Types of calibration reports <b>K3-</b> Types and methods of calibration

**Documents, policies, guidelines:**

- International Labour Organisation (ILO) Standards on Occupational Health and Safety
- Pakistan Electricity Act, 1910 and subsequent amendments
- Institute of Electrical and Electronics Engineers Standards Association (IEEE-SA)
- Industry code of practice

**Tools and Equipment:**

No.	Description	Quantity
1	Personal protective equipment	
2	Tools and equipment for cable works	
3	Hand tools and Powered handheld machine tools	
4	AC power supply 220/110 V	
5	Ampere meter	
6	Analogue and digital trainer	
7	Basic oscilloscope	
8	Blower	
9	Capacitor meter	
10	Clamp Meter (Digital)	

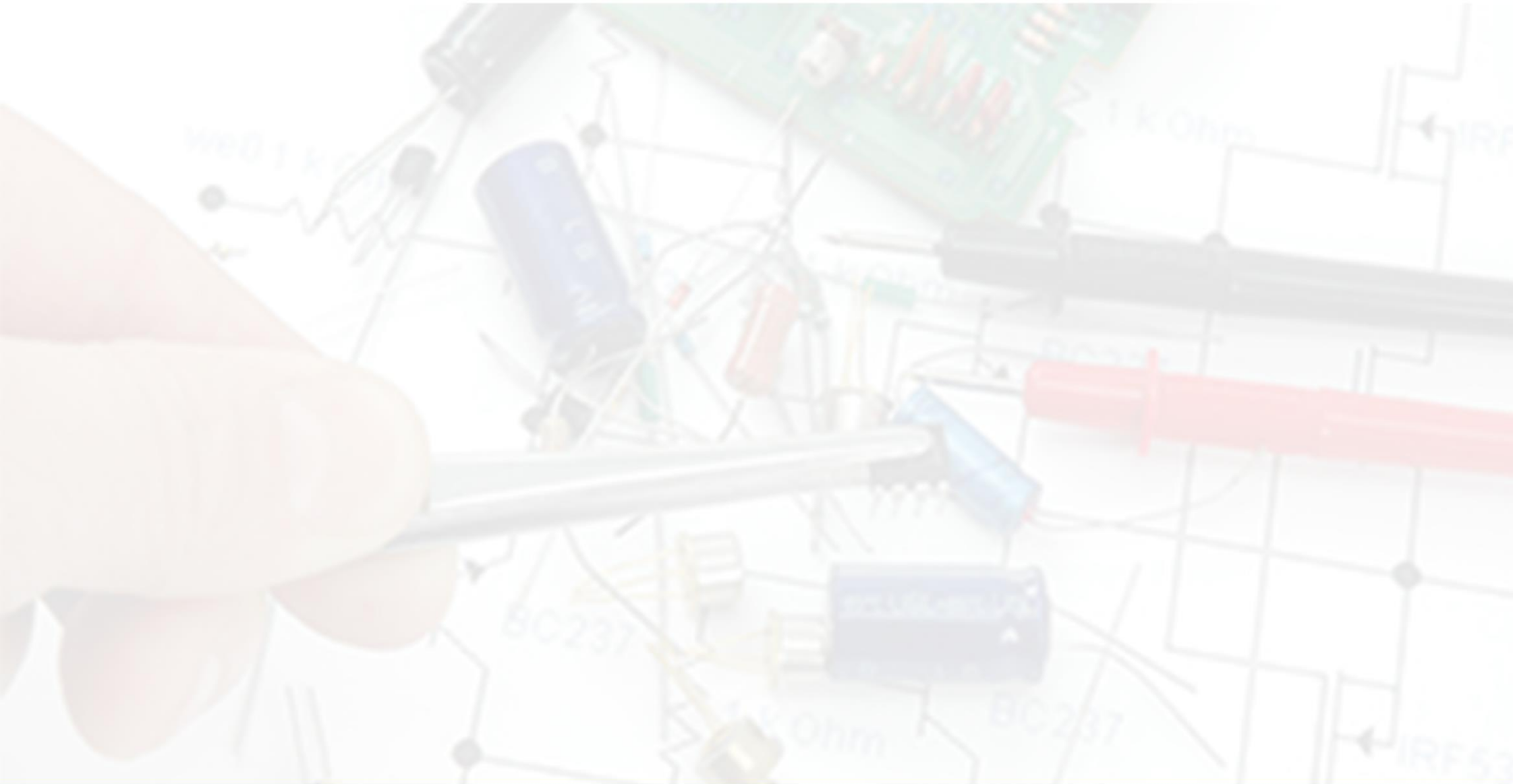
<b>11</b>	Crimping Tools	
<b>12</b>	DC Power Supply	
<b>13</b>	De-soldering gun	
<b>14</b>	Digital & Analogue Multi Meter	
<b>15</b>	Digital winding machine	
<b>16</b>	Drill Machine	
<b>17</b>	EHT probe meter	
<b>18</b>	File Set	
<b>19</b>	Fire extinguisher	
<b>20</b>	First Aid kit	
<b>21</b>	Frequency meter	
<b>22</b>	Gravity Meter	
<b>23</b>	Hacksaw	
<b>24</b>	Hammer set	
<b>25</b>	Heat Gun	
<b>26</b>	IC inserter / exertor kit	
<b>27</b>	Knife Cutter Set	
<b>28</b>	LCR meter	
<b>29</b>	Level meter	
<b>30</b>	L-key set	

<b>31</b>	Magnifier Lamp	
<b>32</b>	Measuring tape	
<b>33</b>	Mega meter	
<b>34</b>	Micro meter	
<b>35</b>	Mini drill machine	
<b>36</b>	Pack machine with strip	
<b>37</b>	PCB vice	
<b>38</b>	Plier set	
<b>39</b>	Project board	
<b>40</b>	Ratchet Set	
<b>41</b>	Screw driver set	
<b>42</b>	Signal generator	
<b>43</b>	Silicon Gun (Glue gun)	
<b>44</b>	Solder Sucker	
<b>45</b>	Soldering Iron with stand	
<b>46</b>	Sound system	
<b>47</b>	Spanner set	
<b>48</b>	Standard wire gauge	
<b>49</b>	Star set	
<b>50</b>	Tuner / watch maker set	
<b>51</b>	Volt meter	
<b>52</b>	Wrench set	

**Consumables:**

No.	Description	Quantity
1	wire 3/29	200m
2	Hock up wire 6 core	100
3	Single way switch 5 Amp	24
4	Two pin socket 5 Amp	24
5	Lamp Holder Piano Type	24
6	Bulb 100W & 200W	24
7	Two pole main switch 10 Amp	03
8	Duck Putty 3*4 inch	01Bundle
9	Fuse 10 Amp	06
10	Insulation Tape	12
11	Samad Bound Elfy	12
12	Board ( Plastic ) 4*4 inch	06
13	Board ( Plastic ) 4*7 inch	06
14	Resistance Different value	500
15	Variable Resistance Different value	100
16	Capacitors Different value	300
17	Transistors Different value	500
18	I.Cs Different value	100
19	Diode 2 Amp & 4 Amp	500

<b>20</b>	Diode ( L E Ds )	Different Colours	100
<b>21</b>	Soldering Iron	60 watts	20
<b>22</b>	Soldering Wire	Quanti Core (60*40)	12
<b>23</b>	Soldering Iron Stand		06
<b>24</b>	Soldering Iron Bitts	60 watts	20
<b>25</b>	Soldering Iron Elements	60 watts	20
<b>26</b>	Coper coated sheet	1*1 feet	05
<b>27</b>	Speakers	6,8,10 inch	06
<b>28</b>	De-Soldering Tools	Solder Sucker	20
<b>29</b>	DVD Mechanism		03
<b>30</b>	DVD Lenz		03
<b>31</b>	DVD Power Supply		03
<b>32</b>	DVD Card		03
<b>33</b>	TV Circuit	TV Kit	03
<b>34</b>	Picture tube (Monitor)	14,15 inch	02
<b>35</b>	Amplifier	LA 4440	06
<b>36</b>	Amplifier	D313,2N3055	06
<b>37</b>	Dack Mechanism	Soft Kit	06
<b>38</b>	Pree Amplifier	Dack Pree	06
<b>39</b>	Bass Tone or Equalizer	Dack Buffer Amplifier	06
<b>40</b>	Transformer	25+25+12 (6 Amp)	06



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