QUALIFICATION FILE

Telecom Electrician (Basic)

☒ Short Term Training (STT) ☐ Long Term Training (LTT) ☒ Apprenticeship

☐ Upskilling ☐ Dual/Flexi Qualification ☒ For ToT ☒ For ToA

☒General ☐ Multi-skill (MS) ☐ Cross Sectoral (CS) ☐ Future Skills ☐ OEM

NCrF/NSQF Level:3

Submitted By:

Telecom Sector Skill Council
Telephone: 0124-4148029
Email: tssc@tsscindia.com

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Section 1: Basic Details

<table>
<tr><td>1.</td><td>Qualification Name</td><td colspan="2">Telecom Electrician (Basic)</td></tr>
<tr><td>2.</td><td>Sector/s</td><td colspan="2">Telecom</td></tr>
<tr><td>3.</td><td>Type of Qualification: ☒ New ☐ Revised ☐ Has Electives/Options ☐OEM</td><td>NQR Code & version of existing/previous qualification: (change to previous, once approved)
NA</td><td>Qualification Name of existing/previous version: NA</td></tr>
<tr><td>4.</td><td>a. OEM Name
b. Qualification Name
(Wherever applicable)</td><td colspan="2">NA</td></tr>
<tr><td>5.</td><td>National Qualification Register (NQR) Code &Version
(Will be issued after NSQC approval)</td><td>QG-03-TL-01996-2024-V1-TSSC</td><td>6. NCrF/NSQF Level: 3</td></tr>
<tr><td>7.</td><td>Award (Certificate/Diploma/Advance Diploma/ Any Other (Wherever applicable specify multiple entry/exits also & provide details in annexure)</td><td colspan="2">Certificate</td></tr>
<tr><td>8.</td><td>Brief Description of the Qualification</td><td colspan="2">The individual in this job role is responsible for optimizing DC and AC circuits with RLC components, operates series and parallel circuits using simulation software, identify DC power supplies, tests power backup systems, and installs surge protection systems. The individual also ensures efficient and reliable telecommunications operations by troubleshooting, inspecting, and adhering to safety protocols.</td></tr>
<tr><td>9.</td><td>Eligibility Criteria for Entry for Student/Trainee/Learner/Employee</td><td colspan="2">a. Entry Qualification & Relevant Experience:
<table>
<tr><th>S. No.</th><th>Academic/Skill Qualification (with Specialization - if applicable)</th><th>Required Experience (with Specialization - if applicable)</th></tr>
<tr><td>1.</td><td>10th Grade Pass or equivalent</td><td>No Experience</td></tr>
<tr><td>2.</td><td>9th Grade pass</td><td>1-year relevant experience</td></tr>
<tr><td>2.</td><td>8th Grade pass</td><td>2-year relevant experience</td></tr>
</table>
b. Age: 18 Years</td></tr>
<tr><td>10.</td><td>Credits Assigned to this Qualification, Subject to Assessment (as per National Credit Framework (NCrF))</td><td>13</td><td>11. Common Cost Norm Category (I/II/III) (wherever applicable): I</td></tr>
<tr><td>12.</td><td>Any Licensing requirements for Undertaking Training on This Qualification (wherever applicable)</td><td colspan="2">NA</td></tr>
</table>

<table>
<tr><td>13.</td><td>Training Duration by Modes of Training Delivery (Specify Total Duration as per selected training delivery modes and as per requirement of the qualification)</td><td>☒Offline ☐Online ☐Blended
<table>
<tr><th>Training Delivery Modes</th><th>Theory (Hours)</th><th>Practical (Hours)</th><th>OJT Mandatory (Hours)</th><th>OJT Recommended (Hours)</th><th>Total (Hours)</th></tr>
<tr><td>Classroom (offline)</td><td>120:00</td><td>150:00</td><td>120:00</td><td>00:00</td><td>390:00</td></tr>
<tr><td>Online</td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
(Refer Blended Learning Annexure for details)</td></tr>
<tr><td>14.</td><td>Aligned to NCO/ISCO Code/s (if no code is available mention the same)</td><td>NCO-2015/7422.9900</td></tr>
<tr><td>15.</td><td>Progression path after attaining the qualification (Please show Professional and Academic progression)</td><td>Vertical progression
NSQF Level 4 – Telecom Electrician (Advanced)</td></tr>
<tr><td>16.</td><td>Other Indian languages in which the Qualification & Model Curriculum are being submitted</td><td>Hindi</td></tr>
<tr><td>17.</td><td>Is similar Qualification(s) available on NQR-if yes, justification for this qualification</td><td>☐ Yes ☒ No URLs of similar Qualifications:</td></tr>
<tr><td>18.</td><td>Is the Job Role Amenable to Persons with Disability</td><td>☐ Yes ☒ No
If “Yes”, specify applicable type of Disability:</td></tr>
<tr><td>19.</td><td>How Participation of Women will be Encouraged</td><td>Yes, Encouraging the participation of women is essential for promoting gender equality and ensuring that women have equal opportunities in various aspects of society. It is important to provide education, mentorship, and networking opportunities, as well as training and development programs. Flexible work arrangements and promoting successful women in this job role can also inspire and encourage women to pursue careers in this field. Creating a culture of inclusion and diversity can help women feel welcome and valued in this job roles, through policies and practices that support work-life balance, equal pay and promotion opportunities, and a safe and respectful workplace.</td></tr>
<tr><td>20.</td><td>Are Greening/ Environment Sustainability Aspects Covered (Specify the NOS/Module which covers it)</td><td>☒ Yes ☐ No
TEL/N9101</td></tr>
<tr><td>21.</td><td>Is Qualification Suitable to be Offered in Schools/Colleges</td><td>Schools ☒ Yes ☐ No Colleges ☒ Yes ☐ No</td></tr>
<tr><td>22.</td><td>Name and Contact Details of Submitting / Awarding Body SPOC
(In case of CS or MS, provide details of both Lead AB & Supporting ABs)</td><td>Name: Sanjay Mehrotra
Email: sanjay.mehrotra@tsscindia.com
Contact No.: 0124-4148029 Website: https://www.tsscindia.com</td></tr>
<tr><td>23.</td><td>Final Approval Date by NSQC: 31.01.2024</td><td>24. Validity Duration: 3 Years</td><td>25. Next Review Date: 31.01.2027</td></tr>
</table>

Section 2: Module Summary

NOS/s of Qualifications

(In exceptional cases these could be described as components)

Mandatory NOS/s:

Specify the training duration and assessment criteria at NOS/ Module level. For further details refer curriculum document.

***Th.**-Theory **Pr.**-Practical **OJT**-On the Job **Man.**-Mandatory Training **Rec.**-Recommended **Proj.**-Project*

S. No	NOS/Module Name	NOS/Module Code & Version *(if applicable)*	Core/ Non-Core	NCrF/ NSQF Level	Credits as per NCrF	Training Duration (Hours)					Assessment Marks					
						Th.	Pr.	OJT-Man.	OJT - Rec.	Total	Th.	Pr.	Proj.	Viva	Total	Weightage (%) *(if applicable)*
1.	Introduction to the role of a Telecom Electrician (Basic)	Bridge Module	-	3	1	20:00	10:00	00:00	-	30:00	-	-	-	-	-	-
2.	Optimize DC and AC Circuits with RLC Components	TEL/N4306 Version 1.0	Core	3	1	10:00	20:00	00:00	-	30:00	40	50	-	10	100	20
3.	Operate series and parallel circuit using circuit simulation software	TEL/N4307 Version 1.0	Core	3	2	10:00	20:00	30:00	-	60:00	40	50	-	10	100	15
4.	Work with DC power supply system	TEL/N4308 Version 1.0	Core	3	3	20:00	40:00	30:00	-	90:00	40	50	-	10	100	15
5.	Test the power backup system to ensure proper working of DC-DC converter, battery, and controller	TEL/N4309 Version 1.0	Core	3	3	10:00	20:00	60:00	-	90:00	40	50	-	10	100	15
6.	Install the surge protection system	TEL/N4310 Version 1.0	Core	3	1	10:00	20:00	00:00	-	30:00	30	60	-	10	100	15
7.	Organise Work and Resources as per Health and Safety Standards	TEL/N9101 Version 2.0	Non-Core	3	1	10:00	20:00	00:00	-	30:00	30	60	-	10	100	10
8.	Employability Skills (30 Hours)	DGT/VSQ/N0101: Version 1.0	Non-Core	2	1	30:00	00:00	00:00	-	30:00	20	30	-	-	50	10
Duration (in Hours) / Total Marks					**13**	**120:00**	**150:00**	**120:00**	**-**	**390:00**	**240**	**350**	**-**	**60**	**650**	

Elective NOS/s:

S. No	NOS/Module Name	NOS/Module Code & Version *(if applicable)*	Core/ Non-Core	NCrF/NSQF Level	Credits as per NCrF	Training Duration (Hours)					Assessment Marks					
						Th.	Pr.	OJT-Man.	OJT-Rec.	Total	Th.	Pr.	Proj.	Viva	Total	Weightage (%) *(if applicable)*
1.																
2.																
Duration (in Hours) / Total Marks																

Optional NOS/s:

S. No	NOS/Module Name	NOS/Module Code & Version *(if applicable)*	Core/ Non-Core	NCrF/NSQF Level	Credits as per NCrF	Training Duration (Hours)					Assessment Marks					
						Th.	Pr.	OJT-Man.	OJT-Rec.	Total	Th.	Pr.	Proj.	Viva	Total	Weightage (%) *(if applicable)*
1.																
2.																
Duration (in Hours) / Total Marks																

Assessment - Minimum Qualifying Percentage

*Please specify **any one** of the following:*

Minimum Pass Percentage – Aggregate at qualification level: 50% *(Every Trainee should score specified minimum aggregate passing percentage at qualification level to successfully clear the assessment.)*

Minimum Pass Percentage – NOS/Module-wise: ___% *(Every Trainee should score specified minimum passing percentage in each mandatory and selected elective NOS/Module to successfully clear the assessment.)*

Section 3: Training Related

1.	**Trainer's Qualification and experience in the relevant sector (in years)** *(as per NCVET guidelines)*	3 years in Engineering Diploma in (Electrical/Electronics) after 10th with 4 years industrial relevant experience or 8 years of teaching experience OR Graduate (Electrical/Electronics) with 1 years of industry relevant experience or 2 years of teaching experience
2.	**Master Trainer's Qualification and experience in the relevant sector (in years)** *(as per NCVET guidelines)*	Diploma in (Science/Electronics/ Telecom/IT and other related Domains) with 7 years industrial relevant experience OR Graduate (Science/Electronics/ Telecom/IT and other relevant domains) with 4 years of industry relevant experience
3.	**Tools and Equipment Required for Training**	☒Yes ☐No (*If "Yes", details to be provided in Annexure)*
4.	**In Case of Revised Qualification, Details of Any Upskilling Required for Trainer**	NA

Section 4: Assessment Related

1.	**Assessor's Qualification and experience in relevant sector (in years)** *(as per NCVET guidelines)*	3 years in Engineering Diploma in (Electrical/Electronics) after 10th with 4 years industrial relevant experience OR Graduate (Electrical/Electronics) with 1 years of industry relevant experience
2.	**Proctor's Qualification and experience in relevant sector (in years)** *(as per NCVET guidelines)*	Diploma in (Science/Electronics/ Telecom/IT and other related Domains) after 10th with 4 years industrial relevant experience OR Graduate (Science/Electronics/ Telecom/IT and other relevant domains) with 1 years of industry relevant experience
3.	**Lead Assessor's/Proctor's Qualification and experience in relevant sector (in years)** *(as per NCVET guidelines)*	Diploma in (Science/Electronics/ Telecom/IT and other related Domains) with 7 years industrial relevant experience OR Graduate (Science/Electronics/ Telecom/IT and other relevant domains) with 4 years of industry relevant experience
4.	**Assessment Mode** *(Specify the assessment mode)*	Offline or Blended
5.	**Tools and Equipment Required for Assessment**	☒ Same as for training ☐ Yes ☐ No *(details to be provided in Annexure-if it is different for Assessment)*

Section 5: Evidence of the need for the Qualification

Provide Annexure/Supporting documents name.

1.	**Latest Skill Gap Study (not older than 2 years) (Yes/No):** Yes
2.	**Latest Market Research Reports or any other source (not older than 2 years) (Yes/No):** Yes
3.	**Government /Industry initiatives/ requirement (Yes/No):** Yes
4.	**Number of Industry validation provided:**
5.	**Estimated nos. of persons to be trained and employed:** 22,400
6.	**Evidence of Concurrence/Consultation with Line Ministry/State Departments:** *Approved* If "No", why:

Section 6: Annexure & Supporting Documents Check List

Specify Annexure Name / Supporting document file name

1.	**Annexure:** NCrF/NSQF level justification based on NCrF level/NSQF descriptors *(Mandatory)*	Yes
2.	**Annexure:** List of tools and equipment relevant for qualification *(Mandatory, except in case of online course)*	Yes
3.	**Annexure:** Detailed Assessment Criteria *(Mandatory)*	Yes
4.	**Annexure:** Assessment Strategy *(Mandatory)*	Yes
5.	**Annexure:** Blended Learning *(Mandatory, in case selected Mode of delivery is "Blended Learning")*	No
6.	**Annexure:** Multiple Entry-Exit Details *(Mandatory, in case qualification has multiple Entry-Exit)*	Yes
7.	**Annexure:** Acronym and Glossary *(Optional)*	Yes
8.	**Supporting Document:** Model Curriculum *(Mandatory – Public view)*	Yes
9.	**Supporting Document:** Career Progression *(Mandatory - Public view)*	Yes
10.	**Supporting Document:** Occupational Map *(Mandatory)*	Yes
11.	**Supporting Document:** Assessment SOP *(Mandatory)*	Yes
12.	**Any other document you wish to submit:**	No

Annexure: Evidence of Level

NCrF/NSQF Level Descriptors	Key requirements of the job role/ outcome of the qualification	How the job role/ outcomes relate to the NCrF/NSQF level descriptor	NCrF/NSQF Level
Professional Theoretical Knowledge/Process	The job role of a Telecom Electrician (Basic) in India requires individuals to possess a thorough understanding of telecom electrical systems, including the installation, maintenance, and troubleshooting of related equipment. Key requirements include a strong grasp of electrical codes and safety standards, practical skills in working with electrical components, and the ability to analyze and rectify electrical issues. Qualifications for this role are typically aligned with the National Skills Qualification Framework (NSQF) at Level 3, indicating proficiency in the domain. This level descriptor signifies that individuals in this role have the knowledge and skills to work independently, manage tasks, and provide technical solutions within the telecom electrical field, ensuring compliance with established standards and regulations.	The job role of a Telecom Electrician (Basic) in India requires individuals to possess a range of key qualifications and outcomes. These include a strong understanding of electrical systems and safety standards, proficiency in the installation and maintenance of telecom electrical components, the ability to troubleshoot and rectify faults, knowledge of relevant codes and regulations, and effective communication skills for working in a team and with customers. This role is typically aligned with the NSQF Level 3, indicating a requirement for moderate to high-level skills and expertise in telecommunications and electrical systems, ensuring that professionals in this role have the competencies needed to meet industry standards and deliver quality telecom electrical services.	3
Professional and Technical Skills/ Expertise/ Professional Knowledge	Telecom Electricians (Basic) require a combination of professional skills, technical expertise, and specialized knowledge to excel in their role. They should possess strong electrical knowledge and skills, including the ability to identify and mitigate electrical hazards, configure protective devices, and maintain power systems in the telecom industry. Proficiency in understanding and applying relevant electrical codes and standards is crucial. Additionally, Telecom Electricians (Basic) should be adept at installing, maintaining, and troubleshooting electrical components, such as batteries and power backup systems, while ensuring compliance with local and international regulations. Strong problem-solving abilities and the capability to	The job role of a Telecom Electrician (Basic) in India, aligned with the National Career Readiness Framework (NCRF) and National Skills Qualification Framework (NSQF), demands a comprehensive set of professional and technical skills. Professionals in this role must possess expertise in electrical systems, telecommunications infrastructure, and power backup solutions. They should be proficient in conducting risk assessments, ensuring compliance with electrical codes and standards, selecting and configuring protective devices, establishing grounding systems, and performing fault detection and maintenance. Additionally, they need to excel in network topology design, hardware selection, cable installation, and network device configuration. Moreover, a strong understanding of safety protocols,	3

	work collaboratively within a team are essential for success in this role.	emergency response planning, and compliance with local and international regulations is vital. These skills and knowledge are typically associated with NSQF Level 3, representing a high degree of specialization and proficiency in the telecom electrician domain.	
Employment Readiness & Entrepreneurship Skills & Mind-set/Professional Skill	The job role of a Telecom Electrician (Basic) demands a strong set of employment readiness and entrepreneurship skills and a proactive professional mindset. These include excellent problem-solving abilities, technical proficiency in electrical systems, adaptability to rapidly evolving technology, effective communication and teamwork, a commitment to safety and compliance, and a strong work ethic. Telecom Electricians (Basic) should also possess an entrepreneurial mindset, with skills in project management, resource optimization, and the ability to identify opportunities for innovation and cost-effective solutions within the telecommunications industry, ultimately contributing to the efficient and reliable operation of electrical systems in this dynamic field.	Employment Readiness and Entrepreneurship Skills for the job role of a Telecom Electrician (Basic) at the NCrF/NSQF level descriptor encompass the ability to adapt to changing technology, work collaboratively with diverse teams, and demonstrate strong problem-solving and communication skills. This role also requires a proactive approach to learning, staying updated with industry trends, and fostering a safety-conscious mindset. Entrepreneurship skills include an understanding of market trends, customer service orientation, and the capacity to identify opportunities for business growth. A professional skill set for this role involves proficiency in electrical systems, safety protocols, and equipment maintenance, with a strong focus on adhering to regulatory standards and promoting a culture of continuous improvement. This skill combination aligns with NCrF/NSQF level descriptors, emphasizing a balance of practical expertise and essential employability and entrepreneurial competencies.	3
Broad Learning Outcomes/Core Skill	The key learning outcomes and core skills for the job role of a Telecom Electrician (Basic) encompass the ability to install, maintain, and troubleshoot electrical systems and components in the telecommunications industry. This includes identifying and mitigating electrical hazards, ensuring compliance with relevant codes and standards, selecting appropriate protective devices, configuring protection settings, establishing grounding systems, and incorporating redundancy for reliability. Telecom Electricians (Basic) are also	The job role of a Telecom Electrician (Basic) in India aligns with the National Skills Qualifications Framework (NSQF) at various levels, primarily at Level 3. The core skills and broad learning outcomes for this role encompass the ability to install, maintain, and troubleshoot telecom electrical systems, adhere to safety standards and regulations, identify and mitigate potential electrical hazards, work effectively in a team, demonstrate proficiency in power backup systems, and apply electrical codes and standards. Telecom Electricians	3

	expected to conduct arc flash hazard analysis, configure protective relays, implement fault detection methods, and maintain comprehensive documentation. They must continuously assess and improve systems, comply with regulations, and develop emergency response plans. Additionally, they should have skills related to network infrastructure, including designing topologies, selecting hardware, cable routing, and security measures, as well as the ability to troubleshoot network issues and develop contingency plans for emergencies, ensuring optimal telecom system functionality and safety.	(Basic) are expected to have in-depth knowledge and practical expertise in telecom electrical systems, including the design and implementation of protection systems, grounding and bonding, and the configuration of protective devices. They should also excel in documentation, testing, maintenance, and continuous improvement of these systems. At NSQF Level 3, Telecom Electricians (Basic) are skilled professionals capable of performing these tasks autonomously, contributing to the telecommunications industry's efficiency and reliability.	
Responsibility	Telecom Electricians (Basic) are responsible for ensuring the efficient operation of electrical systems in the telecommunications industry. Their key responsibilities include installing, maintaining, and troubleshooting electrical components, such as inverters, batteries, and power backup systems. They must adhere to safety protocols, assess potential hazards, and conduct risk assessments to determine protection levels. Telecom Electricians (Basic) also stay updated with relevant electrical codes and standards, configure protective devices, establish grounding and bonding systems, and perform arc flash hazard analysis to prevent electrical faults and hazards. They work to maintain accurate documentation, develop maintenance plans, and continuously improve systems while complying with local and international regulations. Additionally, they may play a crucial role in emergency response planning and coordination to minimize downtime and ensure safety in the event of electrical faults.	The responsibilities of a Telecom Electrician (Basic) align with the National Skills Qualification Framework (NSQF) Level Descriptor for the job role by requiring individuals to demonstrate competence in installing, maintaining, and troubleshooting telecom electrical systems and power backup equipment. They must conduct risk assessments, adhere to safety standards, and stay updated with relevant codes and regulations (NSQF Level 3). Additionally, they are responsible for configuring protection systems, implementing redundancy for fault tolerance, and ensuring compliance with local and international regulations (NSQF Level 3). Telecom Electricians (Basic) may progress to roles like Lead Electricians and Telecom Electrical Technicians, reflecting an increased proficiency and complexity of tasks associated with NSQF Level 3. As they move into supervisory and management positions, they are required to exhibit advanced skills in team management, project planning, and strategic decision-making, aligning with NSQF Level 3 and beyond.	3

Annexure: Tools and Equipment (Lab Set-Up)

List of Tools and Equipment

Batch Size: 30

S. No.	Tool / Equipment Name	Specification	Quantity for specified Batch size
1	Routers	Key Specifications: Forwarding Rate: Measured in packets per second (pps), determines how quickly the router can process and forward packets. Interface Speeds: Indicate the maximum data transfer rates for each interface, commonly ranging from 100 Mbps to 100 Gbps. Routing Protocols: Supported protocols (e.g., OSPF, BGP, RIP) dictate how the router learns and maintains network paths. Memory: RAM and storage capacity influence performance and route table storage. CPU: Processing power affects overall performance and the ability to handle complex routing tasks. Queue Size: Determines how many packets can be held per interface before congestion occurs. QoS Features: Support for Quality of Service mechanisms ensures prioritization of critical traffic.	1
2	Switches	Key Specifications: Switching Fabric: The core component determining forwarding speed and capacity, commonly based on Ethernet or Fibre Channel. Port Density: The number of available network ports for device connections. Switching Latency: The time required to forward a packet from input to output port, measured in microseconds or nanoseconds. Forwarding Modes: Store-and-forward, cut-through, or fragment-free, each with different latency and error-handling characteristics. VLAN Support: The ability to create virtual LANs for segmentation and traffic isolation. Security Features: Access control lists (ACLs), port security, and other security measures to protect the network.	4
5	Trainer Guide	Dimentions: 21.0 x 29.7 cm Pages 250	30
6	Whiteboard	Dimensions: These whiteboards are typically large, often spanning entire walls in NOCs to visualize network diagrams, performance metrics, and troubleshooting information. Common sizes range from 4 meters x 3 meters to 6 meters x 4 meters or even larger.	1

		Specifications: They utilize specialized surfaces like writable glass, melamine, or high-performance dry-erase paint for optimal clarity and durability. Some advanced whiteboards might even incorporate digital projection capabilities for interactive displays.	
7	Marker	Dry erase markers: These markers are used for writing on whiteboards and other dry erase surfaces. They have a chisel tip and come in a variety of colors. Some popular dry erase marker b	4
8	Projector	BenQ TH585: This Full HD projector is great for both home and office use. It has a brightness of 3500 lumens, a contrast ratio of 10000:1, and a throw ratio of 1.47:1. It also has built-in speakers and supports wireless connectivity. The dimensions are 292 x 222 x 122 mm	1
9	Laptop	Display: 13.4-inch InfinityEdge Full HD (1920 x 1080) display Processor: 11th Gen Intel Core i5-1130G7 processor Memory: 16GB LPDDR4x RAM Storage: 512GB PCIe NVMe SSD Graphics: Intel Iris Xe integrated graphics Battery: Up to 14 hours and 48 minutes of battery life (Mobile Mark 2018) Operating system: Windows 11 Home	1
10	Breadboard	Features: 630 tie point terminal strip, 2 distribution strips 200 points, both side have slot, supoort joining together.Solderless breadboard is easy to use for creating temporary prototypes and experimenting with circuit design.With referencing letters printed on side for easy reference of individual holes.Double side adhesive tape back, it is more easy and convenient to use.Interconnect any components with 26-29 Awg(0.3-0.8mm) wire.	12
11	Multimeter	Material: Bronze, Plastic Display Type: LCD Resistance: 200 Ohm, 2 K Ohm, 2 M Ohm	6
12	Resistors	Tolerance: 5% Power Rating(W): 1/4 Watt Mounting Type: Through-hole (PTH) Type: Carbon Film (CFR)	120
13	Capacitors	2PCS OF 4700UF/25V ELECTROLYTIC CAPACITOR	120
14	Inductors	Material: Core Ferrite Inductance: 220µH Tolerance: ±20% Current Rating (Amps): 2.4A Shielding: Unshielded Operating Temperature: -40°C ~ 105°C Mounting Type: Through-Hole Package/Case: Radial, Vertical (Open) Dimensions (D x W): (14mm x 7.45mm)	5
15	Jumper Wires	40P colored jumper wires Length: 200mm Weight: 30 gm	1

		Compatible with 2.54mm spacing pin headers High quality and in good working condition Durable and reusable	
16	Oscilloscope	Bandwidth of 1 GHz or higher are preferred Oscilloscopes with a sample rate of 2 GSa/s (gigasamples per second) or more are recommended Precise triggering capabilities Memory depth of 1 million points or more is desirable to analyze long bursts of data or capture transient events Price: ₹ 1.5 Lakhs - ₹ 5 Lakhs	2
17	Potentiometers	• Tolerance: ±25% • Power rating: .1W @ 70°C max. • Rotation torque: 15~170gfcm.	120
18	Diodes	Low forward voltage drop High current capability High reliability High surge current capability Package included - 100Pcs 1N4007 Diode 1A 1000V Rectifier Diodes	120
19	Voltage Regulator	Fixed output voltage is 5V Output current is 0.5A Dropout voltage is 2V Maximum DC input voltage is 35V Output transition SOA protection Output voltage tolerance is 4% Operating temperature range 0°C to 125°C Applications: Power Management.	120
20	Grounding electrode	Material Copper, Low Carbon Steel Brand Generic Item Dimensions LxWxH 20 x 20 x 580 Millimeters Shape Cylindrical Item Form Rod Base Material - Low Carbon Steel Base Coating Material - Nickel Coating Material - 99.9% Pure Electrolytic Grade Copper Anode Coating Thickness - 100 Microns Diameter(mm) - 14mm Connectors - SS 304 Grade Nut Bolts Good Corrosion Resistance than Cast Iron/ Hot Dip GI Electrodes	1
21	Earth Tester	Dual Ranges (a) 0 - 10 - 1000 OHM Technical Details Display : 3½ Digits, LCD Dimensions (in mm) : 172 x 98 x 38 (Approx.) Weight : 575 gm (Approx.)	8
22	RF Meter	SKU: TES.INS.19189908 Type of Product: Electromagnetic Radiation Tester Display: 3-1/2 Digits LCD Operating Temperature: 0°C - 50°C	8

		Relative Humidity: <80%RH Input Power: 6F22 9V Battery Weight: 146 g Dimensions (L x W X H) (mm): 63.6 x 31 x 125.8 mmVoltage: 9 V Measurement Range: 1V/m-1999V/m Model No: R-EMR	
23	Safety Equipment	Gloves: Types: Work gloves, cut-resistant gloves, chemical-resistant gloves. Specifications: Vary depending on type and intended use. protection. Description: Cover and protect hands from cuts, abrasions, chemicals, heat, cold, and electrical hazards. Safety Goggles: Types: Chemical splash goggles, impact-resistant goggles Specifications: ANSI Z87.1 safety rating for impact resistance, . Description: Shield eyes from flying debris, chemicals, splashes, harmful radiation, and optical hazards. Ear Protection: Types: Earplugs, earmuffs, canal caps, etc. Specifications: NRR (Noise Reduction Rating) of 25dB. Description: Reduce noise exposure and prevent hearing damage from loud machinery, tools, and other noise sources.	30
24	Ammeters	Model Number: 72 MM Type: Moving Iron Ammeters Power Source: AC Measuring Range: 0-30 A Measurement Accuracy: 2.5 A Width: 2.5 cm Length: 4 cm Weight: 100 g	8
25	Filter Capacitors	ECCN (US): EAR99 Part Status: Active HTS: 8548.90.01.00 Capacitance Value: 220pF Tolerance: 20% Voltage: 50VDC IR (mA): 700 Minimum Insulation Resistance (Ohm): 1G Construction: Flat Mounting: Surface Mount Package/Case: 0805	120

		Minimum Operating Temperature (°C): -55 Maximum Operating Temperature (°C): 125 Product Length (mm): 2 Product Depth (mm): 1.25 Product Height (mm): 0.85 Product Weight (g): 0.012	
26	Data Logger	Multi-use temperature data logger,high accuracy sensor,up to 32,000 recording points A wide measuring range:-22°F~158°F;accuracy:±0.9°F Built-in USB connector, no cable required to download and manage data Up to 6 months battery life, replaceable battery, low power consumption 【Please email/message us for the calibration certificate.】Powerful LCD Indication, more intuition display on key information. 24/7 US Technician Support via Email and Phone.	2
27	Fuses	Voltage: 250V Current Rating: 0.5A to 15A	120
28	Screwdrivers	6.0x0.8mm Two In One Screw Driver, 907, Blade Length: 200 mm Accurately hardened & Tempered to 56-60 HRC. To withstand high torque and high wear resistance properties	10
29	Pliers	Product Dimensions: 18L x 5W Centimeters Handle Material: Rubber	10
30	Voltage sources (Power supplies)	ATX Power Supplies (Desktop Computers): These are the most common. Standard ATX power supplies are around 150mm x 150mm x 86mm. However, high-power ATX supplies can be longer.	1
31	Transformers	Input Voltage 110-240 V Cooling Type Dry Type/Air Cooled Phase Single Phase Brand Step Up Maximum Ambient Air Temperature 40 Degree C Current 100 VA to 2000 VA	1
32	Thicker conductors	Standard sizes: Most common sizes include 16x20x1, 20x25x1, and 24x30x1 inches.	2
33	AC waveform generators	35MHz,125MSa/s And 2Mpts Memory, One Channel Arbitrary Function Generator-DG831	1
34	Impedance and admittance analysers	4 Hz to 8 MHz (Upto 10 MHz special order available) Measurement range : 100 mΩ to 100 MΩ, 10 rangesBasic accuracy : Z : ±0.05%rdg. θ: ±0.03°	1
35	Power factor correction components	Dimensions: Usually compact, fitting within electrical panels.	1
36	Grounding equipment	Grounding Rods: Typical lengths range from 8 feet to 10 feet (2.4 meters to 3 meters) Diameter usually around 1/2 inch to 3/4 inch (12.7 mm to 19 mm)	1

37	ESR meters	ESR Meter, Capacitor, Atlas ESR+, 0.00 Ohms to 40.0 Ohms, 1uF to 22000uF	2
38	Q factor meters	Width: 12-18 inches (30-45 cm) Height: 6-10 inches (15-25 cm) Depth: 12-18 inches (30-45 cm)	2
39	Frequency response analysers	Portable FRAs: These are compact and lightweight, designed for use in the field. They often resemble large handheld devices or small benchtop units. Typical dimensions might be in the range of 20cm x 10cm x 5cm.	2
40	Voltmeters	Pocket-sized voltmeters: These are typically small and lightweight, making them easy to carry and use in tight spaces. They are often used for basic troubleshooting and field service applications. Their dimensions can be as small as 2.5 inches x 1.5 inches x 0.5 inches.	6
41	Power supply unit	The dimensions of a PSU can vary depending on its wattage and features. However, they typically follow a standard ATX form factor, measuring approximately 5.9 inches (15 cm) wide, 3.35 inches (8.5 cm) tall, and 6.3 inches (16 cm) deep. Some high-wattage PSUs may be slightly larger to accommodate additional cooling components.	1
42	Soldering iron and solder	Length: 7-10 inches (17.8-25.4 cm) Tip diameter: 0.03-0.06 inches (0.76-1.52 cm) Handle diameter: 0.5-1 inches (1.27-2.54 cm)	120
43	Resistor	0603 (metric size 1.6 x 0.8 mm) 0805 (metric size 2.0 x 1.2 mm) 1/4 watt (metric size 2.5 x 3.6 mm) 1/2 watt (metric size 3.6 x 6.3 mm) 1 watt (metric size 5 x 10 mm)	1
44	DC-DC Converter	Specification Input Rage: 8-18V DC Output: 24V DC Output Current: 10A(max) Size: 74 X 74 X 32mm(2.91x2.91x1.26) Efficiency: 82-88Percent Weight:0.28Kg Maximum working temperature:80C	1
45	Battery	Width 52 cm Height 28.2 cm Depth 27.5 cm Battery Weight - Dry 27.6 Battery Weight - Wet 51.3 kg	1

46	UPS Systems	Small UPS systems: These are designed for home use or small businesses and typically have dimensions around 10-12 inches tall, 6-8 inches wide, and 12-14 inches deep.	1
47	Surge protection devices (SPDs)	Point-of-use SPDs: These are typically small, plug-in devices designed to protect individual electronic devices like computers, TVs, and gaming consoles. They can range in size from a few inches long to a few feet long, depending on the number of outlets they offer.	1
48	Impedance measuring tools	LCR meters: These are also handheld but tend to be slightly larger than multimeters, measuring around 8-10 inches in length and 3-4 inches wide.	6

Classroom Aids

The aids required to conduct sessions in the classroom are:

1. Projector
2. Computer/laptops
3. Internet connectivity

Annexure: Industry Validations Summary

Provide the summary information of all the industry validations in table. This is not required for OEM qualifications.

S.l No	Organization Name	Representative Name	Designation	Contact Address	Contact Phone No	E-mail ID	LinkedIn Profile *(if available)*
1.	ATL Advisor	Malar	Managing Partner	F-12, DS-IV, Uttarpan, MCC, Ultadanga, Kolkata-700054	9830803100/9073621498	atlfin.co@gmail.com	
2.	Dipti Consultancy Pvt.Ltd.	Ambar Shome	HR Head	EC-48, Ghosh Para, PO – Desh Bandhu Nagar, PS – Rajarhat, 24 Parganas (N), Kolkata, West Bengal India--700059	9874641344	subhro@pkfc.in	
3.	Dreamz Tech Solutions	Kaushiki Mazumder	Recruitment Lead	AQ-7, 6th floor, Ambient Building, Sector V, Saltlake city, Kolkata 700091	033-40040627	marketing@dreamztech.com	
4.	Global Digital Care	Sudip Roy	Founder	AB-189, Salt Lake, Sector -1, Kolkata-700064	9831595105	globaldigitalcare@gmail.com	
5.	Senrysa Technologies Pvt.Ltd.	Triparna Mukherjee	HR – Business Partner & Leadership Acquisition	#601,Godrej Waterside, Tower -1, DP block, Saltlake, Sector V, Kolkata-700091	033-66212222	mail@senrysa.com	
6.	Vipanan Management Services unit of global digital care	Sudip Roy	Founder	10th Floor. Tower B, Unitech Cyber Park, Sector -39, Gurgaon, India - 122003	9831595105	vipananmanagementservices@gmail.com	

7.	RETROFIT TECHNOLOGY PVT LTD	Raj Kishore Raj	Director	Pallavi Palace, Buer Jail Road, Above Indian Bank ATM, Anisabad, Patna	7283080808	rajkishore_raj@hotmail.com	
8.	Brightwell Engineers	M.Sandeep	Electrical supervisor	206/207, Konark Indrayu Mall, Kondhwa (Kh), Pune - 411048	7020646560	brightwellgroupofeng@gmail.com	
9.	Apar Infratel pvt ltd	Sunil Prasad	Coordinator	Plot no. 71, Raksha Enclave Mohan Garden, Uttam Nagar, Near Chat Ghat, New Delhi, West Delhi India - 110059	8240768869	aparinfratel@aparinfratel.in	
10.	Greentech Infratel Private limited	Ashish Solanki	Project Manager	296/3/1, GROUND FLOOR, PORWAL ROAD, LOHEGAON, PUNE, Maharashtra, 411047	7030341414	ashish.solanki87@gmail.com	
11.	M.S Contractor	Manjeet	Electrical supervisor	Jani Khurd, Meerut 250501(U.P)	9911067269	mscontractor.sidq@gmail.com	
12.	Ocean Blue Infra Solutions Pvt Ltd.	KAPIL	Electrical supervisor	A-49, Ramayan South Avenue, Phase-2, Katara Hills, Bhopal, MP-462043	9340317312	oceanblueinfra@obtl.in	
13.	Om Sai Associates	Om Prakash	Supervisor	(B2/5 2nd Floor, Shiwangi tower, Vibhuti Khand, Gomti Nagar, Lucknow – 226010 (UP)	9450440316/9794671111/7007946683	omsaiassociatesgkp@gmail.com	
14.	Parin Electric Corporation	Sandeep Kushavah	Coordinator	S/22-23, Sarthi Complex, Near Ashirwad Hotel, Jashoda Cross Road, Jashodanagar, Ahmedabad-382445, Gujarat	9723454184	sk144507@gmail.com	
15.	R.S. Construction	Jitendra Kumar Chourasia	Director	Bishunpur, P.O-Gomoh, Dist-Dhanbad, Jharkhand - 828401	8757770898	rsconstruction0000@gmail.com	
16.	Radha Krishan Contractor	Sanjeev Kumar	Coordinator	89-2-3/2-1, Opp. HPCL Petrol Bunk Road, Beside Airtel Tower, Morampudi, Rajahmundry - 533107	8886661228	project@radhakrishancontractor.in	
17.	Steelman Telecom Limited	Nirmal	HR	Rishi Tower, Premises No. 02-315, Street No. 315, First Floor, New Town, Kolkata - 700156	9311911490	nirmalendu.sarkar@steelmantelecom.com	
18.	Sumit Enterprises & Fabrication	Mahaling Prabhu Raut	Proprietor	1457/1, AKATE COLONY, MEHETRE VASTI, CHIKHALI, Pune, Maharashtra, 411014, PUNE , Pune , 411014	7020177942	mahalingmali1191@gmail.com/ mahalingmali1191@gmail.com	
19.	AKS Techno	Manoj Choudhary	Supervisor	175, HANSA INDUSTRIAL PARK, DERBASSI- 140 507. MOHALI PB	8789514246	manoj.chaudhary@akstechno.com	

20.	Aleem Enterprises	Ramesh	Supervisor	B-102, Taibah Residency, Opp. Amber Tower, Sarkhej, Ahmedabad – 380055	9940939980/9549015190	aleem.khan@aleementerprises.com	
21.	HKB Rahman Constructions	Bahar Hussain Beg	Director	G-250, Indralok Colony, Krishna Nagar, Lucknow - 226023	9598073740/9889639786		
22.	Infratech constructions	D.R. Arote	Supervisor	Rakshak Nagar Gold, S.No. 4/1/2 Bi-B1, Kharadi Pune - 411014	9373332644	arote.infratech@gmail.com	
23.	Infytel Corporation	Kounik Chakraborty	Director	Webel IT Park (Ph-1), Module 213, DH Block, (Newtown), Action Area 1, Newtown, North 24 Pgs, Pin: 700156	6290440066	kounik.chakraborty@infytel.co.in	
24.	Perfect Power System	Chandan	Supervisor	4th Floor, Krishna Building, S.P. Verma Road, Patna- 800001	9038012039/8873035800/8873035801	chandan.das@telepower.in/ info@perfectpowersystem.com	
25.	Prabhat Construction & Fabricators	Vikram	Supervisor	153, Mitar Nagar, Jhotwara, Jaipur, Rajasthan-302012	9887428142/9928329678/8696329678	mis.project@prabhatconstruction.com/prabhat_construction@yahoo.com/bhanwarlaljpr1@yahoo.in	
26.	Saumya Infraspace	Mukesh Yadav	Supervisor	1208, Swati Crimson and clover, Nr, Shilaj Circle, Ahmedabad, 380059, Gujarat	7435807507	projects@saumyainfraspace.in	
27.	Secured Security Solutions Pvt.Ltd	Ashim Mandal	Director	47/1B , Bose Pukur, KasbaKolkata (W.B)India	0771 – 4287200	info@securedsecuritysolutions.com	
28.	Smart Project	Jafar	Supervisor	235/99, Doctor's Lane, Rohra Plaza, 1st Floor, Room no-164, JC Ghosh Sarani, Chinsurah, Hooghly-712101	9830045838	info@smartproject.co.in	
29.	Tele Power	Jyotirmoy Saha	Director	126, KM Roy Chowdhury Road, Rajpur,24 PGS (S), Kol-700151	9073538374	jyotirmoy.saha@telepower.in	
30.	AQUINT Global Techskill India Pvt Ltd	Nirav Mehta	HOD Training and Placement	1312, Fortune Business Hub, Near Science City, Science City Road, Ahmedabad-380060	8200695636	contact@aquint.com	

Annexure: Training & Employment Details

Training and Employment Projections:

Year	Total Candidates		Women		People with Disability	
	Estimated Training #	Estimated Employment Opportunities	Estimated Training #	Estimated Employment Opportunities	Estimated Training #	Estimated Employment Opportunities
23-24	5400	3500	1000	700	00	00
24-25	7000	5000	3000	1500	00	00
25-26	10000	8000	4000	2500	00	00

Data to be provided year-wise for next 3 years

Training, Assessment, Certification, and Placement Data for previous versions of qualifications: NA

Qualification Version	Year	Total Candidates				Women				People with Disability			
		Trained	Assessed	Certified	Placed	Trained	Assessed	Certified	Placed	Trained	Assessed	Certified	Placed

Applicable for revised qualifications only, data to be provided year-wise for past 3 years.

List Schemes in which the previous version of Qualification was implemented: *NA*

1.
2.

Content availability for previous versions of qualifications: NA

☐ Participant Handbook ☐ Facilitator Guide ☐ Digital Content ☐ Qualification Handbook ☐ Any Other:

Languages in which Content is available: NA

Annexure: Blended Learning

Blended Learning Estimated Ratio & Recommended Tools: NA

Refer NCVET "Guidelines for Blended Learning for Vocational Education, Training & Skilling" available on:
https://ncvet.gov.in/sites/default/files/Guidelines%20for%20Blended%20Learning%20for%20Vocational%20Education,%20Training%20&%20Skilling.pdf

S. No.	Select the Components of the Qualification	List Recommended Tools – for all Selected Components	Offline : Online Ratio
1	☐Theory/ Lectures - Imparting theoretical and conceptual knowledge		
2	☐Imparting Soft Skills, Life Skills, and Employability Skills /Mentorship to Learners		
3	☐Showing Practical Demonstrations to the learners		
4	☐Imparting Practical Hands-on Skills/ Lab Work/ workshop/ shop floor training		
5	☐Tutorials/ Assignments/ Drill/ Practice		
6	☐Proctored Monitoring/ Assessment/ Evaluation/ Examinations		
7	☐On the Job Training (OJT)/ Project Work Internship/ Apprenticeship Training		

Annexure: Detailed Assessment Criteria

Detailed assessment criteria for each NOS/Module are as follows:

NOS/Module Name	Assessment Criteria for Performance Criteria/Learning Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
TEL/N4306: Optimize DC and AC Circuits with RLC Components	*DC Circuits*	**13**	**14**	**-**	**6**
	PC1. identify simple components such as resistors, voltage sources, and current sources	2	2	-	-
	PC2. solve Ohm's Law (V = IR) to relate voltage, current, and resistance	1	2	-	1
	PC3. calculate power dissipation using P = IV or P = I^2R	1	2	-	1
	PC4. apply KCL and KVL to solve complex circuits with multiple elements and loops	1	1	-	2
	PC5. resolve and repair any issues related to series and parallel connection for voltage, current and resistance	1	1	-	-
	PC6. choose components with appropriate specifications to match the design requirements	2	1	-	-
	PC7. Minimize power losses by selecting resistors with lower values and efficient components	2	1	-	-
	PC8. use voltage dividers or current dividers to achieve desired voltage or current levels	1	1	-	-
	PC9. balance series and parallel connections to distribute loads and minimize stress on components	1	1	-	1
	PC10. use circuit simulation software to model and analyze circuits before implementing them physically	1	2	-	1
	AC Circuits	**17**	**24**	**-**	**1**
	PC11. simulate AC waveforms with characteristics such as amplitude, frequency, and phase	1	1	-	-
	PC12. analyse AC by converting sinusoidal waveforms into complex numbers, considering magnitude and phase angle	1	1	-	-
	PC13. relate uniform load distribution system to develop electrical circuits for whole beam or slab	2	3	-	-
	PC14. work with Phasor Diagrams	2	5	-	-
	PC15. distribute loads uniformly to avoid overloading specific parts of the circuit	1	1	-	-

	PC16. add capacitors to offset inductive loads and improve the power factor	1	1	-	-
	PC17. use thicker conductors with lower resistance to decrease energy loss as heat	1	1	-	-
	PC18. employ voltage regulators to maintain a stable output voltage despite varying loads	1	1	-	-
	PC19. install filters to reduce harmonics, which can distort waveforms and cause inefficiencies	1	1	-	-
	PC20. choose transformers with high efficiency and appropriate turns ratios for voltage transformation	1	1	-	-
	PC21. ensure proper grounding to improve safety and signal integrity	1	1	-	-
	PC22. select components with lower ESR (Equivalent Series Resistance) and higher Q factors for better performance	1	1	-	1
	PC23. avoid operating at resonant frequencies that can lead to excessive currents and voltage magnification	1	2	-	-
	PC24. prevent overheating by designing circuits that efficiently dissipate heat	2	4	-	-
	RLC Circuits and Resonance	**10**	**12**	**-**	**3**
	PC25. analyze the circuit using Kirchhoff's laws and impedance/admittance relationships to determine current, voltage, and resonance conditions	1	1	-	1
	PC26. choose appropriate component values (R, L, C) based on desired frequency response and application requirements	2	3	-	1
	PC27. design for resonance frequency if you need a specific peak response	1	1	-	-
	PC28. consider the trade-offs between bandwidth and Q-factor for your application	1	1	-	-
	PC29. implement power factor correction to improve system efficiency and reduce costs	1	1	-	-
	PC30. simulate and analyze the circuit using software tools like SPICE to predict its behavior accurately	1	2	-	1
	PC31. regularly monitor and maintain the circuit's performance, especially in power factor correction setups	1	1	-	-

	PC32. analyze the circuit's behavior across a range of frequencies. At resonance, the current is maximized, and voltage across the components can be significantly affected	2	1	-	-
	Total Marks	**40**	**50**	**-**	**10**
TEL/N4307: Operate series and parallel circuit simulation software	*Practical Electrical Exercises*	**40**	**50**	**-**	**10**
	PC1. choose Circuit Simulation Software like LTSpice, CircuitLab, Tinkercad, and Multisim	4	5	-	1
	PC2. open the simulation software and create a new project or circuit design	4	5	-	2
	PC3. connect the components as per the circuit design	3	8	-	1
	PC4. set the resistance values for the resistors and the voltage values for the voltage sources	7	5	-	1
	PC5. insert an ammeter (current measurement tool) in series with the circuit to measure the current	6	9	-	2
	PC6. insert a voltmeter (voltage measurement tool) across each resistor to measure the voltage drops	6	4	-	1
	PC7. run the simulation and observe the results	3	7	-	1
	PC8. observe how changing values affect current distribution, voltage drops, and overall circuit behaviour	7	7	-	1
	Total Marks	**40**	**50**	**-**	**10**
TEL/N4308: Work with DC power supply system	*Introduction to DC Power Systems*	**30**	**35**	**-**	**5**
	PC1. identify the voltage (V) and current (I) requirements for different electrical devices like batteries, inverters, UPS, circuit boards and others electrical devices	3	4	-	1
	PC2. choose the type DC power supplies	3	3	-	1
	PC3. ensures that the output voltage remains constant even if the input voltage or load changes	4	4	-	-
	PC4. choose a transformer that converts your input AC voltage to the desired output AC voltage	3	3	-	-
	PC5. place a capacitor across the rectified output to smoothen the pulsating DC voltage	2	3	-	-
	PC6. ensures a steady output voltage	2	4	-	1
	PC7. to limit the maximum current, especially for protection purposes	2	3	-	-
	PC8. calculate the required transformer turns ratio	3	2	-	1

	PC9. connect the components as per design	2	3	-	-
	PC10. power up the circuit and measure the output voltage and current using a multimeter	4	3	-	-
	PC11. adjust the voltage regulator if necessary to achieve the desired output voltage	2	3	-	1
	Rectifiers and Power Conversion	**10**	**15**	**-**	**5**
	PC12. work with AC waveform which is allowed to pass through, while the other half is blocked	2	6	-	1
	PC13. utilizes both halves of the AC input waveform	3	2	-	2
	PC14. reduce the ripple (fluctuations) in the pulsating DC waveform, a filter capacitor is added to the circuit	2	4	-	2
	PC15. convert voltage regulation and can provide galvanic isolation between input and output circuits	3	3	-	-
	Total Marks	**40**	**50**	**-**	**10**
TEL/N4309: Test the power backup system to ensure proper working of DC-DC converter, battery and controller	*DC-DC Converters and Voltage Regulation*	**24**	**45**	**-**	**8**
	PC1. ensure that the power backup system is properly assembled and connected, including the DC-DC converter, battery, controller, and any associated components	2	3	-	-
	PC2. check for any loose connections or damaged components before starting the testing process	1	2	-	1
	PC3. work in a well-ventilated area to prevent exposure to fumes or gases	1	-	-	-
	PC4. connect a variable DC power supply to the input of the DC-DC converter	1	2	-	1
	PC5. set the input voltage to the typical operating range of the DC-DC converter	1	-	-	1
	PC6. measure the output voltage of the DC-DC converter using a multimeter or an oscilloscope	1	3	-	1
	PC7. gradually change the input voltage while monitoring the output voltage	1	2	-	-
	PC8. connect a stable load (resistor, electronic load, or equivalent) to the output of the DC-DC converter	1	2	-	-
	PC9. measure the output voltage of the converter with the load connected and varying load conditions	1	3	-	1
	PC10. connect the DC-DC converter to a stable input voltage	1	-	-	-

	PC11. measure the input and output power using appropriate instruments	1	2	-	-
	PC12. calculate the efficiency of the DC-DC converter using the formula: Efficiency (%) = (Output Power / Input Power) * 100	1	-	-	-
	PC13. connect the battery to the DC-DC converter's output and the controller	1	3	-	1
	PC14. monitor the charging process to ensure that the battery voltage rises steadily and does not exceed the safe charging voltage limit	1	2	-	1
	PC15. monitor the discharging process to ensure that the battery voltage remains within the safe discharge voltage range	1	2	-	-
	PC16. connect a known resistive load to the battery output and start discharging	1	3	-	-
	PC17. measure the discharge time until the battery voltage reaches its lower safe limit. Calculate the battery capacity using the formula: Capacity (Ah) = (Current × Discharge Time) / 3600	1	2	-	-
	PC18. test the various functions of the controller, such as input/output voltage regulation, overvoltage/undervoltage protection, and temperature monitoring	1	2	-	1
	PC19. simulate fault conditions to ensure that the controller responds appropriately	1	1	-	-
	PC20. verify that the controller can communicate data accurately and respond to commands	1	2	-	-
	PC21. integrate the DC-DC converter, battery, and controller into the full power backup system	1	3	-	-
	PC22. simulate power outage or disruption scenarios to ensure the system switches to battery power seamlessly	1	3	-	-
	PC23. monitor the system's behavior during transitions and ensure that the voltage regulation, battery charging, and protection mechanisms function as intended	1	3	-	-
	Power Backup Systems and UPS	**16**	**5**	**-**	**2**
	PC24. determine the power capacity (measured in volt-amperes or watts) required for the devices you want to protect	3	1	-	-
	PC25. choose between online, offline, and line- interactive UPS systems based on your needs	2	1	-	1

	PC26. plug the UPS into a power outlet	4	-	-	-
	PC27. connect the devices you want to protect to the UPS's output sockets	3	-	-	1
	PC28. connect the UPS to your computer if you want to monitor its status and configure settings	4	3	-	-
	Total Marks	**40**	**50**	**-**	**10**
TEL/N4310: Install the surge protection system	*Practical DC Power Systems Exercises*	**30**	**60**	**-**	**10**
	PC1. determine the critical electrical and electronic equipment that need protection	2	6	-	1
	PC2. assess the potential sources of surges, such as lightning strikes, power grid fluctuations, and electromagnetic interference	3	6	-	1
	PC3. select the appropriate types of surge protection devices based on your assessment: Type 1 for service entrance, Type 2 for distribution boards, and Type 3 for individual devices.	4	3	-	1
	PC4. ensure that the chosen SPDs have voltage ratings suitable for system's operating voltage	3	4	-	1
	PC5. install SPDs at strategic points where electrical surges are likely to enter your system	2	4	-	-
	PC6. follow grounding standards and guidelines to create a low-resistance path for surge currents to dissipate	2	4	-	1
	PC7. use appropriate wiring and cables to connect the SPDs to the system. Keep wire lengths short and avoid sharp bends to minimize impedance	2	4	-	1
	PC8. ensure coordination between different types of SPDs to prevent unwanted interaction and improve overall protection	2	4	-	1
	PC9. install a Type 1 SPD at the main electrical service entrance to divert high-energy surges	4	5	-	1
	PC10. connect it to the main grounding system and the supply lines	2	5	-	1
	PC11. test the SPDs to ensure they're working as intended. Some SPDs come with built-in indicators or monitoring systems	2	5	-	1
	PC12. inspect and maintain the surge protection system	1	5	-	-
	PC13. replace SPDs if they've been subjected to a significant surge event or if their performance is compromised	1	5	-	-

	Total Marks	40	50	-	10
TEL/N9101: Organize Work and Resources as per Health and Safety Standards	*Perform work as per quality standards*	**4**	**9**	-	**2**
	PC1. keep workspace clean and tidy	-	1	-	-
	PC2. perform individual role and responsibilities as per the job role while taking accountability for the work	1	1	-	1
	PC3. record/document tasks completed as per the requirements within specific timelines	-	1	-	1
	PC4. implement schedules to ensure timely completion of tasks	-	2	-	-
	PC5. identify the cause of a problem related to own work and validate it	2	2	-	-
	PC6. analyse problems accurately and communicate different possible solutions to the problem	1	2	-	-
	Maintain safe, healthy and secure working environment	**16**	**27**	-	**4**
	PC7. comply with organisation's current health, safety, security policies and procedures	1	1	-	-
	PC8. check for water spills in and around the work space and escalate these to the appropriate authority	1	2	-	1
	PC9. report any identified breaches in health, safety, and security policies and procedures to the designated person	1	2	-	1
	PC10. use safety materials such as goggles, gloves, ear plugs, caps, ESD pins, covers, shoes, etc.	1	2	-	1
	PC11. avoid damage of components due to negligence in ESD procedures or any other loss due to safety negligence	2	3	-	1
	PC12. identify hazards such as illness, accidents, fires or any other natural calamity safely, as per organisation's emergency procedures, within the limits of individual's authority	2	1	-	-
	PC13. participate regularly in fire drills or other safety related workshops organized by the company	1	3	-	-
	PC14. report any hazard outside the individual's authority to the relevant person in line with organisational procedures and warn others who may be affected	1	3	-	-
	PC15. maintain appropriate posture while sitting/standing for long hours	1	1	-	-

	PC16. handle heavy and hazardous materials with care, while maintaining appropriate posture	1	1	-	-
	PC17. sanitize workstation and equipment regularly	1	2	-	-
	PC18. clean hands with soap, alcohol-based sanitizer regularly	-	1	-	-
	PC19. avoid contact with anyone suffering from communicable diseases and take necessary precautions	-	1	-	-
	PC20. take safety precautions while travelling e.g. maintain 1m distance from others, sanitize hands regularly, wear masks, etc.	1	2	-	-
	PC21. report hygiene and sanitation issues to appropriate authority	1	1	-	-
	PC22. follow recommended personal hygiene and sanitation practices, for example, washing/sanitizing hands, covering face with a bent elbow while coughing/sneezing, using PPE, etc.	1	1	-	-
	Conserve material/energy/electricity	**7**	**16**	**-**	**3**
	PC23. optimize usage of material including water in various tasks/activities/processes	1	2	-	-
	PC24. use resources such as water, electricity and others responsibly	1	2	-	1
	PC25. carry out routine cleaning of tools, machine and equipment	1	2	-	-
	PC26. optimize use of electricity/energy in various tasks/activities/processes	1	3	-	1
	PC27. perform periodic checks of the functioning of the equipment/machine and rectify wherever required	1	3	-	1
	PC28. report malfunctioning and lapses in maintenance of equipment	1	2	-	-
	PC29. use electrical equipment and appliances properly	1	2	-	-
	Use effective waste management/recycling practices	**3**	**8**	**-**	**1**
	PC30. identify recyclable, non-recyclable and hazardous waste	1	2	-	1
	PC31. deposit recyclable and reusable material at identified location	1	3	-	-
	PC32. dispose non-recyclable and hazardous waste as per recommended processes	1	3	-	-
	Total Marks	**30**	**60**	**-**	**10**
	Introduction to Employability Skills	**1**	**1**	**-**	**-**
	PC1. understand the significance of employability skills in meeting the job requirements	-	-	-	-
	Constitutional values – Citizenship	**1**	**1**	**-**	**-**

DGT/VSQ/N0101: Employability Skills (30 Hours)	**PC2.** identify constitutional values, civic rights, duties, personal values and ethics and environmentally sustainable practices	-	-	-	-
	Becoming a Professional in the 21st Century	**1**	**3**	**-**	**-**
	PC3. explain 21st Century Skills such as Self- Awareness, Behavior Skills, Positive attitude, self-motivation, problem-solving, creative thinking, time management, social and cultural awareness, emotional awareness, continuous learning mindset etc.	-	-	-	-
	Basic English Skills	**2**	**3**	**-**	**-**
	PC4. speak with others using some basic English phrases or sentences	-	-	-	-
	Communication Skills	**1**	**1**	**-**	**-**
	PC5. follow good manners while communicating with others	-	-	-	-
	PC6. work with others in a team	-	-	-	-
	Diversity & Inclusion	**1**	**1**	**-**	**-**
	PC7. communicate and behave appropriately with all genders and PwD	-	-	-	-
	PC8. report any issues related to sexual harassment	-	-	-	-
	Financial and Legal Literacy	**3**	**4**	**-**	**-**
	PC9. use various financial products and services safely and securely	-	-	-	-
	PC10. calculate income, expenses, savings etc.	-	-	-	-
	PC11. approach the concerned authorities for any exploitation as per legal rights and laws	-	-	-	-
	Essential Digital Skills	**4**	**6**	**-**	**-**
	PC12. operate digital devices and use its features and applications securely and safely	-	-	-	-
	PC13. use internet and social media platforms securely and safely	-	-	-	-
	Entrepreneurship	**3**	**5**	**-**	**-**
	PC14. identify and assess opportunities for potential business	-	-	-	-
	PC15. identify sources for arranging money and associated financial and legal challenges	-	-	-	-
	Customer Service	**2**	**2**	**-**	**-**
	PC16. identify different types of customers	-	-	-	-
	PC17. identify customer needs and address them appropriately	-	-	-	-
	PC18. follow appropriate hygiene and grooming standards	-	-	-	-
	Getting ready for apprenticeship & Jobs	**1**	**3**	**-**	**-**
	PC19. create a basic biodata	-	-	-	-
	PC20. search for suitable jobs and apply	-	-	-	-

	PC21. identify and register apprenticeship opportunities as per requirement	-	-	-	-
	Total Marks	**20**	**30**	**-**	**-**
Grand Total		**240**	**350**	**-**	**60**

Annexure: Assessment Strategy

This section includes the processes involved in identifying, gathering, and interpreting information to evaluate the Candidate on the required competencies of the program.

Mention the detailed assessment strategy in the provided template.

a. Assessment System Overview:
   i. Batches assigned to the assessment agencies for conducting the assessment on SDSM/SIP or email.
   ii. Assessment agencies send the assessment confirmation to VTP/TC looping SSC.
   iii. The assessment agency deploys the ToA certified Assessor for executing the assessment.
   iv. SSC monitors the assessment process & records.

b. Testing Environment:
   i. Confirm that the centre is available at the same address as mentioned on SDMS or SIP.
   ii. Check the duration of the training.
   iii. Check the Assessment Start and End time to be as 10 a.m. and 5 p.m.
   iv. If the batch size is more than 30, then there should be 2 Assessors.
   v. Check that the allotted time to the candidates to complete Theory & Practical Assessment is correct.
   vi. Check the mode of assessment—Online (TAB/Computer) or Offline (OMR/PP).
   vii. Confirm the number of TABs on the ground are correct to execute the Assessment smoothly.
   viii. Check the availability of the Lab Equipment for the particular Job Role.

c. Assessment Quality Assurance levels / Framework:
   i. Question papers created by the Subject Matter Experts (SME).
   ii. Question papers created by the SME verified by the other subject Matter Experts.
   iii. Questions are mapped with NOS and PC.
   iv. Question papers are prepared considering that level 1 to 3 is for the unskilled & semi- skilled individuals, and level 4 and above are for the skilled, supervisor & higher management.
   v. An assessor must be ToA certified & the trainer must be ToT Certified.
   vi. The assessment agency must follow the assessment guidelines to conduct the assessment.

d. Types of evidence or evidence-gathering protocol:
    i. Time-stamped & geotagged reporting of the assessor from assessment location.
    ii. Center photographs with signboards and scheme-specific branding.
    iii. Biometric or manual attendance sheet (stamped by TP) of the trainees during the training period.
    iv. Time-stamped & geotagged assessment (Theory + Viva + Practical) photographs & videos.

e. Method of verification or validation:
    i. A surprise visit to the assessment location.
    ii. A random audit of the batch.
    iii. Random audit of any candidate.

f. Method for assessment documentation, archiving, and access:
    i. Hard copies of the documents are stored.
    ii. Soft copies of the documents & photographs of the assessment are uploaded / accessed from Cloud Storage.
    iii. Soft copies of the documents & photographs of the assessment are stored in the Hard Drives.

Assessment Strategy (Employability Skills 60 hours)

The trainee will be tested for the acquired skill, knowledge and attitude through formative/summative assessment at the end of the course and as this NOS and MC is adopted across sectors and qualifications, the respective AB can conduct the assessments as per their requirements.

Annexure: Acronym and Glossary

Acronym

Acronym	Description
AA	Assessment Agency
AB	Awarding Body
ISCO	International Standard Classification of Occupations
NCO	National Classification of Occupations
NCrF	National Credit Framework
NOS	National Occupational Standard(s)
NQR	National Qualification Register
NSQF	National Skills Qualifications Framework
OJT	On the Job Training

Glossary

Term	Description
National Occupational Standards (NOS)	NOS define the measurable performance outcomes required from an individual engaged in a particular task. They list down what an individual performing that task should know and also do.
Qualification	A formal outcome of an assessment and validation process which is obtained when a competent body determines that an individual has achieved learning outcomes to given standards
Qualification File	A Qualification File is a template designed to capture necessary information of a Qualification from the perspective of NSQF compliance. The Qualification File will be normally submitted by the awarding body for the qualification.
Sector	A grouping of professional activities on the basis of their main economic function, product, service or technology.
Long Term Training	Long-term skilling means any vocational training program undertaken for a year and above. https://ncvet.gov.in/sites/default/files/NCVET.pdf